(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 108 690 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.10.2009 Bulletin 2009/42

(51) Int Cl.:
C09K 11/06 *(2006.01)*

(21) Application number: **09250836.5**

(22) Date of filing: **24.03.2009**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA RS

(30) Priority: **02.04.2008 KR 20080030977**

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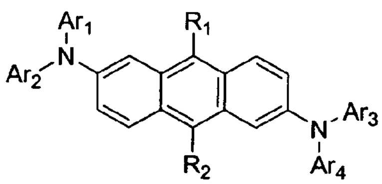
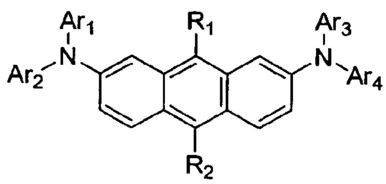
(54) Novel organic electroluminescent compounds and organic electroluminescent device using the same

(57) The present invention relates to novel organic electroluminescent compounds, and organic electroluminescent devices employing the same in an electroluminescent layer. Specifically, the organic electroluminescent compounds according to the invention are **characterized in that** they are represented by Chemical Formula (1) or Chemical Formula (2):

Chemical Formula 1



Chemical Formula 2



provided that the total number of carbons in R_1 or R_2 is from 21 to 60.

Since the organic electroluminescent compounds according to the invention have good luminous efficiency and excellent life property of material, organic electroluminescent devices having high color purity and luminance with very good operation life can be manufactured therefrom.

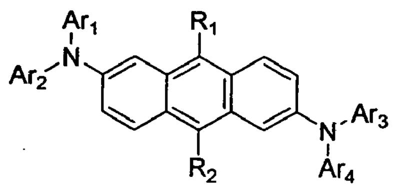
Printed by Jouve, 75001 PARIS (FR)

Description

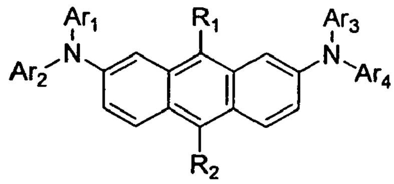
FIELD OF THE INVENTION

[0001] The present invention relates to novel organic electroluminescent compounds, and organic electroluminescent devices employing the same in an electroluminescent layer. Specifically, the organic electroluminescent compounds according to the present invention are represented by Chemical Formula (1) or Chemical Formula (2):

Chemical Formula 1



Chemical Formula 2



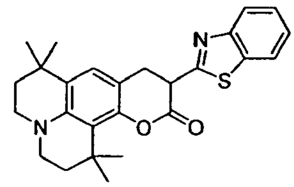
wherein, R_1 and R_2 independently represent (C6-C60)aryl or (C5-C60)heteroaryl, and the aryl and heteroaryl may be further substituted by one or more substituent(s) selected from halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, halo(C1-C30)alkyl, halo(C1-C30)alkoxy, (C1-C30)alkyl(C6-C30)aryl, (C6-C30)ar(C1-C30)alkyl, (C6-C30)ar(C1-C30)alkoxy, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro and hydroxyl, provided that the total number of carbons in R_1 or R_2 is from 21 to 60;

[0002] Ar_1 through Ar_4 independently represent hydrogen, halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro and hydroxyl; and the alkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, arylsilyl, alkylsilyl, alkylamino and arylamino of Ar_1 through Ar_4 may be further substituted by one or more substituent(s) selected from halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5-or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro and hydroxyl.

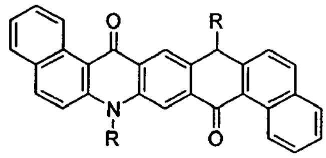
BACKGROUND OF INVENTION

[0003] The most important factor in developing organic electroluminescent devices of high efficiency and long life is development of electroluminescent material of high performance. In view of current development of electroluminescent material, green electroluminescent materials show superior electroluminescent property to red or blue electroluminescent materials. However, conventional green electroluminescent materials still have many problems to achieve manufacturing panels of large size with low power consumption. In view of practical efficiency and life, various kinds of electroluminescent materials for green have been reported up to now. Though they exhibit from 2 to 5 times of electroluminescent property as compared to red or blue electroluminescent materials, development of green electroluminescent material is getting challenged by the improvement of properties of red or blue electroluminescent material. In the meanwhile, enhancement of lifetime of green material is still insufficient, so that a green electroluminescent material providing long life is seriously required.

[0004] As green fluorescent material, a coumarin derivative (Compound D), quinacrydone derivatives (Compound E), DPT (Compound F) and the like have been known. Compound D is the structure of C545T that is the most widely used coumarin derivative up to the present. In general, those materials are doped, by using Alq as the host, at a concentration of several % to about several ten %, to form an electroluminescent device.



Com pound D



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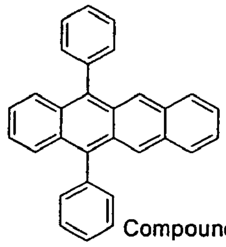
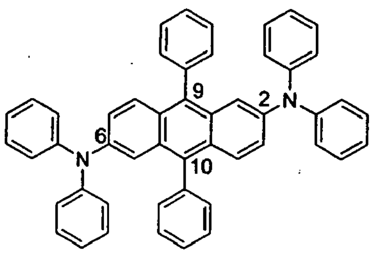
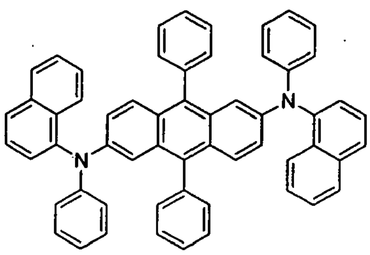


Compound F

[0005] Japanese Patent Laid-Open No. 2001-131541 discloses bis(2,6-diarylamino)-9,10-diphenylanthracene derivatives represented by Compound G shown below, wherein diarylamino groups are directly substituted at 2- and 6-position of anthracene, respectively.



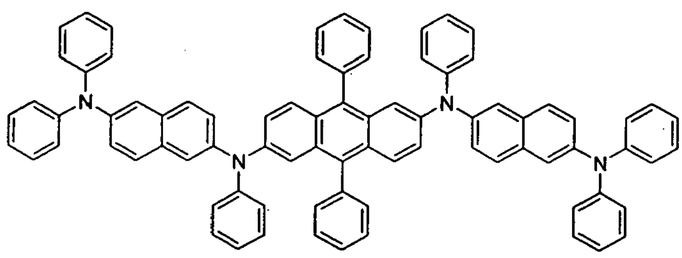
Com pound G



Com pound H

[0006] Japanese Patent Laid-Open No. 2003-146951 (which discloses compounds for a hole transport layer) does not mention the compounds wherein diarylamino groups are directly substituted at 2- and 6-position of anthracene, respectively, but simply describing the compounds having phenyl substituents at 9- and 10-position of anthracene. As considering that Japanese Patent Laid-Open No. 2003-146951 indicated the problem of Compound (H) (wherein diarylamino groups are directly substituted at 2- and 6-position of the anthracene ring, respectively) having poor luminous efficiency, it is found that the invention of Japanese Patent Laid-Open No. 2003-146951 did not recognize the compounds other than those having phenyl substituents at 9- and 10-position of anthracene.

[0007] In the meanwhile, Japanese Patent Laid-Open No. 2004-91334 suggested the organic electroluminescent compounds represented by Compound (J), which overcomes poor luminous efficiency of conventional compounds but exhibits low ionization potential and excellent hole transportation, by further substituting the aryl group of the diarylamino group with diarylamino groups, even though diarylamino groups are directly substituted on the anthracene group.



Com pound J

[0008] The compounds suggested by Japanese Patent Laid-Open No. 2004-91334 (applied as a hole transport layer), however, show the problem of shortened operation life as a hole transport layer because of too many amine functional groups, even though they showed lowered ionization potential due to many amine functional groups and overcame the problem of increase in hole transporting property.

SUMMARY OF THE INVENTION

[0009] The present inventors found that anthracene compounds, wherein (C21-C60) bulky aryl or heteroaryl is incorporated at the 9- and 10-position, and amino groups having two alkyl, aryl, heteroaryl, cycloalkyl or heterocycloalkyl groups being substituted, respectively, are directly substituted at the 2- and 6-, or 2- and 7-position, show excellent improvement in luminescent properties, and completed the present invention.

[0010] Thus, the inventors have intensively endeavored to overcome the problems described above and to develop novel electroluminescent compounds which can realize an organic electroluminescent device having excellent color purity and luminous efficiency with long life.

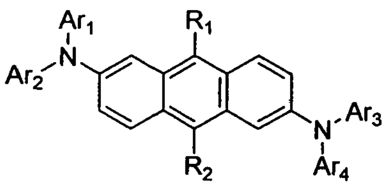
[0011] The object of the invention is to provide novel organic electroluminescent compounds which are anthracene compounds wherein (C21-C60) bulky aryl or heteroaryl is incorporated at the 9- and 10-position, and amino groups having two alkyl, aryl, heteroaryl, cycloalkyl or heterocycloalkyl groups being substituted, respectively, are directly substituted at the 2- and 6- or 2- and 7-position.

[0012] Another object of the present invention is to provide an organic electroluminescent device having an electroluminescent region, by using one or more organic electroluminescent compound(s) described above, together with one or more compound(s) selected from anthracene derivatives and benz[a]anthracene derivatives as electroluminescent host.

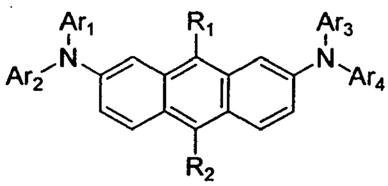
[0013] Thus the object of the present invention is to provide organic electroluminescent compounds having excellent color purity and luminous efficiency with very good device life, and to provide organic electroluminescent devices comprising said novel organic electroluminescent compounds.

[0014] The present invention relates to novel organic electroluminescent compounds and organic electroluminescent devices employing the same in an electroluminescent layer. Specifically, the organic electroluminescent compounds according to the present invention are represented by Chemical Formula (1) or Chemical Formula (2):

【Chemical Formula 1】



【Chemical Formula 2】



wherein, R_1 and R_2 independently represent (C6-C60)aryl or (C5-C60)heteroaryl, and the aryl and heteroaryl may be further substituted by one or more substituent(s) selected from halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, halo(C1-C30)alkyl, halo(C1-C30)alkoxy, (C1-C30)alkyl(C6-C30)aryl, (C6-C30)ar(C1-C30)alkyl, (C6-C30)ar(C1-C30)alkoxy, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro and hydroxyl, provided that the total number of carbons in R_1 or R_2 is from 21 to 60;

[0015] Ar_1 through Ar_4 independently represent hydrogen, halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C1-C60) alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro or hydroxyl; and the alkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, arylsilyl, alkylsilyl, alkylamino and arylamino of Ar_1 through Ar_4 may be further substituted by one or more substituent(s) selected from halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro and hydroxyl.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

Fig. 1 is a cross-sectional view of an organic light emitting diode (OLED).

DETAILED DESCRIPTION OF THE INVENTION

[0017] Referring now to the Drawings, Fig. 1 illustrates a cross-sectional view of an OLED of the present invention comprising a Glass 1, Transparent electrode 2, Hole injecting layer 3, Hole transport layer 4, Electroluminescent layer 5, Electron transport layer 6, Electron injecting layer 7 and Al cathode 8.

[0018] The term "alkyl", "alkoxy" and other subsituents containing "alkyl" moiety include both linear and branched species.

[0019] The term "aryl" described herein means an organic radical derived from aromatic hydrocarbon via elimination of one hydrogen atom. Each ring suitably comprises a monocyclic or fused ring system containing from 4 to 7, preferably from 5 to 6 cyclic atoms. Specific examples include phenyl, naphthyl, biphenyl, anthryl, tetrahydronaphthyl, indanyl, fluorenyl, phenanthryl, triphenylenyl, pyrenyl, perylenyl, chrysenyl, naphthacenyl and fluoranthenyl, but they are not restricted thereto.

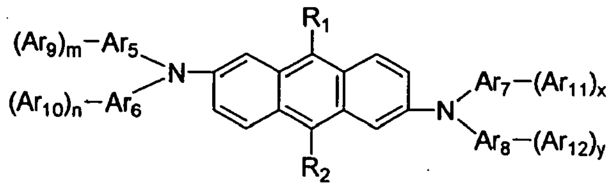
[0020] The term "heteroaryl" described herein means an aryl group containing from 1 to 4 heteroatom(s) selected from N, O and S for the aromatic cyclic backbone atoms, and carbon atom(s) for remaining aromatic cyclic backbone atoms. The heteroaryl may be 5- or 6-membered monocyclic heteroaryl or a polycyclic heteroaryl which is fused with one or more benzene ring(s), and may be partially saturated. Specific examples include monocyclic heteroaryl groups such as furyl, thiophenyl, pyrrolyl, pyranyl, imidazolyl, pyrazolyl, thiazolyl, thiadiazolyl, isothiazolyl, isoxazolyl, oxazolyl, oxadiazolyl, triazinyl, tetrazinyl, triazolyl, tetrazolyl, furazanyl, pyridyl, pyrazinyl, pyrimidinyl, pyridazinyl; and polycyclic heteroaryl groups such as benzofuranyl, benzothiophenyl, isobenzofuranyl, benzimidazolyl, benzothiazolyl, benzisothiazolyl, benzisoxazolyl, benzoxazolyl, isoindolyl, indolyl, indazolyl, benzothiadiazolyl, quinolyl, isoquinolyl, cinnolinyl, quinazolinyl, quinolizinyl, quinoxalinyl, carbazolyl, phenanthridinyl and benzodioxolyl; but they are not restricted thereto.

[0021] The organic electroluminescent compounds of the invention which are represented by Chemical Formula (1) or (2) are characterized by their structure of novel concept which maximizes luminous efficiency of green electroluminescent devices resulted from those compounds and their device life, being unexpected by conventional inventions.

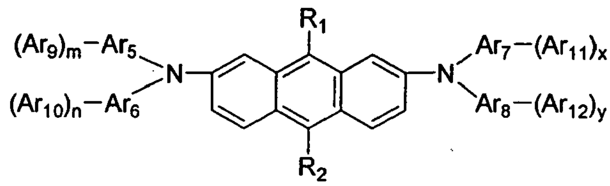
[0022] The organic electroluminescent compounds of Chemical Formula (1) or (2) according to the invention adopted a structure showing an efficient energy transfer mechanism between the host and the dopant, which can realize electroluminescent property with a reliably high efficiency on the basis of improvement in electron density distribution. The structure of the novel compounds according to the present invention can provide a skeletal which can also tune an electroluminescent property with high efficiency in the range from blue to red, not only for green electroluminescence. Beyond the concept of using a host material with high electron conductivity such as Alq, the invention applies a host having appropriate balance of hole conductivity and electron conductivity, thereby overcoming the problems of conventional materials including low initial efficiency and short lifetime, and ensures electroluminescent properties with high performance having high efficiency and long life for each color.

[0023] The organic electroluminescent compounds according to the present invention include those represented by Chemical Formula (3) or (4):

【Chemical Formula 3】

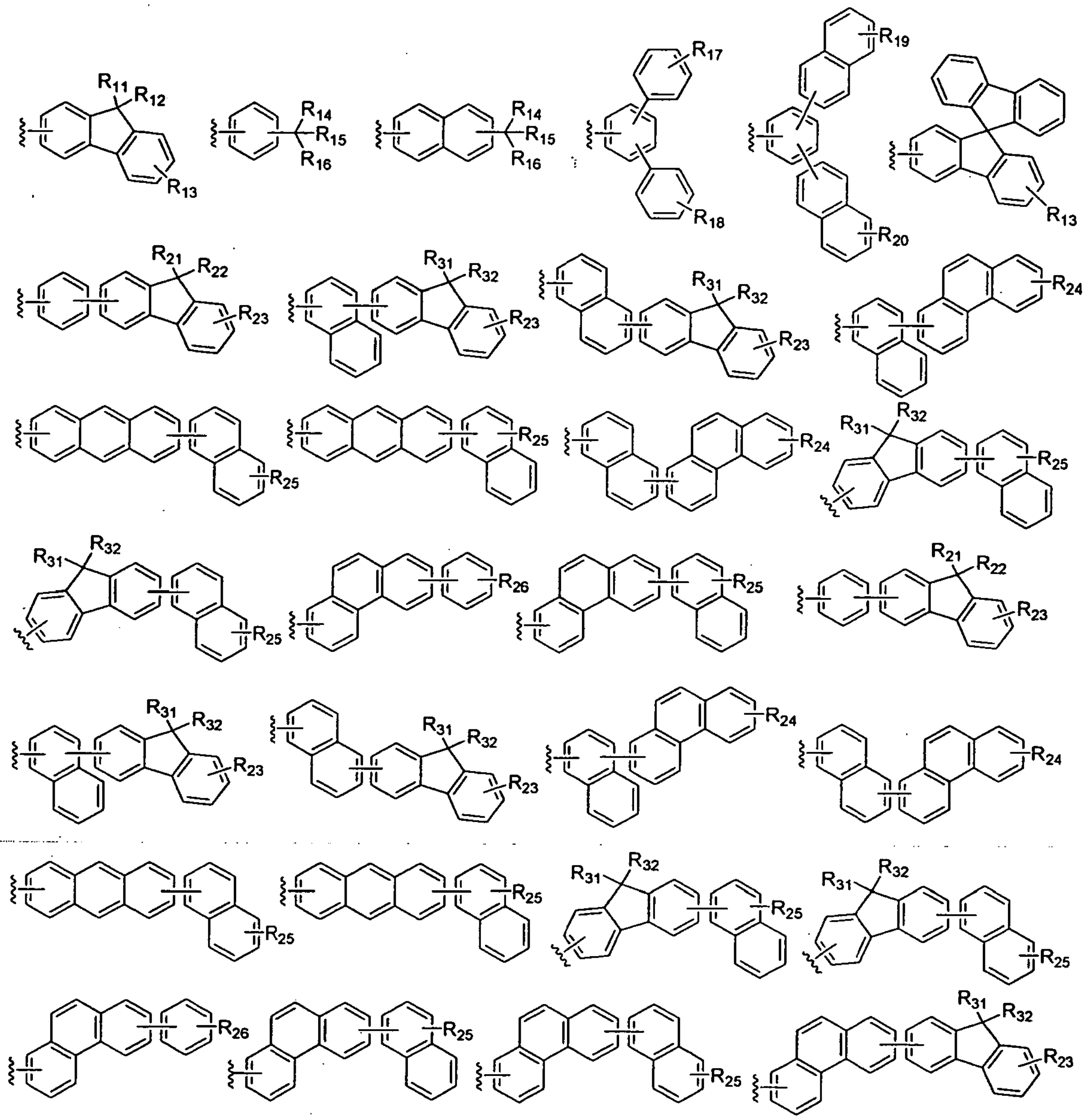


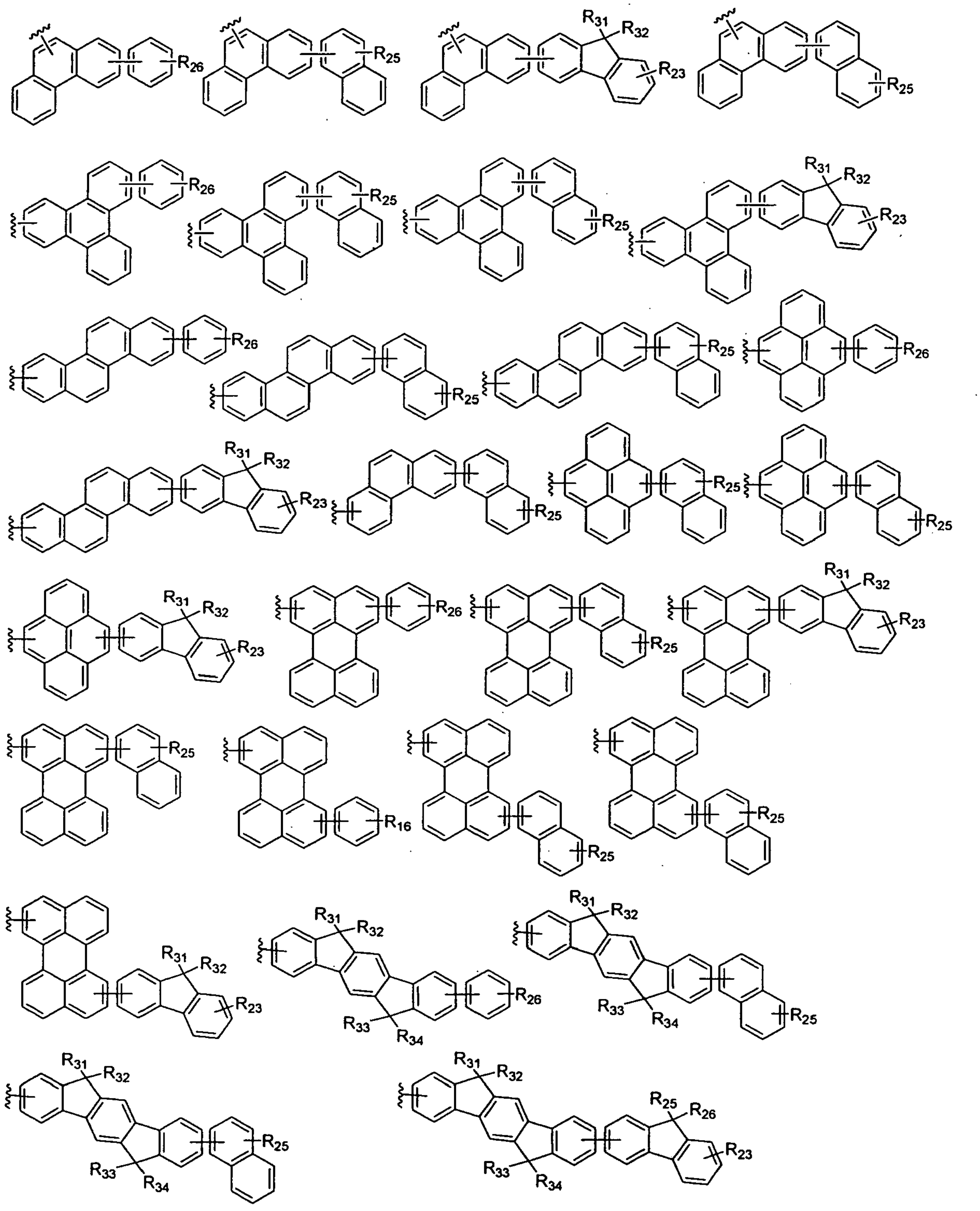
【Chemical Formula 4】



wherein, R_1 and R_2 are defined as in Chemical Formula (1);
Ar_5 through Ar_8 independently represent (C6-C60)aryl, (C4-C60)heteroaryl, (C3-C60)cycloalkyl, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C6-C60)arylene or (C4-C60) heteroarylene; the aryl, heteroaryl, arylene or heteroarylene of Ar_5 through Ar_8 may be further substituted by one or more substituent(s) selected from a group consisting of (C1-C60)alkyl, halo(C1-C30)alkyl, (C1-C30)alkoxy, halo (C1-C30)alkoxy, (C3-C60)cycloalkyl, halogen, cyano, (C1-C30)alkyl(C6-C30)aryl, (C6-C30)ar(C1-C30)alkyl, (C6-C30)ar(C1-C30)alkoxy, tri(C1-C30)alkylsilyl, di(C1-C30)alkyl(C6-C30)arylsilyl and tri(C6-C30)arylsilyl;
Ar_9 through Ar_{12} independently represent (C6-C60)aryl or (C4-C60)heteroaryl; the aryl or heteroaryl of Ar_9 through Ar_{12} may be further substituted by one or more substituent(s) selected from a group consisting of (C1-C60)alkyl, halo(C1-C30)alkyl, (C1-C30)alkoxy, halo(C1-C30)alkoxy, (C3-C60)cycloalkyl, halogen, cyano, (C1-C30)alkyl(C6-C30)aryl, (C6-C30)ar(C1-C30)alkyl, (C6-C30)ar(C1-C30)alkoxy, tri(C1-C30)alkylsilyl, di(C1-C30)alkyl(C6-C30)arylsilyl and tri(C6-C30)arylsilyl;
provided that m is 0 when Ar_5 represents (C6-C60)aryl, (C4-C60)heteroaryl, (C3-C60)cycloalkyl or 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, while m is an integer from 1 to 4 when Ar_5 represents (C6-C60)arylene or (C4-C60)heteroarylene;
n is 0 when Ar_6 represents (C6-C60)aryl, (C4-C60)heteroaryl, (C3-C60)cycloalkyl or 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, while n is an integer from 1 to 4 when Ar_6 represents (C6-C60)arylene or (C4-C60)heteroarylene;
x is 0 when Ar_{11} represents (C6-C60)aryl, (C4-C60)heteroaryl, (C3-C60)cycloalkyl or 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, while x is an integer from 1 to 4 when Ar_{11} represents (C6-C60)arylene or (C4-C60)heteroarylene; and
y is 0 when Ar_{12} represents (C6-C60) aryl, (C4-C60)heteroaryl, (C3-C60)cycloalkyl or 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, while y is an integer from 1 to 4 when Ar_{12} represents (C6-C60)arylene or (C4-C60)heteroarylene.

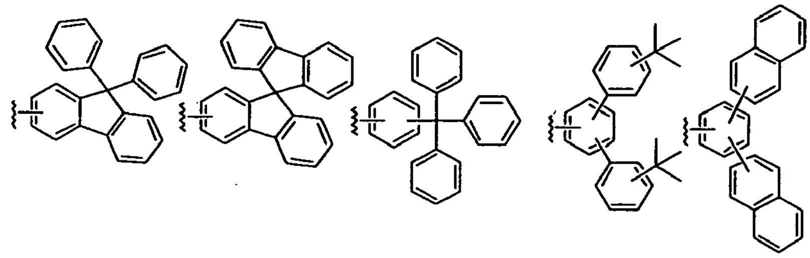
[0024] The term "arylene" described herein means an organic radical derived from aromatic hydrocarbon via elimination of two or more hydrogen atoms. Each ring suitably comprises a monocyclic or fused ring system containing from 4 to 7, preferably from 5 to 6 cyclic atoms. The term "heteroarylene" means organic radicals derived from aromatic heterocyclic compounds via elimination of two or more hydrogen atoms, which may be 5- or 6-membered monocyclic heteroarylene or polycyclic heteroarylene fused with one or more benzene ring(s). The heteroarylene may be partially saturated.
[0025] In Chemical Formula (1) or (2), R_1 and R_2 may be independently selected from the following structures:



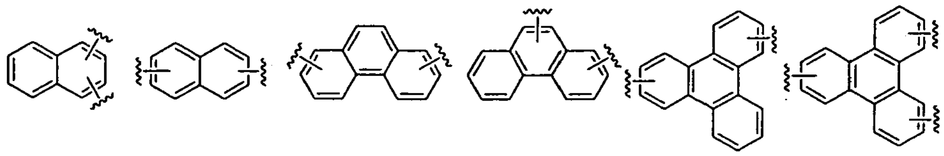


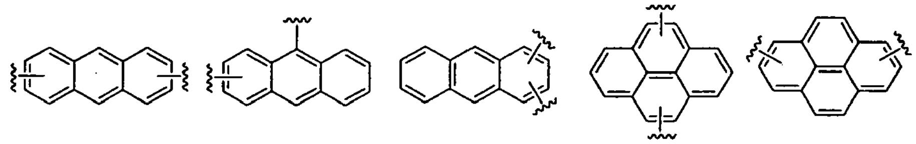
wherein, R_{11} and R_{12} independently represent (C6-C60)aryl, (C1-C30)alkyl(C6-C30)aryl or (C6-C30)ar(C1-C30)alkyl; R_{13} represents hydrogen, (C1-C60)alkyl, (C6-C60)aryl, (C1-C30)alkyl(C6-C30)aryl or (C6-C30)ar(C1-C30)alkyl; R_{14} through R_{16} independently represent (C6-C60)aryl, (C1-C30)alkyl(C6-C30)aryl or (C6-C30)ar(C1-C30)alkyl; R_{17} and R_{18} independently represent (C1-C60)alkyl; R_{19} and R_{20} independently represent hydrogen or (C1-C60)alkyl; R_{21} through R_{26} independently represent (C1-C60)alkyl; and R_{31} through R_{34} independently represent hydrogen or (C1-C60)alkyl.

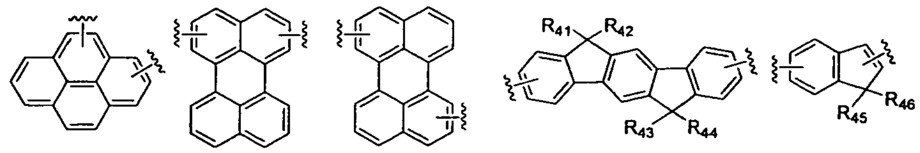
[0026] Preferably, R_1 and R_2 are selected from the following structures:

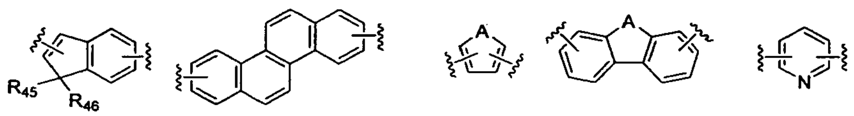


[0027] In Chemical Formulas (3) and (4), Ar_5 through Ar_8 are independently selected from phenyl, biphenyl, naphthyl, anthryl, fluorenyl, phenanthryl, pyrenyl, perylenyl, fluoranthenyl, pyridyl, quinolyl, furanyl, thiophenyl, thiazolyl, imidazolyl, oxazolyl, benzofuranyl, benzothiazolyl, benzimidazolyl, benzoxazolyl, morpholino, thiomorpholino, 1,2-phenylene, 1,3-phenylene, 1,4-phenylene, 1,3,4-phenylene, 1,3,5-phenylene, and the following structures:









the phenyl, biphenyl, naphthyl, fluorenyl or benzimidazolyl of Ar_5 through Ar_8 may be further substituted by one or more substituent(s) selected from methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, t-butyl, n-pentyl, i-pentyl, n-hexyl, n-heptyl, n-octyl, 2-ethylhexyl, n-nonyl, decyl, dodecyl, hexadecyl, trifluoromethyl, perfluorethyl, trifluorethyl, perfluoropropyl, perfluorobutyl, methoxy, ethoxy, butoxy, hexyloxy, cyclopropyl, cyclopentyl, cyclohexyl, fluoro, cyano, phenyl, naphthyl, anthryl, trimethylsilyl, triethylsilyl, tripropylsilyl, tri(t-butyl)silyl, t-butyldimethylsilyl, dimethylphenylsilyl and triphenylsilyl;

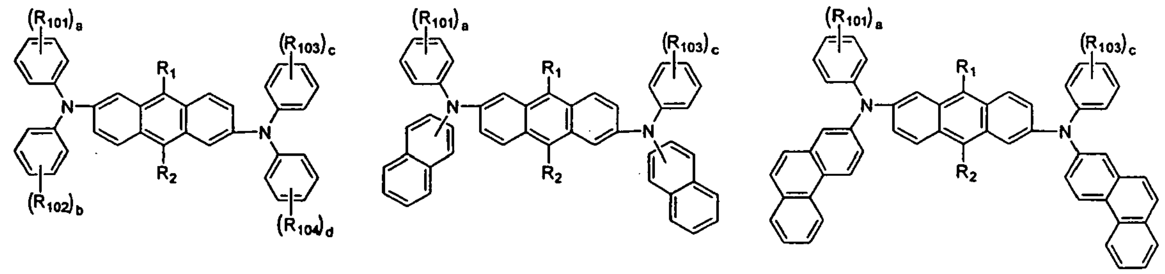
R_{41} through R_{46} independently represent hydrogen, halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro or hydroxyl; or R_{41} and R_{42}, R_{43} and R_{44} or R_{45} and R_{46} may be linked via (C3-C60)alkylene or (C3-C60)alkenylene with or without a fused ring to form an alicyclic ring, or a monocyclic or polycyclic aromatic ring;

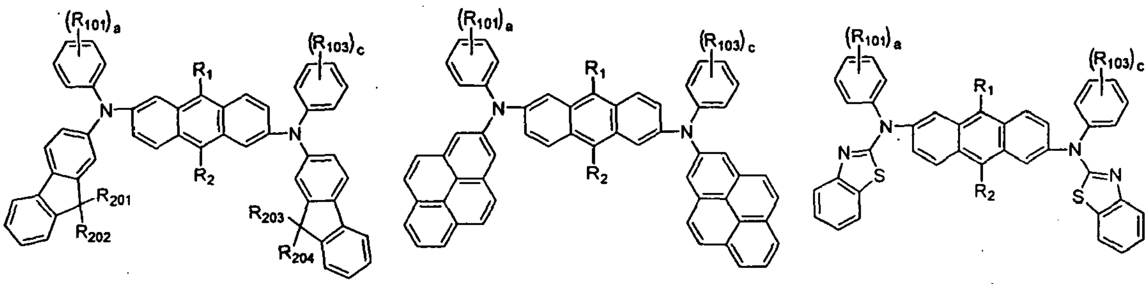
A represents $CR_{51}R_{52}$, NR_{53}, O or S;

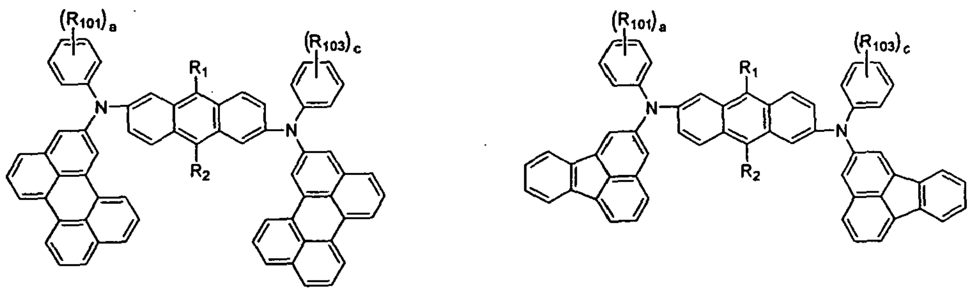
wherein R_{51} through R_{53} independently represent hydrogen, halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5-or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro or hydroxyl; or R_{51} and R_{52} may be linked via (C3-C60)alkylene or (C3-C60)alkenylene with or without a fused ring to form an alicyclic ring, or a monocyclic or polycyclic aromatic ring;

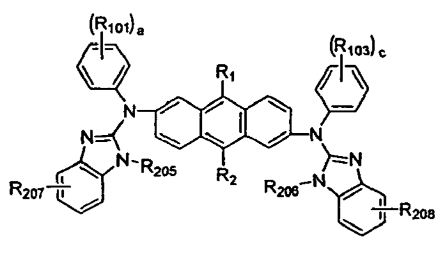
Ar_9 through Ar_{12} independently represent phenyl, biphenyl, naphthyl, anthryl, fluorenyl, phenanthryl, pyrenyl, perylenyl, fluoranthenyl, pyridyl or quinolyl; and the phenyl, naphthyl, anthryl, fluorenyl, phenanthryl, pyrenyl, perylenyl, fluoranthenyl, pyridyl or quinolyl of Ar_9 through Ar_{12} may be further substituted by one or more substituent(s) selected from methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, t-butyl, n-pentyl, i-pentyl, n-hexyl, n-heptyl, n-octyl, 2-ethylhexyl, n-nonyl, decyl, dodecyl, hexadecyl, trifluoromethyl, perfluorethyl, trifluorethyl, perfluoropropyl, perfluorobutyl, methoxy, ethoxy, butoxy, hexyloxy, cyclopropyl, cyclopentyl, cyclohexyl, fluoro, cyano, phenyl, naphthyl, anthryl, trimethylsilyl, triethylsilyl, tripropylsilyl, tri(t-butyl)silyl, t-butyldimethylsilyl, dimethylphenylsilyl and triphenylsilyl.

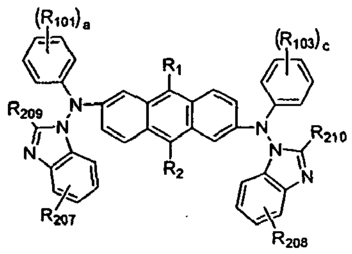
[0028] The organic electroluminescent compounds according to the present invention can be specifically exemplified by the following compounds, but are not restricted thereto:

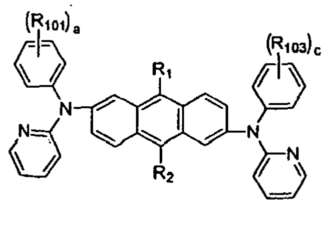


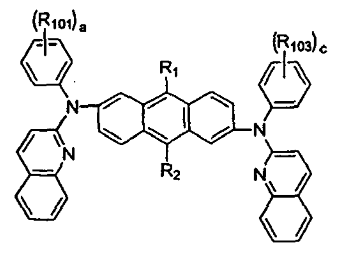


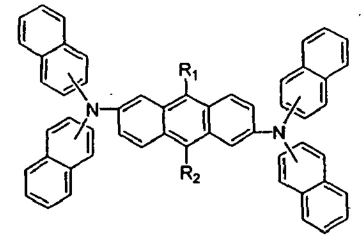


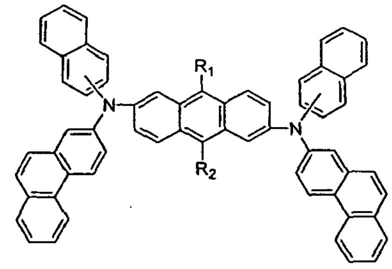

(R101)a
(R103)c
R1
R2
N
R205
R206
R207
R208

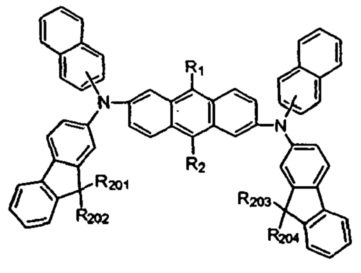

(R101)a
(R103)c
R1
R2
N
R209
R210
R207
R208

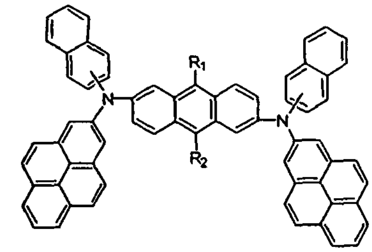

(R101)a
(R103)c
R1
R2
N

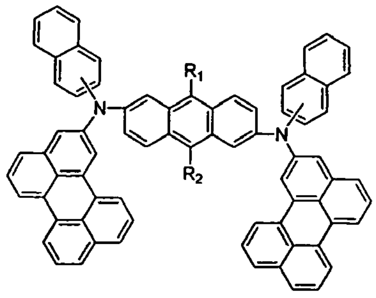

(R101)a
(R103)c
R1
R2
N

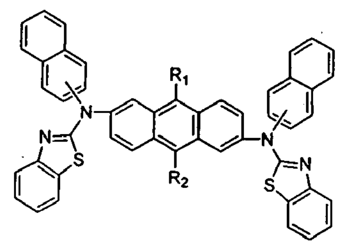

R1
R2
N

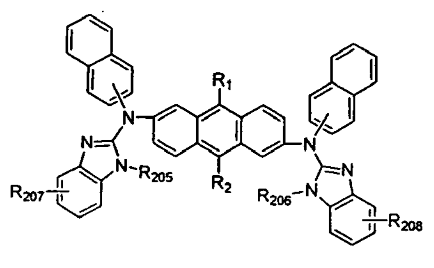

R1
R2
N

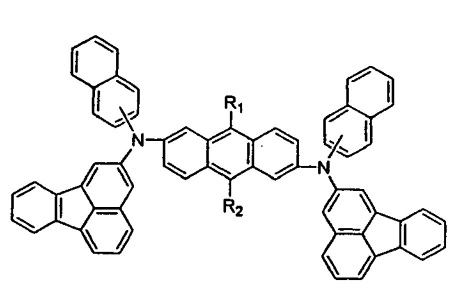

R1
R2
N
R201
R202
R203
R204

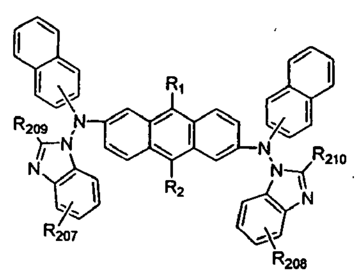

R1
R2
N

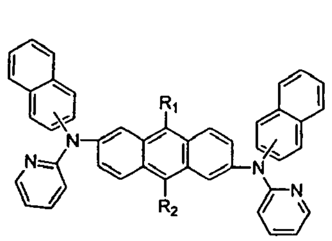

R1
R2
N

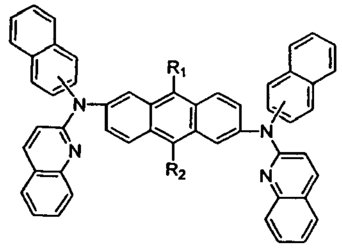
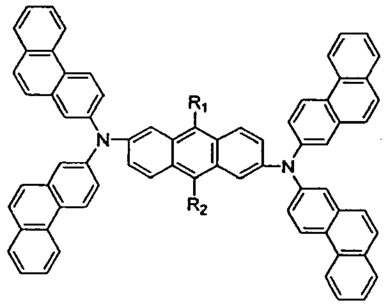
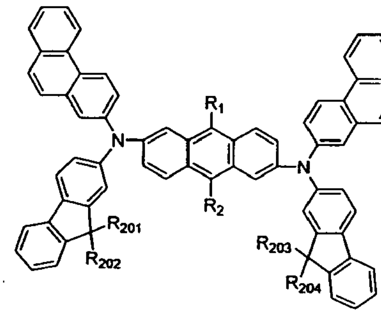

R1
R2
N
S

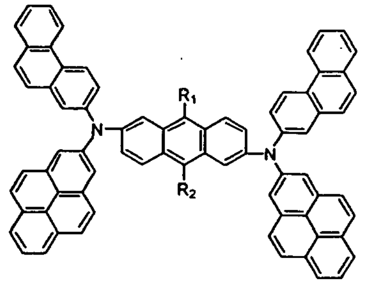
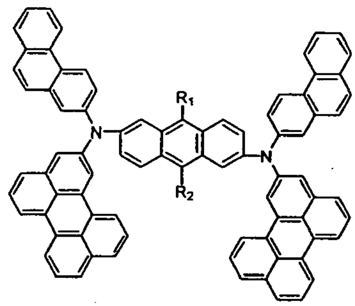

R1
R2
N
R205
R206
R207
R208

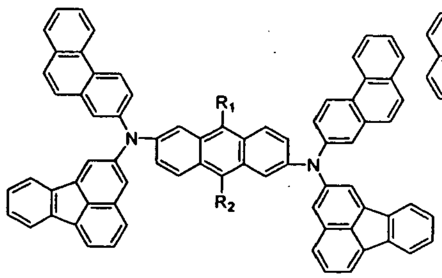
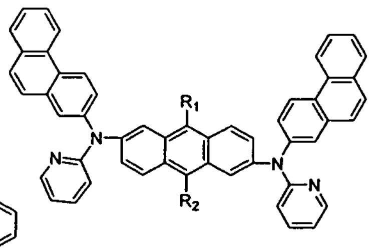
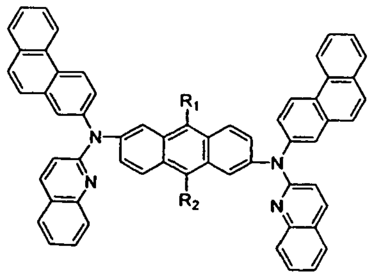

R1
R2
N

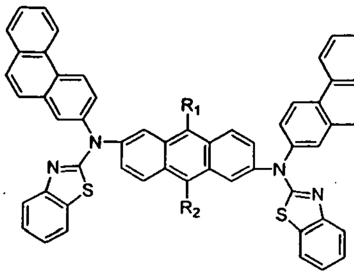
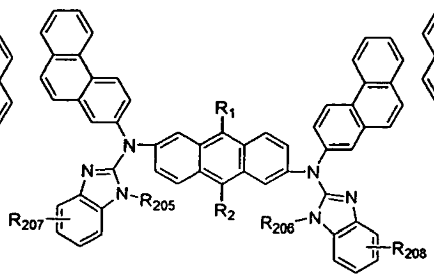
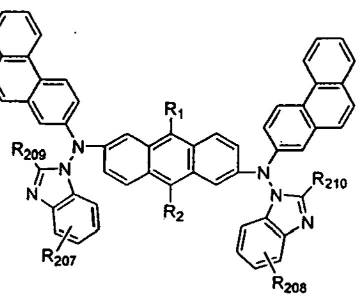

R1
R2
N
R209
R210
R207
R208

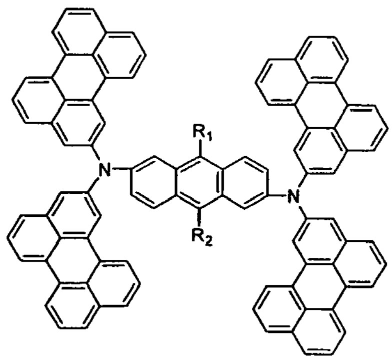

R1
R2
N

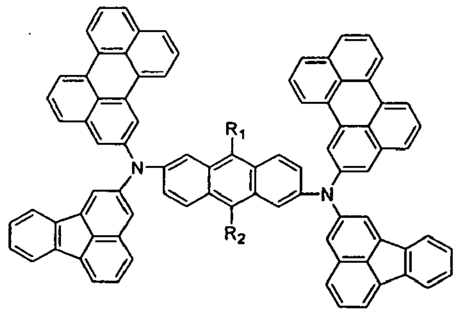




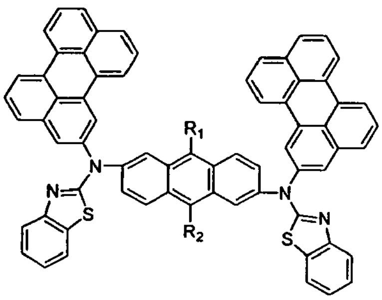



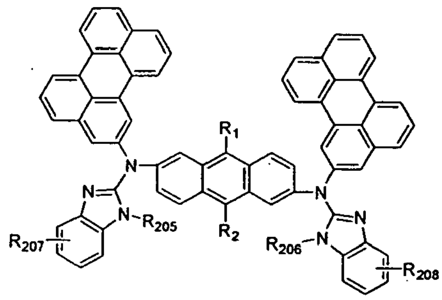




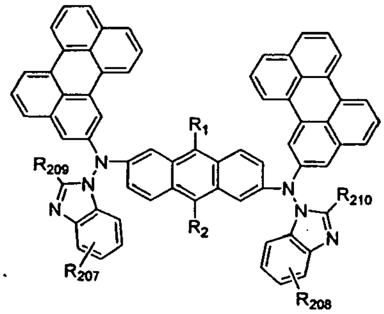




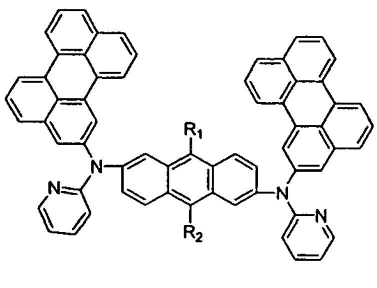

R1
R2
N
N

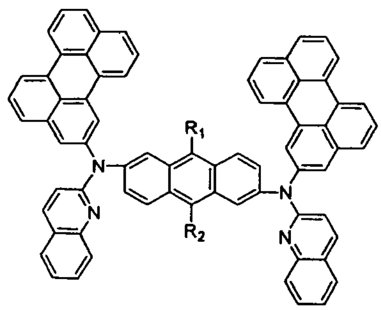

R1
R2
N
N

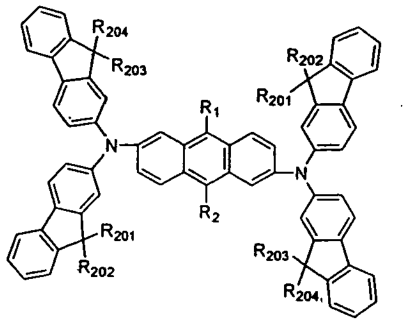

R1
R2
N
N
S
S

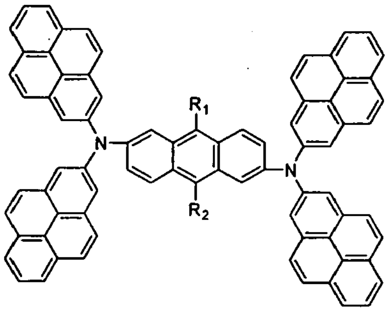

R1
R2
R205
R206
R207
R208

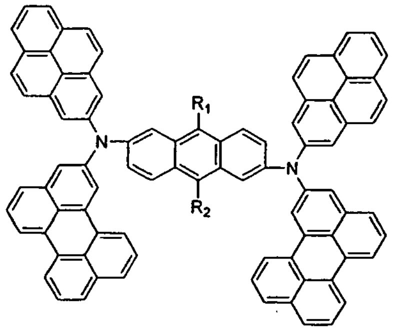

R1
R2
R209
R210
R207
R208

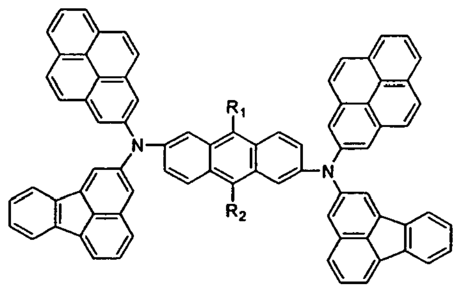

R1
R2

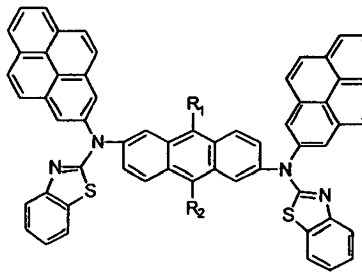

R1
R2

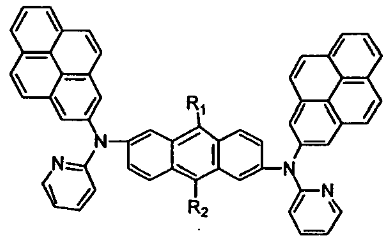

R1
R2
R201
R202
R203
R204

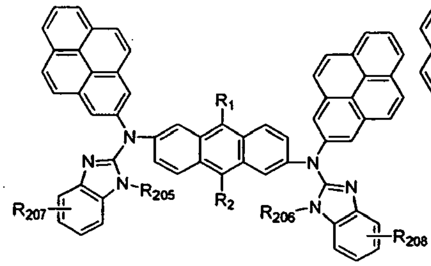

R1
R2

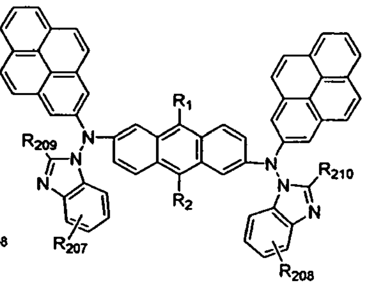


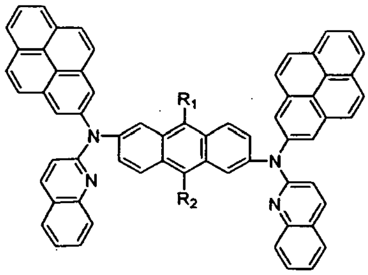


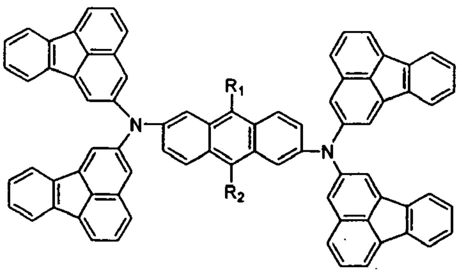


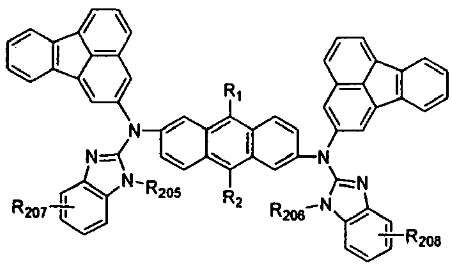


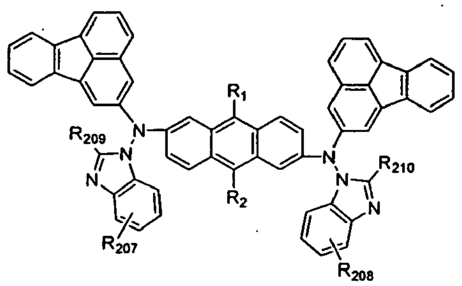


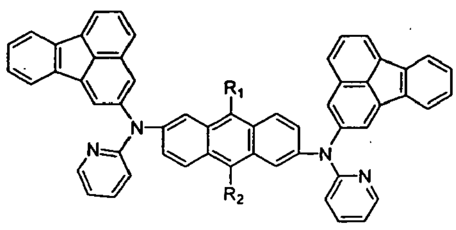


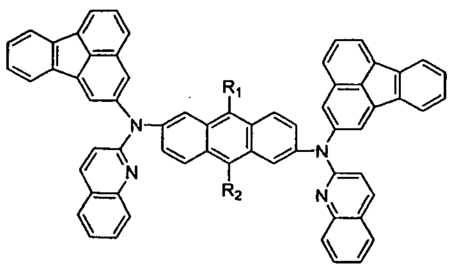


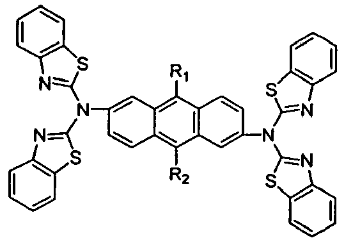


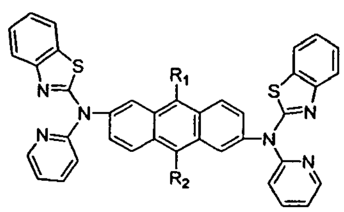


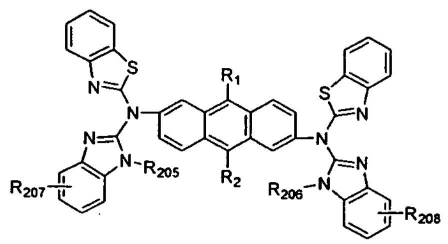


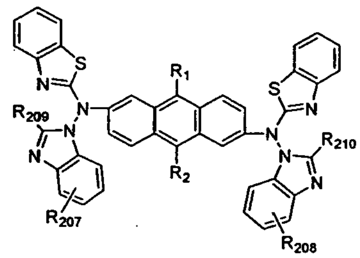


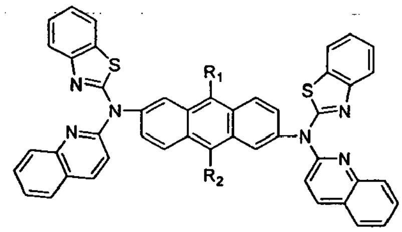


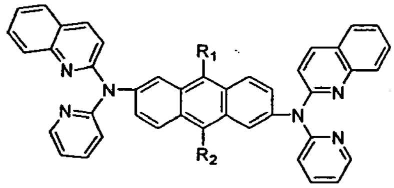


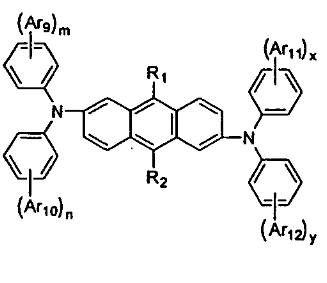


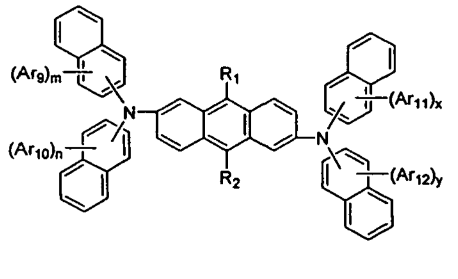


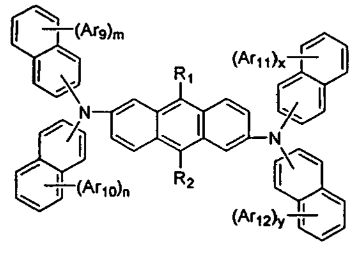


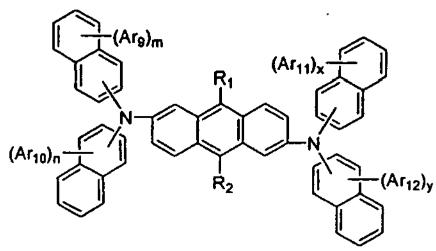


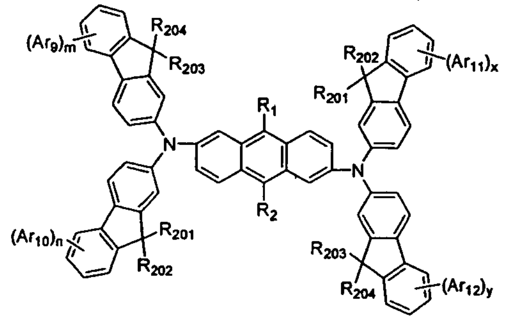


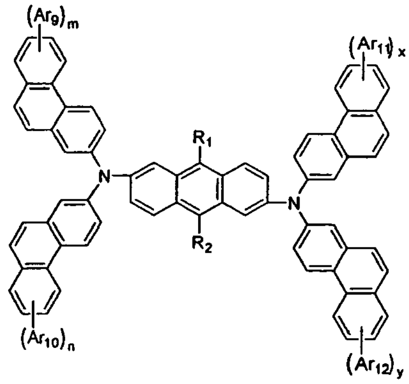


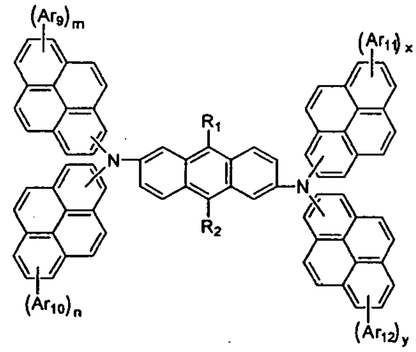


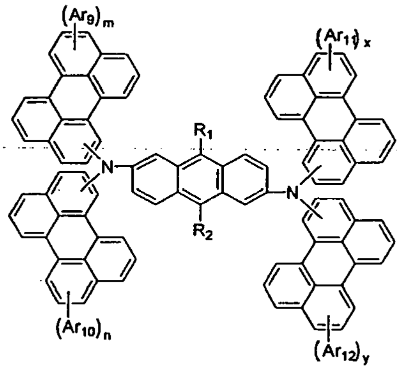


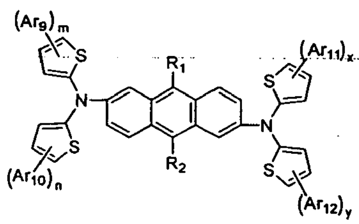


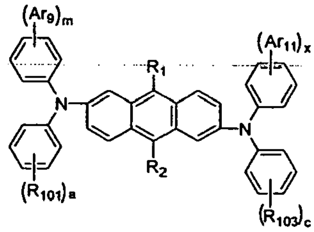


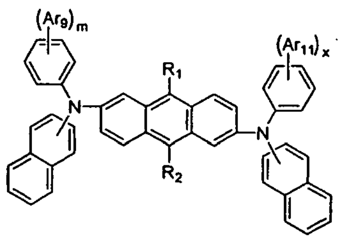


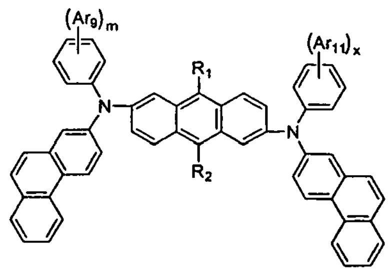


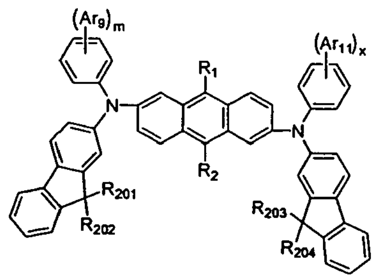


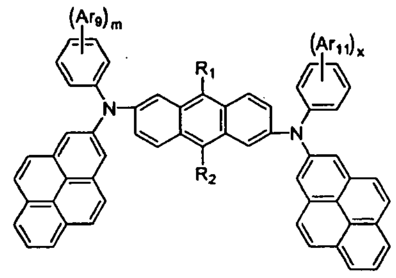


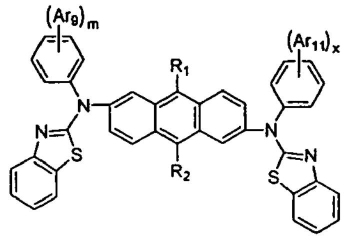


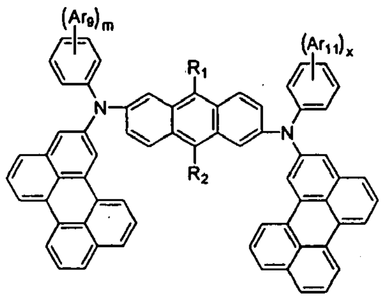


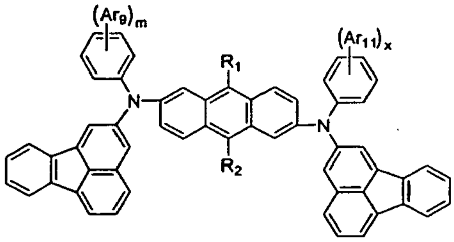


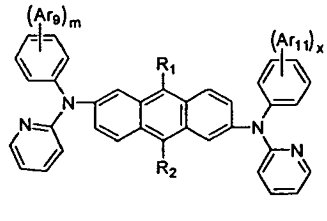


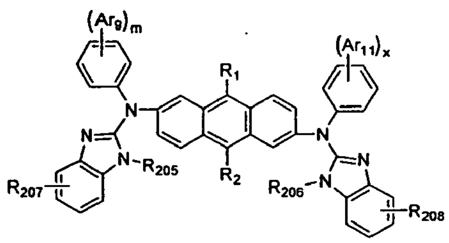


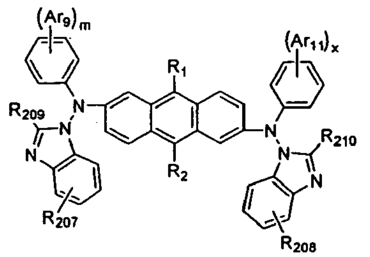


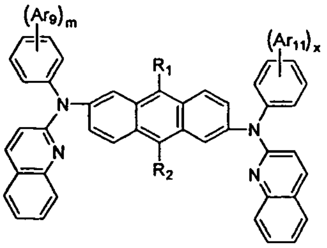


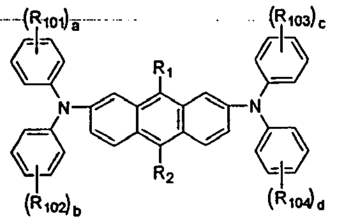


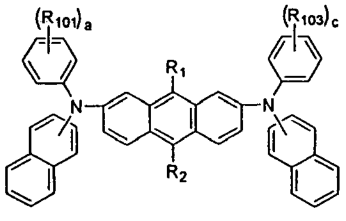


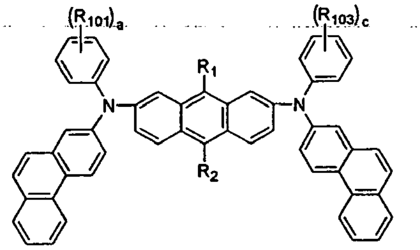


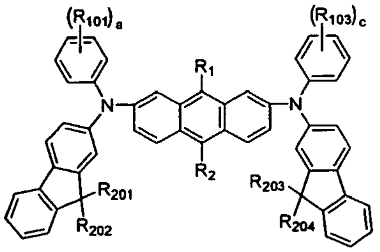


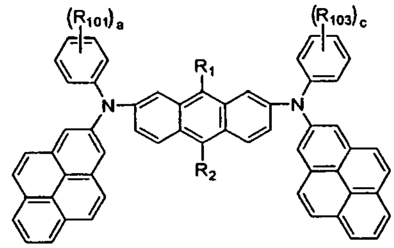


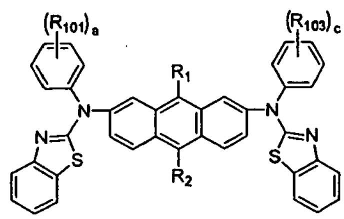


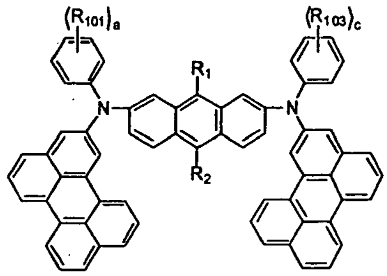


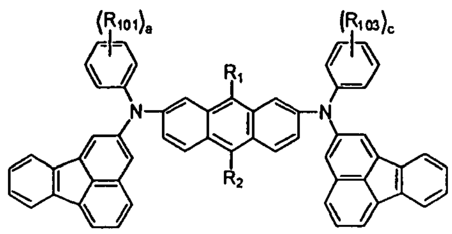


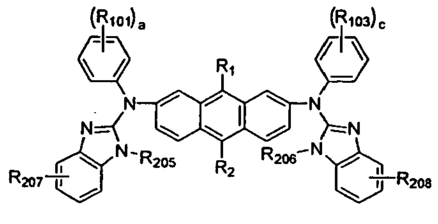


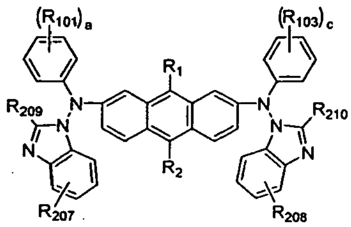


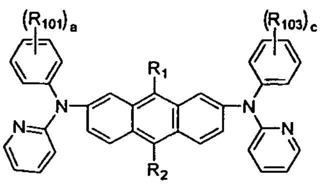


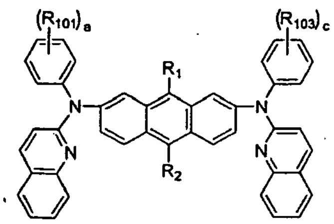


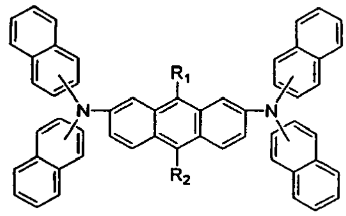


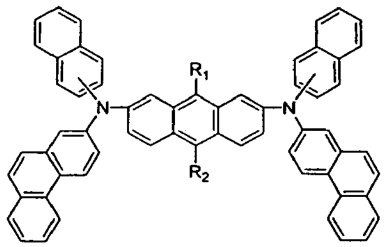


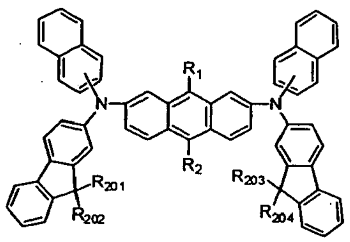


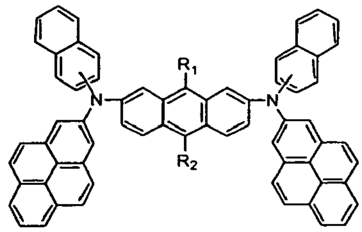


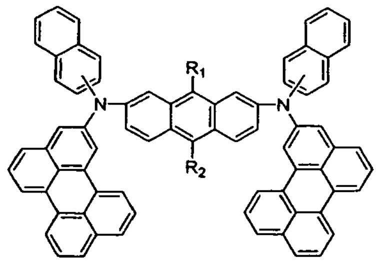


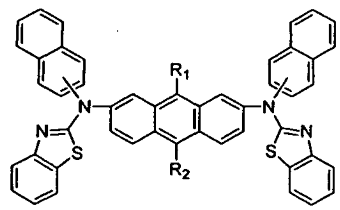


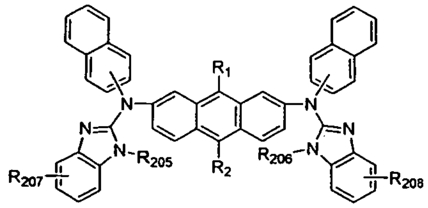


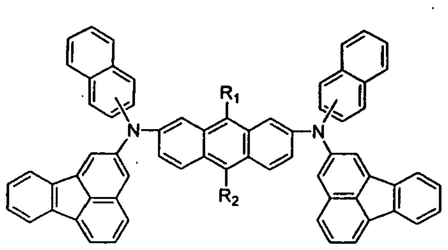
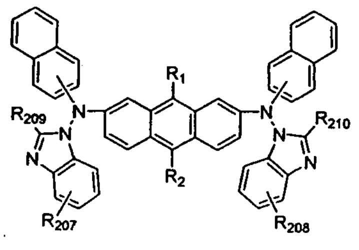
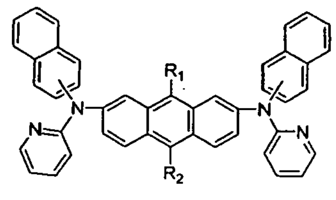


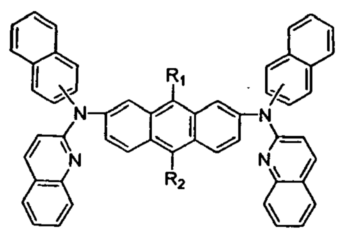
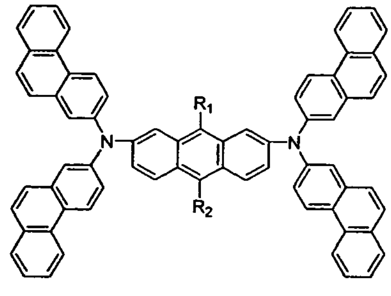
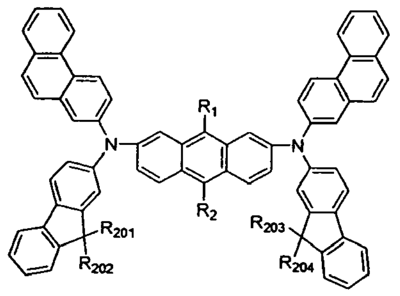


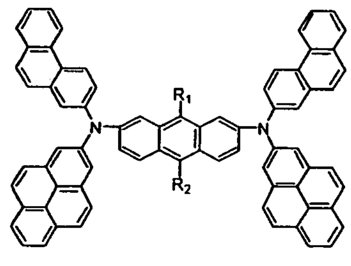
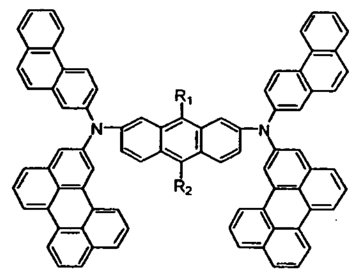


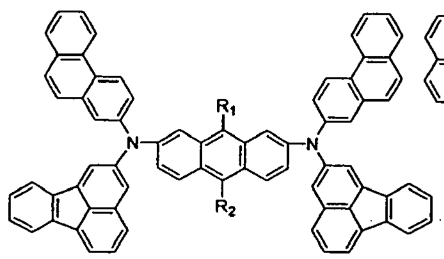
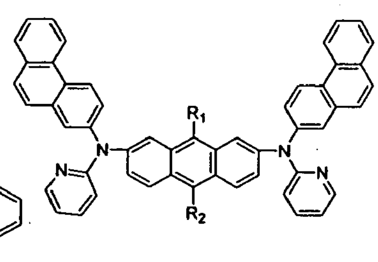
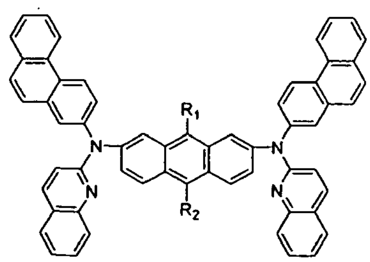


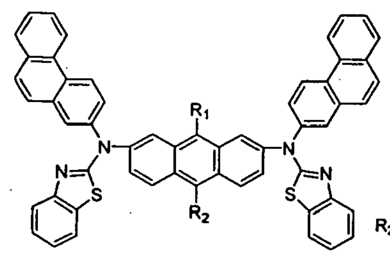
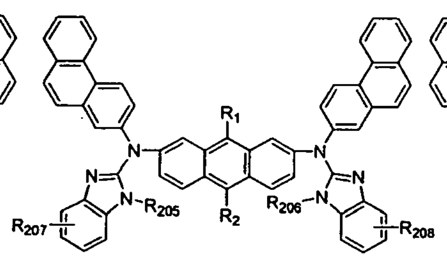
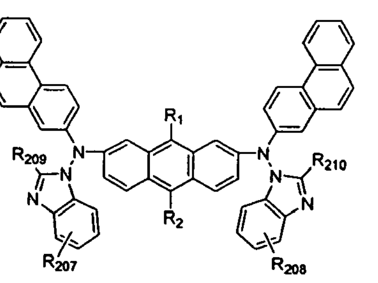


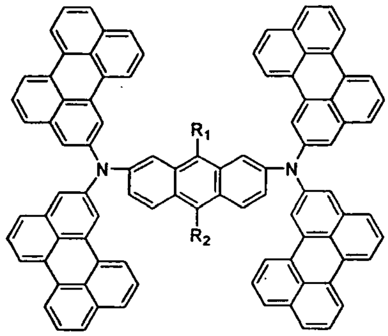




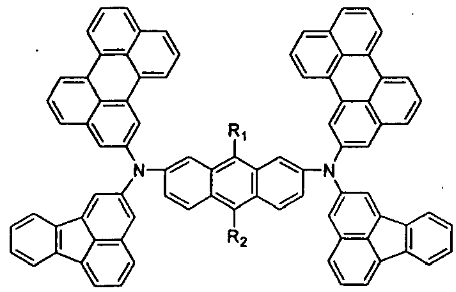




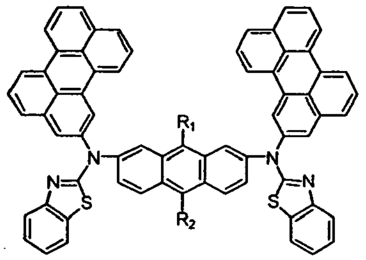



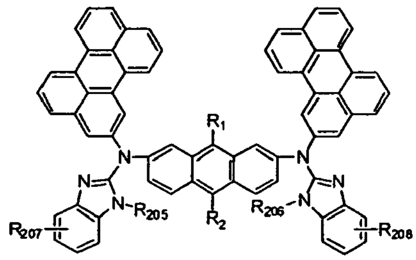




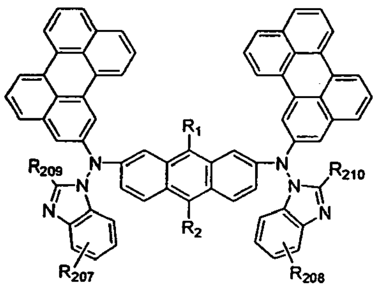




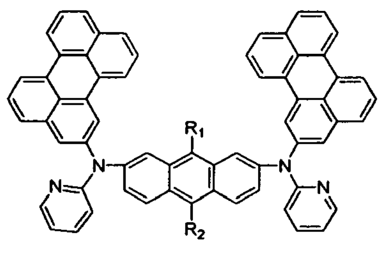


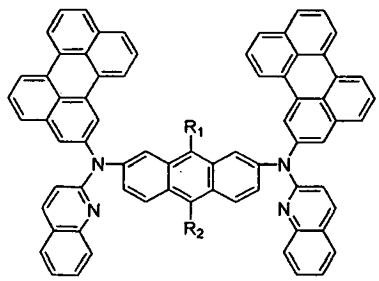


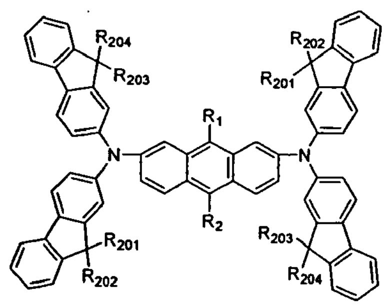


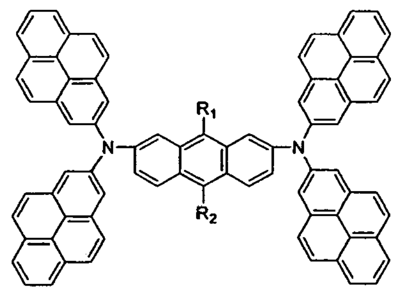


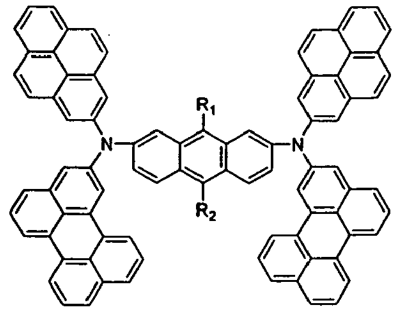


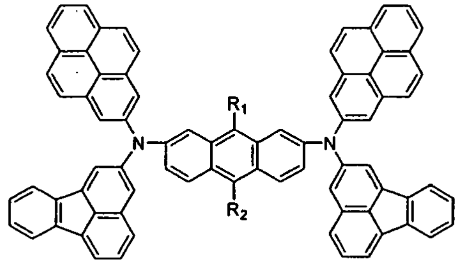


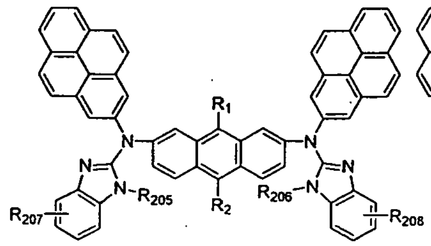


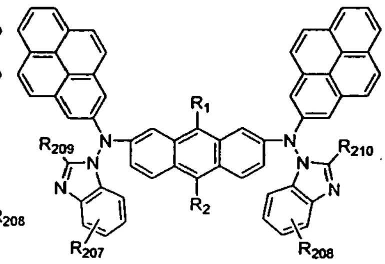


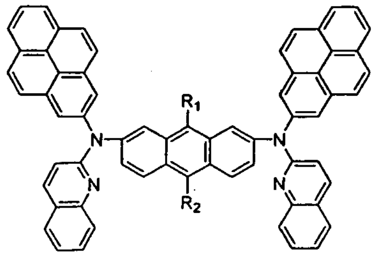


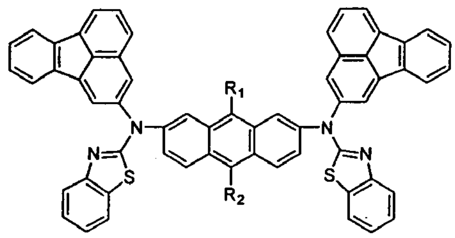


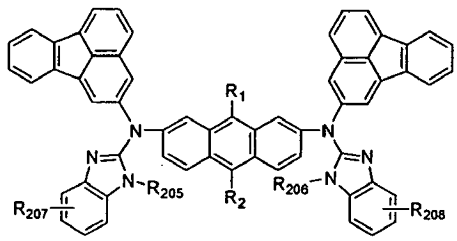


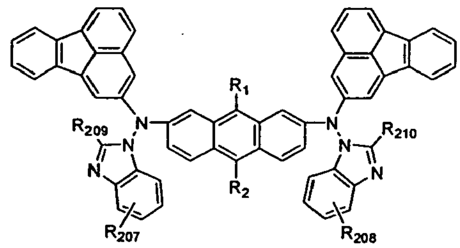


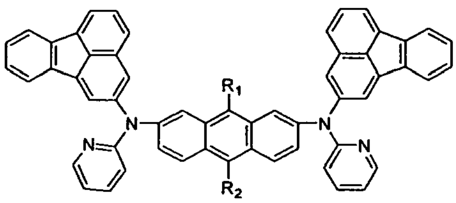


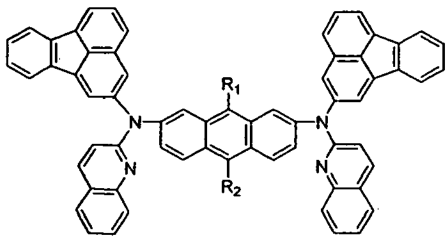


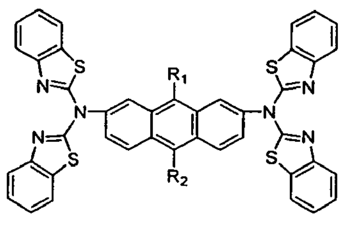


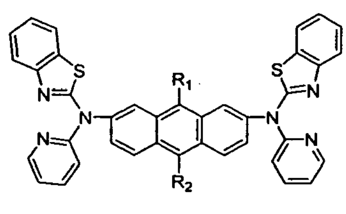


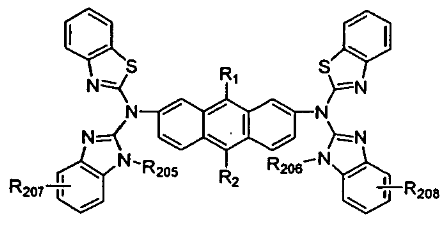








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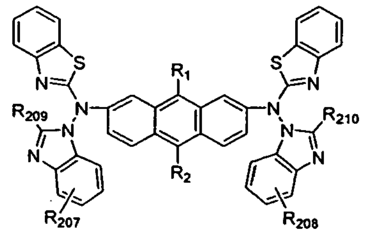
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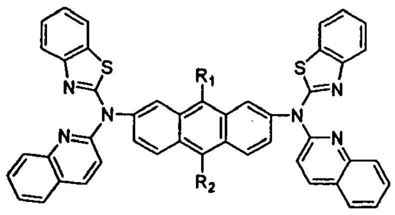
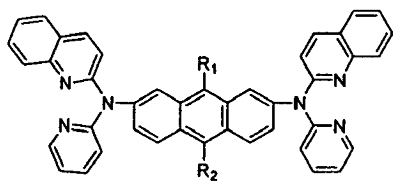
R207
R208


R1
R2
N
S


R1
R2
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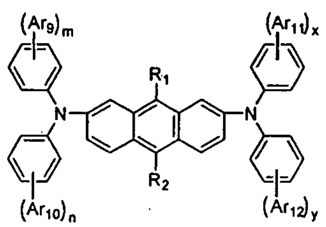
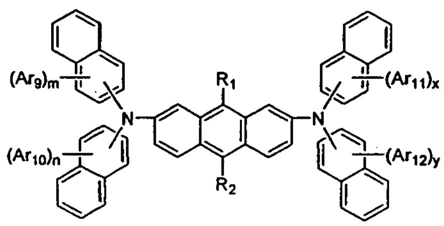

(Ar9)m
(Ar10)n
(Ar11)x
(Ar12)y
R1
R2
N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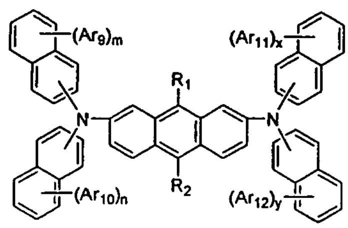
(Ar12)y
R1
R2
N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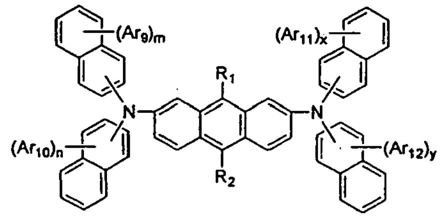
R1
R2
N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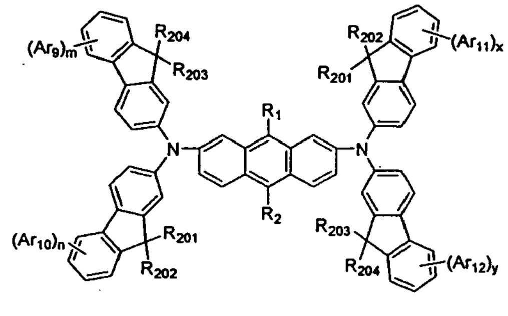
(Ar11)x
(Ar12)y
R1
R2
N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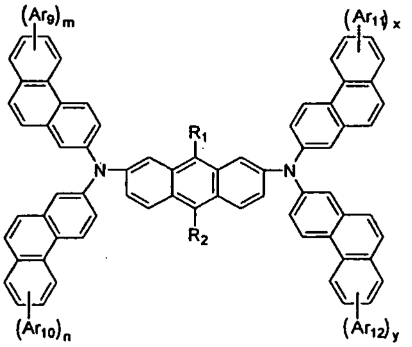
R1
R2
R201
R202
R203
R204
N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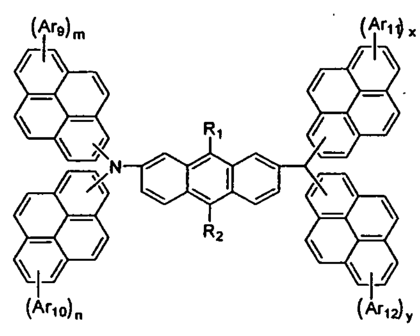
(Ar10)n
(Ar11)x
(Ar12)y
R1
R2
N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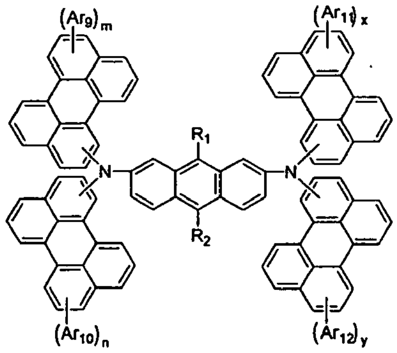
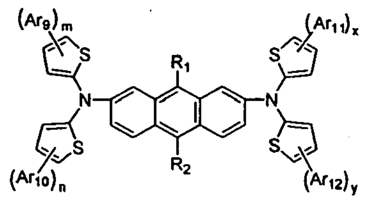
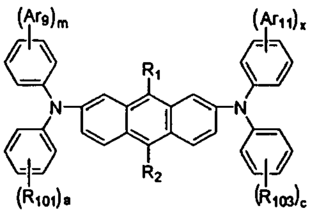
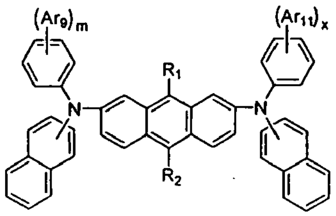
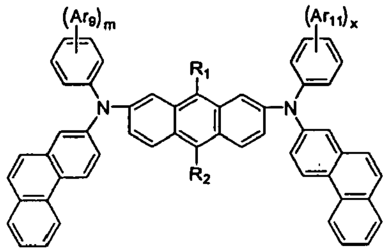
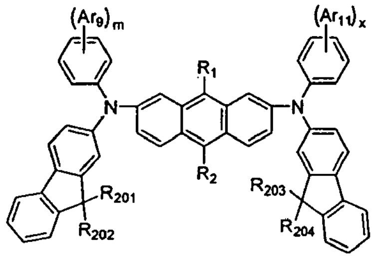
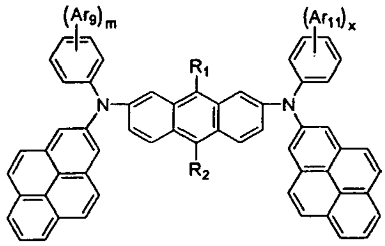
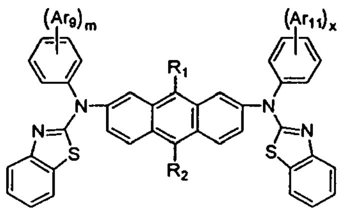
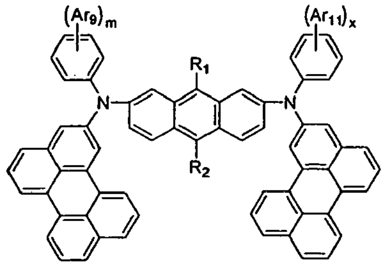
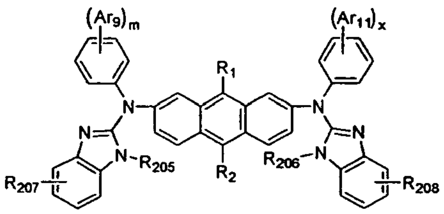
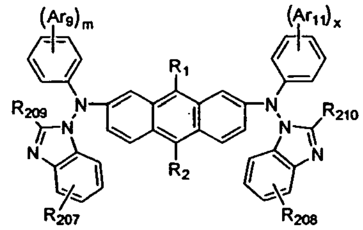
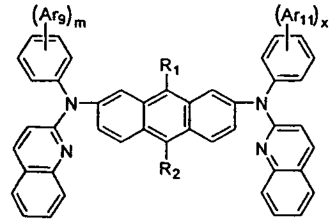
(Ar10)n
(Ar11)x
(Ar12)y
R1
R2
N

wherein, R_1 and R_2 are defined as in Chemical Formula (1) and Chemical Formula (2);

R_{101}, R_{102}, R_{103} and R_{104} independently represent methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, t-butyl, n-pentyl, i-pentyl, n-hexyl, n-heptyl, n-octyl, 2-ethylhexyl, n-nonyl, decyl, dodecyl, hexadecyl, trifluoromethyl, perfluorethyl, trifluorethyl, perfluoropropyl, perfluorobutyl, methoxy, ethoxy, butoxy, hexyloxy, cyclopropyl, cyclopentyl, cyclohexyl, fluoro, cyano, trimethylsilyl, triethylsilyl, tripropylsilyl, tri(t-butyl)silyl, t-butyldimethylsilyl, dimethylphenylsilyl or triphenylsilyl;

R_{201}, R_{202}, R_{203} and R_{204} independently represent methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, t-butyl, n-pentyl, i-pentyl, n-hexyl, n-heptyl, n-octyl, 2-ethylhexyl, phenyl or naphthyl;

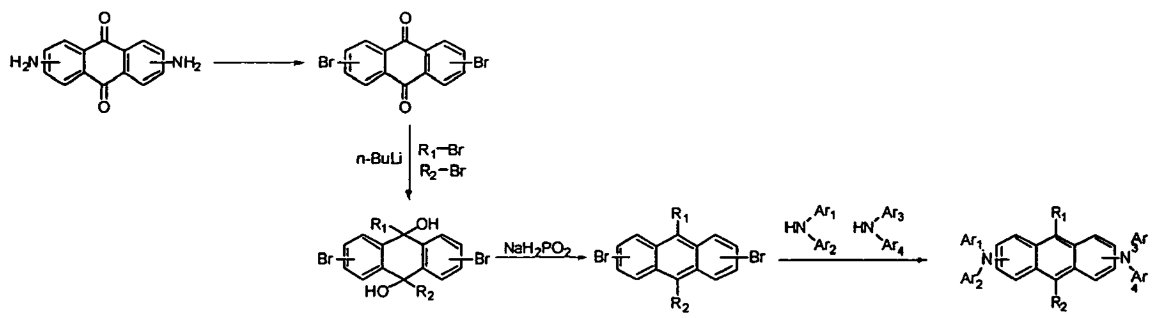
R_{205} and R_{206} independently represent methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, t-butyl, n-pentyl, i-pentyl, n-hexyl, n-heptyl, n-octyl, 2-ethylhexyl, phenyl or naphthyl;

R_{207} and R_{208} independently represent hydrogen, methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, t-butyl, n-pentyl,

i-pentyl, n-hexyl, n-heptyl, n-octyl, fluoro or cyano;
R_{209} and R_{210} independently represent methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, t-butyl, n-pentyl, i-pentyl, n-hexyl, n-heptyl, n-octyl, 2-ethylhexyl, phenyl or naphthyl;
Ar_9, Ar_{10}, Ar_{11} and Ar_{12} independently represent phenyl, biphenyl, naphthyl, anthryl, fluorenyl, phenanthryl, pyrenyl, perylenyl, fluoranthenyl, pyridyl or quinolyl; the phenyl, naphthyl, anthryl, fluorenyl, phenanthryl, pyrenyl, perylenyl, fluoranthenyl, pyridyl or quinolyl of Ar_9 through Ar_{12} may be further substituted by one or more substituent(s) selected from methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, t-butyl, n-pentyl, i-pentyl, n-hexyl, n-heptyl, n-octyl, 2-ethylhexyl, n-nonyl, decyl, dodecyl, hexadecyl, trifluoromethyl, perfluorethyl, trifluorethyl, perfluoropropyl, perfluorobutyl, methoxy, ethoxy, butoxy, hexyloxy, cyclopropyl, cyclopentyl, cyclohexyl, fluoro, cyano, phenyl, naphthyl, anthryl, trimethylsilyl, triethylsilyl, tripropylsilyl, tri(t-butyl)silyl, t-butyldimethylsilyl, dimethylphenylsilyl and triphenylsilyl;
a, b, c and d independently represent an integer from 0 to 4; and
m, n, x and y independently represent an integer from 1 to 3.

[0029] The organic electroluminescent compounds according to the present invention can be prepared according to the procedure illustrated by Reaction Scheme (1):

【Reaction Scheme 1】



wherein, R_1, R_2, Ar_1, Ar_2, Ar_3 and Ar_4 are defined as in Chemical Formulas (1) and (2).

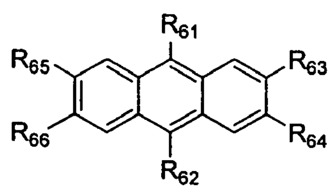
[0030] In addition, the present invention provides organic solar cells, which comprise one or more organic electroluminescent compound(s) represented by Chemical Formula (1) or Chemical Formula (2).

[0031] The present invention also provides an organic electroluminescent device which is comprised of a first electrode; a second electrode; and at least one organic layer(s) interposed between the first electrode and the second electrode; wherein the organic layer comprises one or more organic electroluminescent compound(s) represented by Chemical Formula (1) or Chemical Formula (2).

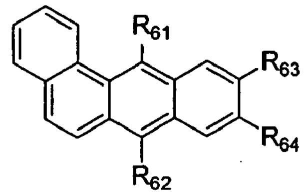
[0032] The organic electroluminescent device according to the present invention is **characterized in that** the organic layer comprises an electroluminescent region containing one or more organic electroluminescent compound(s) represented by Chemical Formula (1) or Chemical Formula (2) as electroluminescent dopant, and one or more host(s).

[0033] The host applied to the organic electroluminescent device according to the invention is not particularly restricted, but preferably selected from the compounds represented by one of Chemical Formulas (5) to (7):

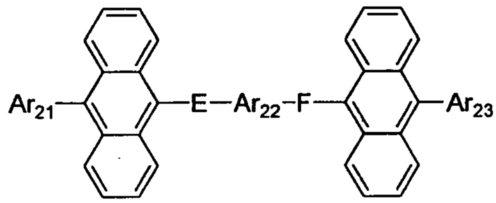
【Chemical Formula 5】



【Chemical Formula 6】



【Chemical Formula 7】

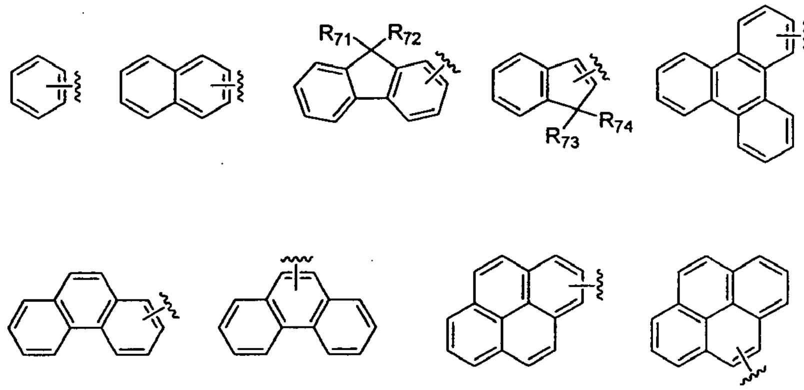


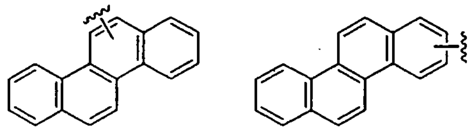
wherein, R_{61} and R_{62} independently represent (C6-C60)aryl, (C4-C60)heteroaryl, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, or (C3-C60)cycloalkyl; and the aryl or heteroaryl of R_{61} and R_{62} may be further substituted by one or more substituent(s) selected from a group consisting of (C1-C60)alkyl, halo(C1-C60)alkyl, (Cl-C60)alkoxy, (C3-C60)cycloalkyl, (C6-C60)aryl, (C4-C60)heteroaryl, halogen, cyano, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl and tri(C6-C60)arylsilyl;

R_{63} through R_{66} represent hydrogen, (C1-C60)alkyl, (C1-C60)alkoxy, halogen, (C4-C60)heteroaryl, (C5-C60)cycloalkyl or (C6-C60)aryl; and the heteroaryl, cycloalkyl or aryl of R_{63} through R_{66} may be further substituted by one or more substituent(s) selected from a group consisting of (C1-C60)alkyl with or without halogen substituent(s), (C1-C60)alkoxy, (C3-C60)cycloalkyl, halogen, cyano, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl and tri(C6-C60)arylsilyl;

E and F independently represent a chemical bond, or (C6-C60)arylene with or without one or more substituent(s) selected from (C1-C60)alkyl, (C1-C60)alkoxy, (C6-C60)aryl, (C4-C60)heteroaryl and halogen;

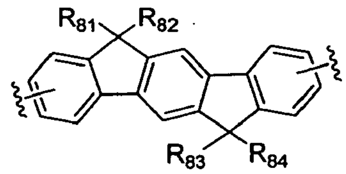
Ar_{21} and Ar_{23} represent aryl selected from the following structures, or (C4-C60)heteroaryl:





the aryl or heteroaryl of Ar_{21} and Ar_{23} may be substituted by one or more substituent(s) selected from (C1-C60) alkyl, (C1-C60)alkoxy, (C6-C60)aryl and (C4-C60)heteroaryl;

Ar_{22} represents (C6-C60)arylene, (C4-C60)heteroarylene, or a compound represented by the following structural formula:



the arylene or heteroarylene of Ar_{22} may be substituted by one or more substituent(s) selected from (C1-C60)alkyl, (C1-C60)alkoxy, (C6-C60)aryl, (C4-C60)heteroaryl and halogen;

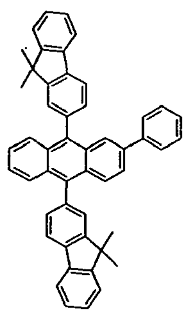
R_{71} through R_{74} independently represent hydrogen, (C1-C60)alkyl or (C6-C60)aryl, or each of them may be linked to an adjacent substituent via (C3-C60)alkylene or (C3-C60)alkenylene with or without a fused ring to form an alicyclic ring, or a monocyclic or polycyclic aromatic ring;

R_{81} through R_{84} independently represent hydrogen, (C1-C60)alkyl, (C1-C60)alkoxy, (C6-C60)aryl, (C4-C60)heteroaryl or halogen, or each of them may be linked to an adjacent substituent via (C3-C60)alkylene or (C3-C60) alkenylene with or without a fused ring to form an alicyclic ring, or a monocyclic or polycyclic aromatic ring.

[0034] The electroluminescent layer means the layer where electroluminescence occurs, and it may be a single layer or a multi-layer consisting of two or more layers laminated. When a mixture of host-dopant is used according to the constitution of the present invention, noticeable improvement in luminous efficiency due to the inventive electroluminescent host could be confirmed. This can be achieved by the doping concentration of 0.5 to 10% by weight. The host according to the present invention exhibits higher hole and electron conductivity, and excellent stability of material as compared to other conventional host materials, and provides improved device life as well as luminous efficiency.

[0035] Thus, it can be described that use of the compound represented by one of Chemical Formulas (5) to (7) as an electroluminescent host significantly supplements electronic drawback of the organic electroluminescent compounds of Chemical Formula (1) according to the present invention.

[0036] The host compounds represented by one of Chemical Formulas (5) to (7) can be exemplified by the following compounds, but are not restricted thereto.



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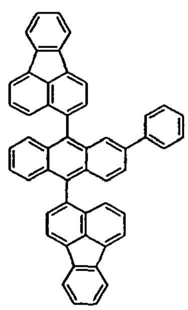

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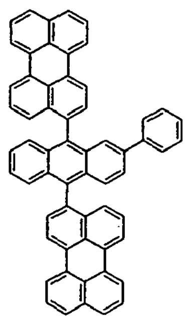

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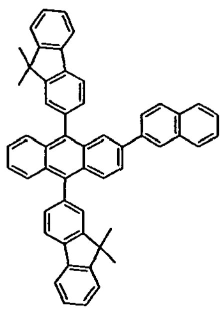

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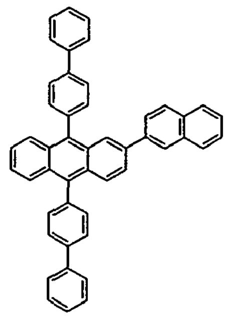

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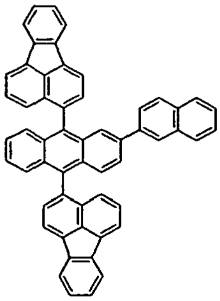
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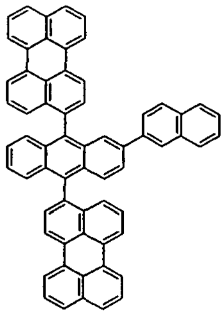
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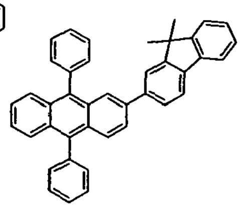
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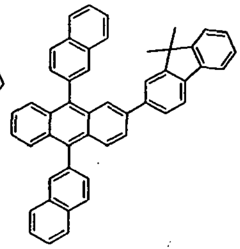
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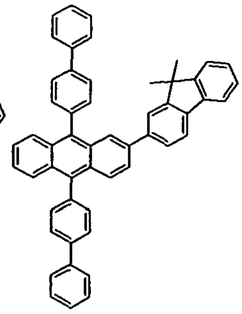
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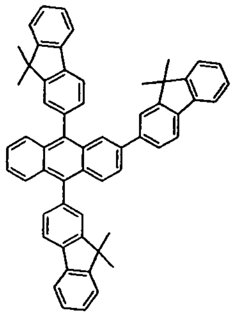
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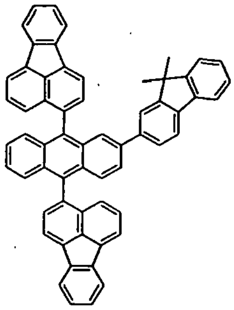
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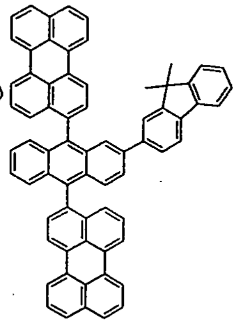
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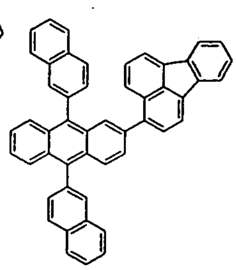
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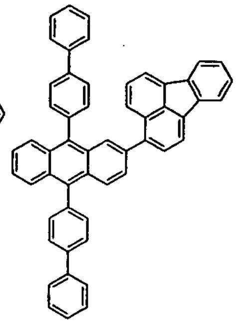
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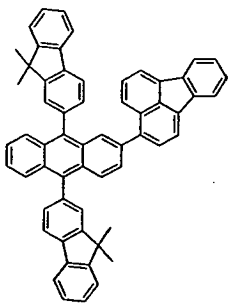
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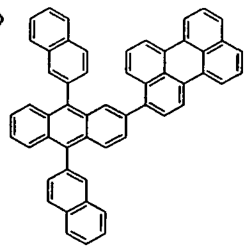
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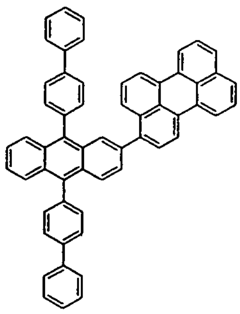
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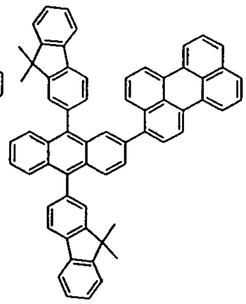
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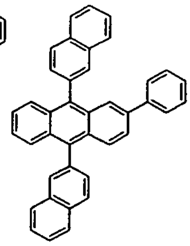
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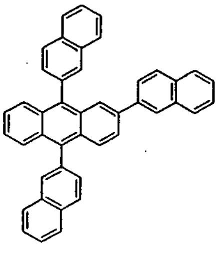
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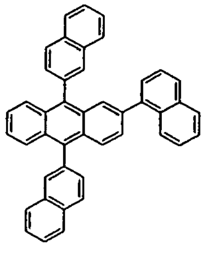
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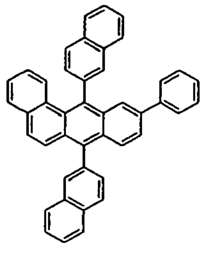
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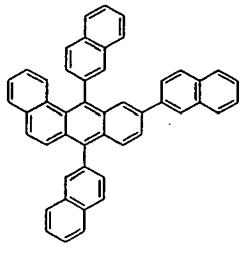
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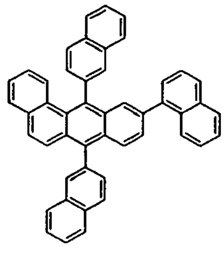
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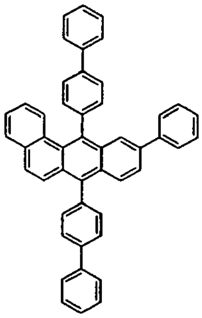
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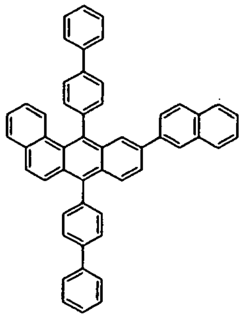
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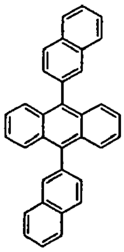
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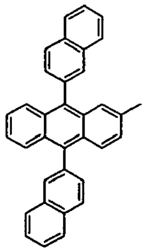
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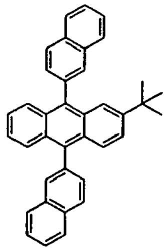
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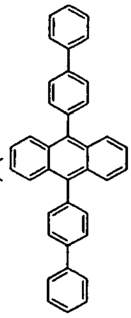
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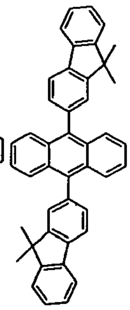
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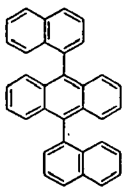
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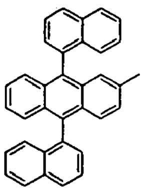
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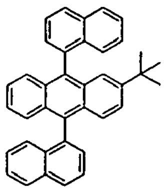
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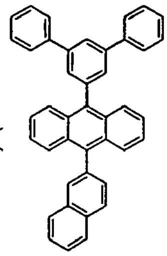
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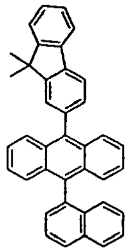
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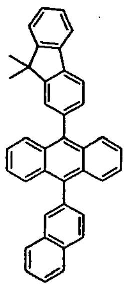
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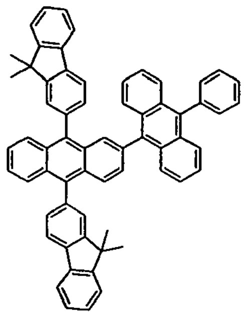
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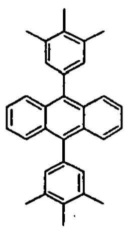
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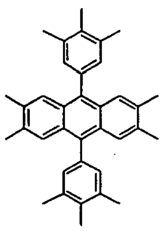
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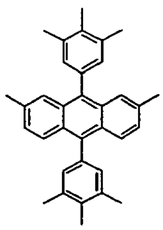
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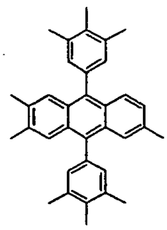
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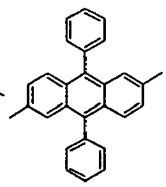
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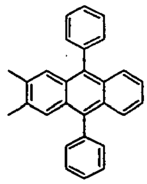
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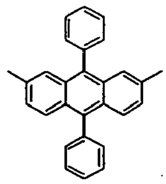
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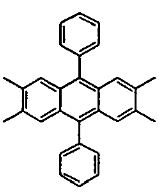
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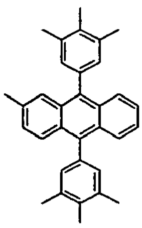
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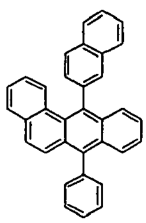
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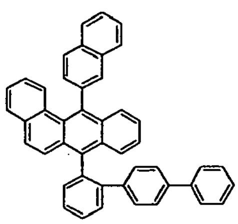
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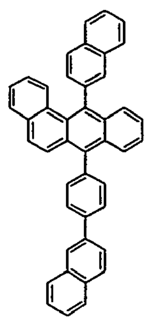
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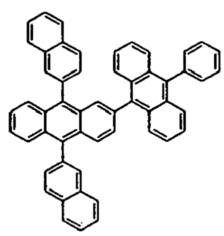
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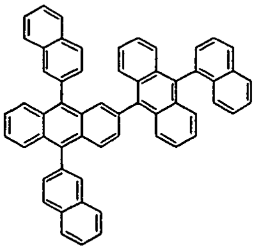
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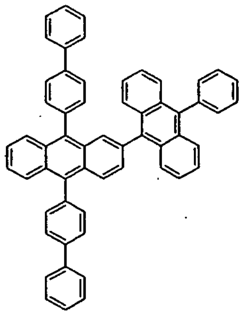
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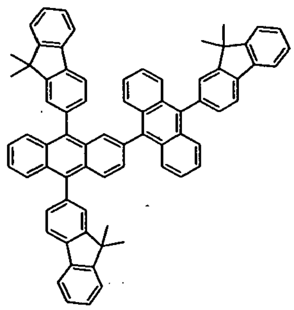
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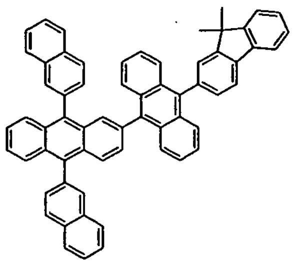
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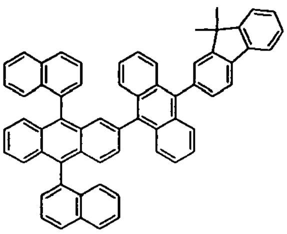
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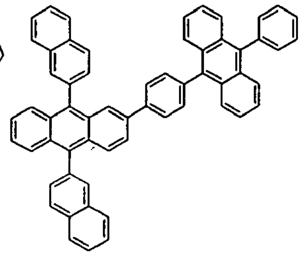
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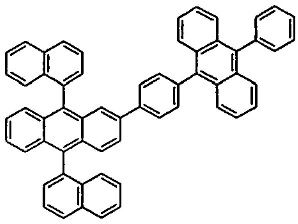
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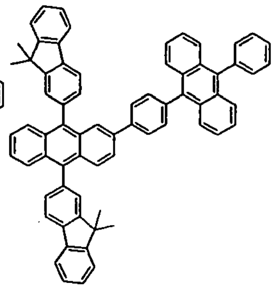
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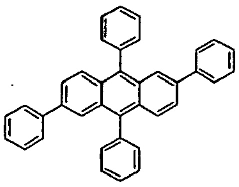
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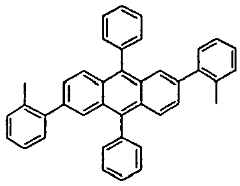
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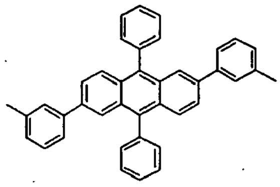
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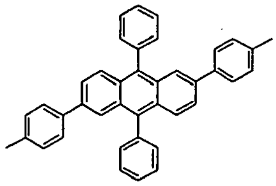
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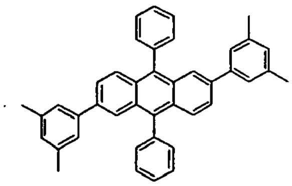
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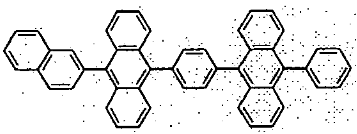
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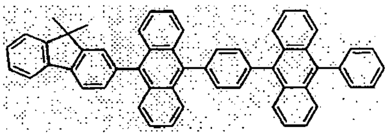
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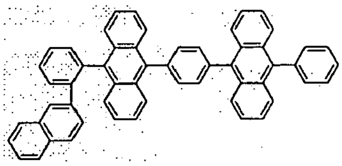
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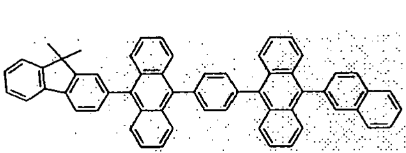
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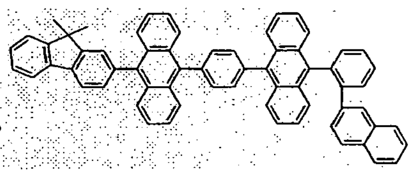
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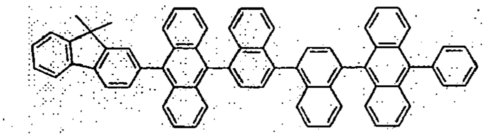

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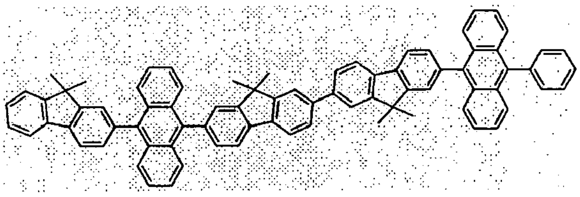

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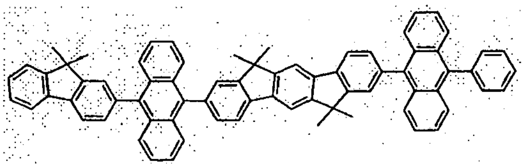

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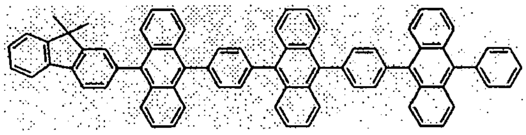

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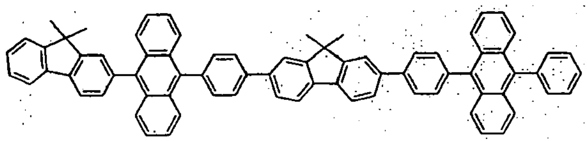

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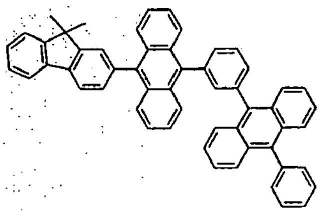

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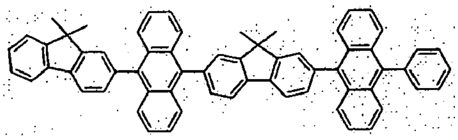

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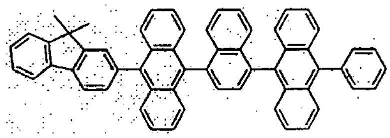

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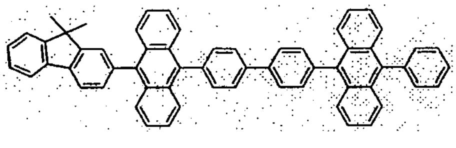

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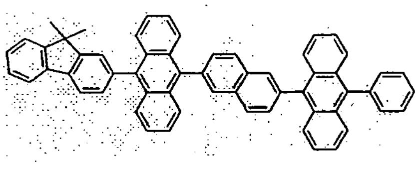

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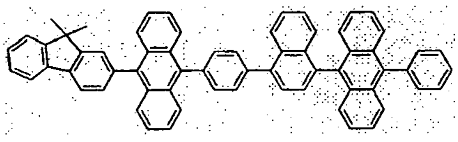

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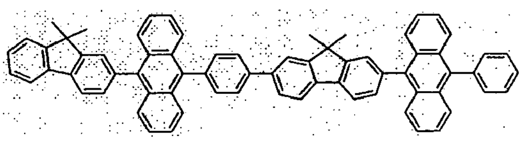

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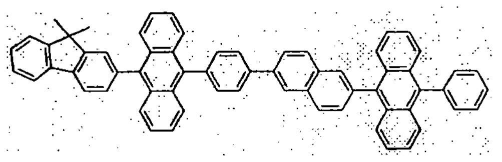

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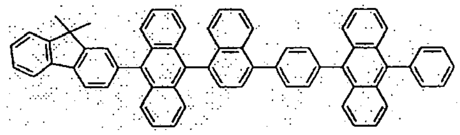

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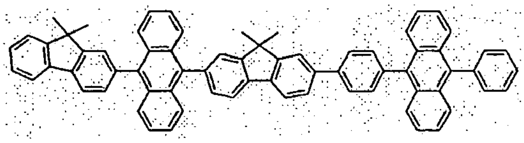

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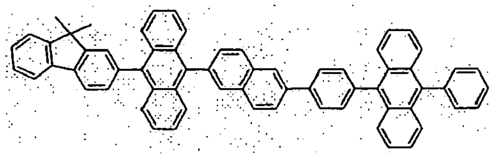
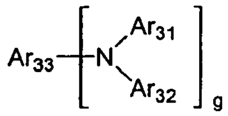


H-86

[0037] The organic electroluminescent device according to the invention may further comprise one or more compound (s) selected from arylamine compounds and styrylarylamine compounds, as well as the organic electroluminescent compound represented by Chemical Formula (1) or Chemical Formula (2). Examples of the arylamine or styrylarylamine compounds include the compounds represented by Chemical Formula (8), but they are not restricted thereto:

【Chemical Formula 8】

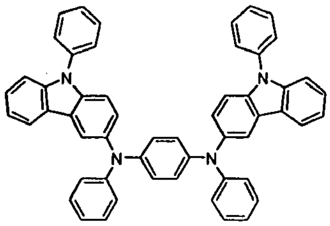
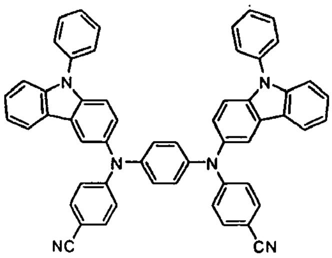
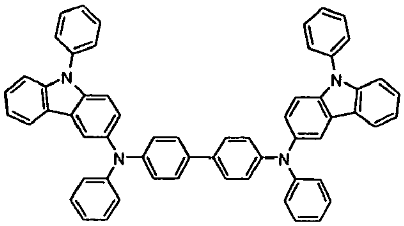
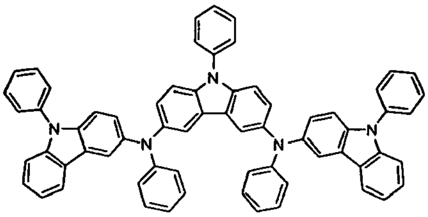
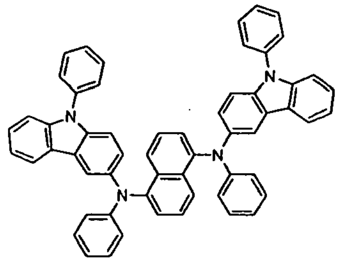
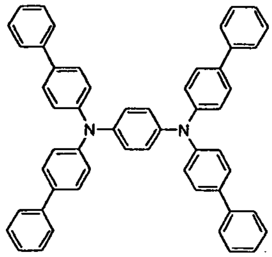
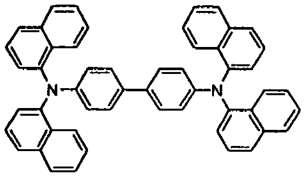
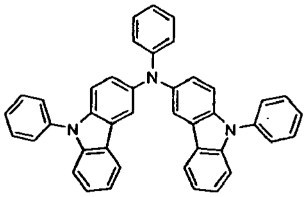
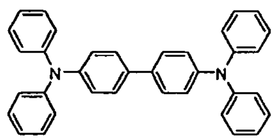
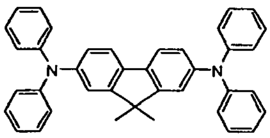
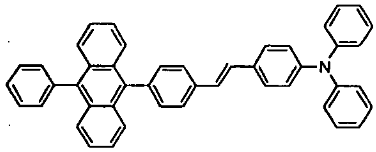
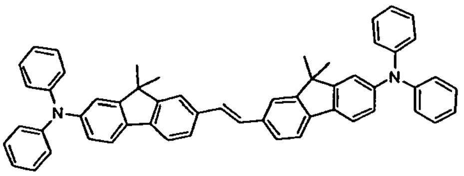
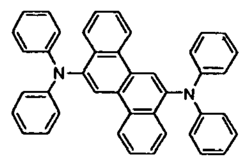
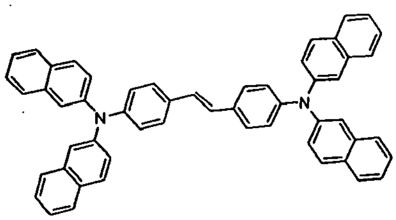
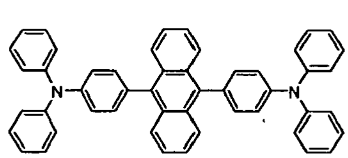
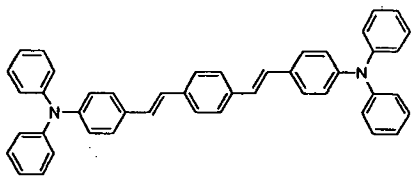
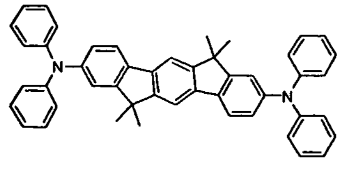
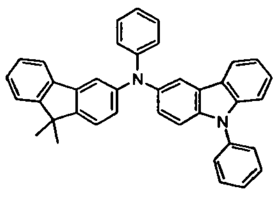
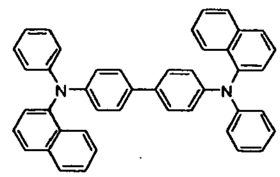


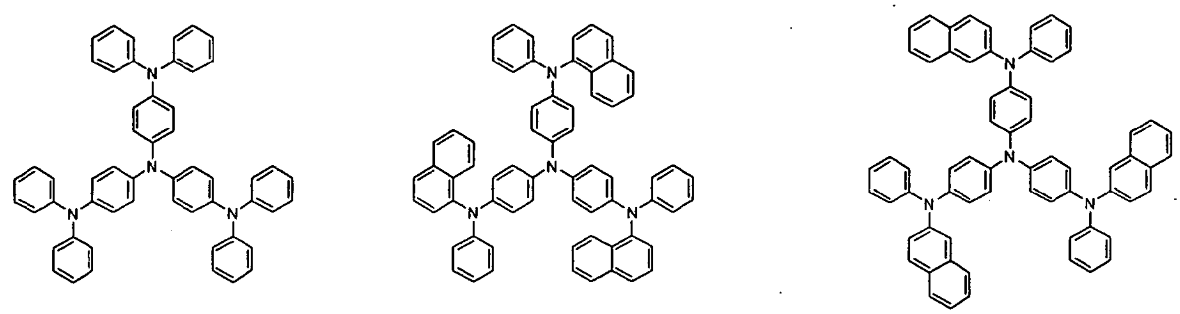
wherein, Ar_{31} and Ar_{32} independently represent (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, (C6-C60)arylamino, (C1-C60)alkylamino, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, or (C3-C60)cycloalkyl, or Ar_{31} and Ar_{32} may be linked via (C3-C60)alkylene or (C3-C60)alkenylene with or without a fused ring to form an alicyclic ring, or a monocyclic or polycyclic aromatic ring; the aryl, heteroaryl, arylamino or heterocycloalkyl of Ar_{31} and Ar_{32} may be further substituted by one or more substituent(s) selected from halogen, (C1-C60)alkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C1-C60) alkyloxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60) arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro and hydroxyl;

Ar_{33} represents (C6-C60)aryl, (C5-C60)heteroaryl or (C6-C60)arylamino; the aryl, heteroaryl or arylamino of Ar_{33} may be further substituted by one or more substituent(s) selected from halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkyloxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro and hydroxyl; and

g is an integer from 1 to 4.

[0038] The arylamine compounds or styrylarylamine compounds may be more specifically exemplified by the following compounds, but they are not restricted thereto.



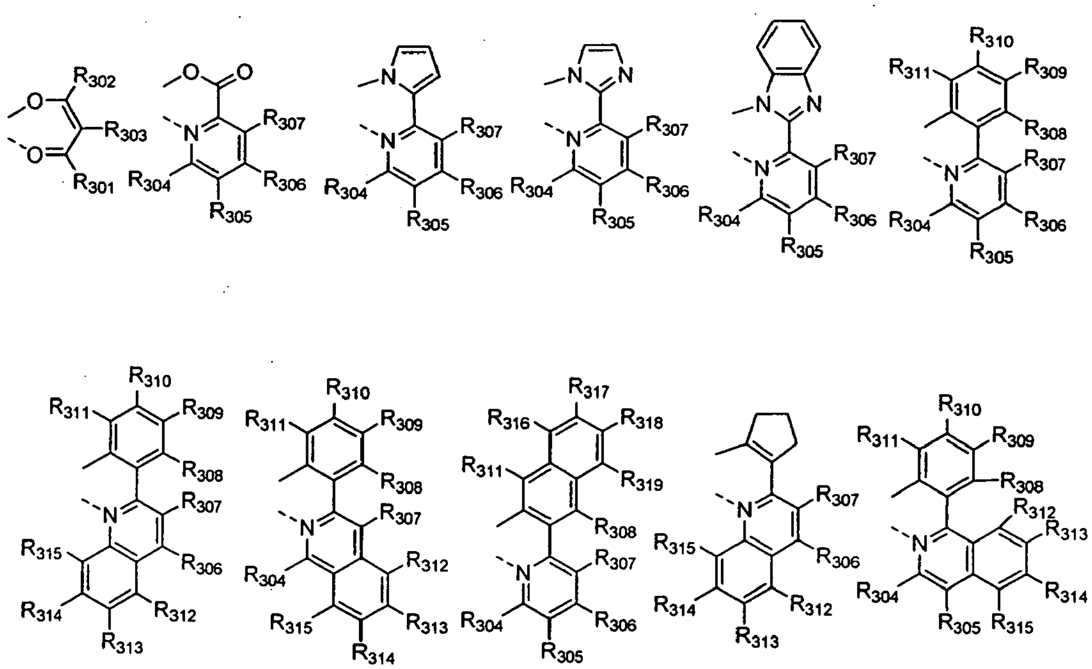
[0039] In an organic electroluminescent device according to the present invention, the organic layer may further comprise one or more metal(s) selected from a group consisting of organic metals of Group 1, Group 2, 4th period and 5th period transition metals, lanthanide metals and d-transition elements from the Periodic Table of Elements, as well as the organic electroluminescent compound represented by Chemical Formula (1) or Chemical Formula (2). The organic layer may comprise a charge generating layer, in addition to an electroluminescent layer.

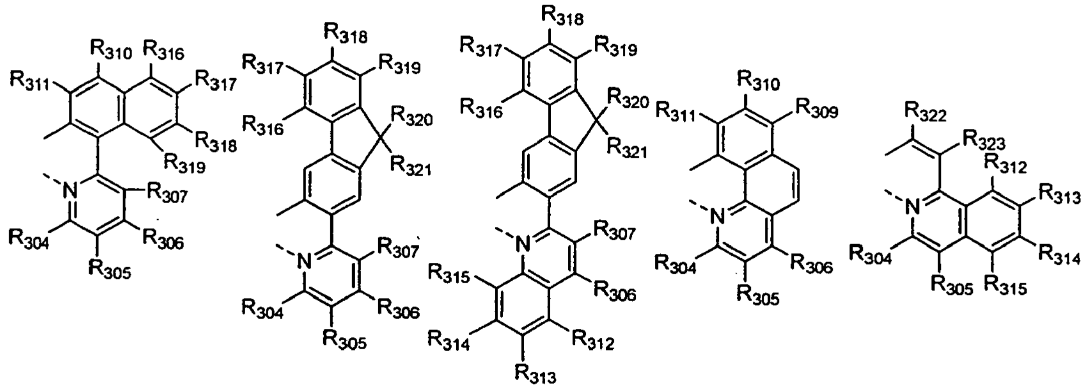
[0040] The present invention can realize an organic electroluminescent device having a pixel structure of independent light-emitting mode, which comprises an organic electroluminescent device containing one of the organic electroluminescent compounds of Chemical Formula (1) or Chemical Formula (2) as a sub-pixel, and one or more sub-pixel(s) comprising one or more metallic compound(s) selected from a group consisting of Ir, Pt, Pd, Rh, Re, Os, Tl, Pb, Bi, In, Sn, Sb, Te, Au and Ag, patterned in parallel at the same time.

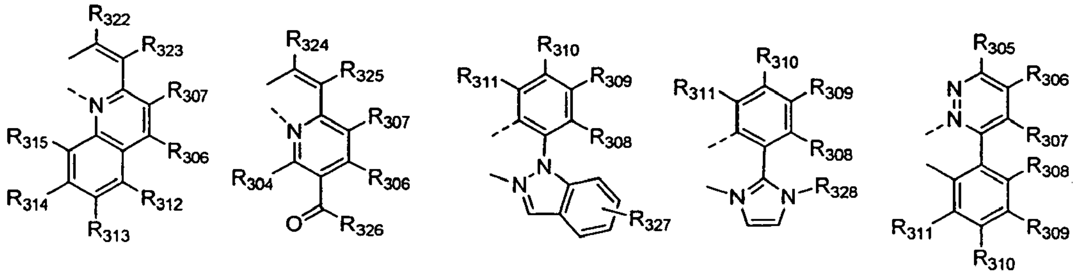
[0041] Further, the organic electroluminescent device is a white electroluminescent device wherein the organic layer comprises, in addition to the organic electroluminescent compound according to the invention, one or more compound (s) selected from compounds having the electroluminescent peak of wavelength of not more than 500 nm, or those having the electroluminescent peak of wavelength of not less than 560 nm, at the same time. Those compounds may be exemplified by the compounds represented by one of Chemical Formulas (9) to (15), but they are not restricted thereto.

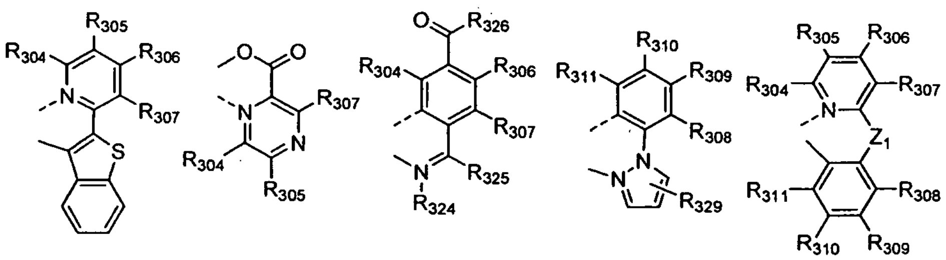
[Chemical Formula 9] $M^1L^1L^2L^3$

[0042] In Chemical Formula (9), M^1 is selected from metals from Group 7, 8, 9, 10, 11, 13, 14, 15 and 16 in the Periodic Table of Elements, and ligands L^1, L^2 and L^3 are independently selected from the following structures:









wherein, R_{301} through R_{303} independently represent hydrogen, (C1-C60)alkyl with or without halogen substituent (s), (C6-C60)aryl with or without (C1-C60)alkyl substituent(s), or halogen;

R_{304} through R_{319} independently represent hydrogen, (C1-C60)alkyl, (C1-C30)alkoxy, (C3-C60)cycloalkyl, (C2-C30)alkenyl, (C6-C60)aryl, mono or di(C1-C30)alkylamino, mono or di(C6-30)arylamino, SF_5, tri(C1-C30)alkylsilyl, di(C1-C30)alkyl(C6-C30)arylsilyl, tri(C6-C30)arylsilyl, cyano or halogen; and the alkyl, cycloalkyl, alkenyl or aryl of R_{304} through R_{319} may be further substituted by one or more substituent(s) selected from (C1-C60)alkyl, (C6-C60) aryl and halogen;

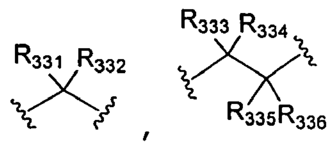
R_{320} through R_{323} independently represent hydrogen, (C1-C60)alkyl with or without halogen substituent(s), or (C6-C60)aryl with or without (C1-C60)alkyl substituent(s);

R_{324} and R_{325} independently represent hydrogen, linear or branched (C1-C60)alkyl, (C6-C60)aryl or halogen, or R_{324} and R_{325} may be linked via (C3-C12)alkylene or (C3-C12)alkenylene with or without a fused ring to form an alicyclic ring, or a monocyclic or polycyclic aromatic ring; and the alkyl or aryl of R_{324} and R_{325}, or the alicyclic ring, or the monocyclic or polycyclic aromatic ring formed therefrom via (C3-C12)alkylene or (C3-C12)alkenylene with or without a fused ring may be further substituted by one or more substituent(s) selected from linear or branched (C1-C60)alkyl with or without halogen substituent(s), (C1-C30)alkoxy, halogen, tri(C1-C30)alkylsilyl, tri(C6-C30)arylsilyl and (C6-C60)aryl;

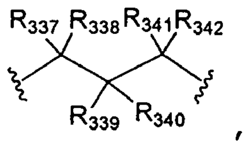
R_{326} represents (C1-C60)alkyl, (C6-C60) aryl, (C5-C60)heteroaryl or halogen;

R_{327} through R_{329} independently represent hydrogen, (C1-C60)alkyl, (C6-C60)aryl or halogen, and the alkyl or aryl of R_{326} through R_{329} may be further substituted by halogen or (C1-C60)alkyl;

Z_1 represents

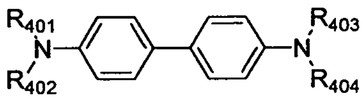


or



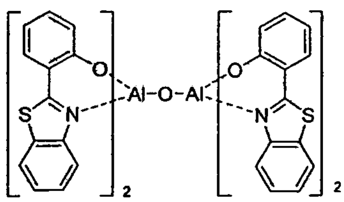
and R_{331} through R_{342} independently represent hydrogen, (C1-C60)alkyl with or without halogen substituent(s), (C1-C30)alkoxy, halogen, (C6-C60)aryl, cyano or (C5-C60)cycloalkyl, or each of R_{331} through R_{342} may be linked to an adjacent substituent via alkylene or alkenylene to form a (C5-C7) spiro-ring or (C5-C9) fused ring, or each of them may be linked to R_{307} or R_{308} via alkylene or alkenylene to form a (C5-C7) fused ring.

【Chemical Formula 10】

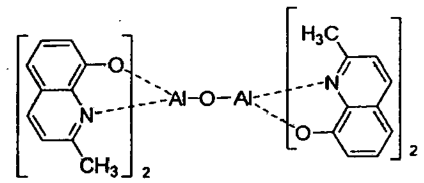


[0043] In Chemical Formula (10), R_{401} through R_{404} independently represent (C1-C60)alkyl or (C6-C60)aryl, or each of them may be linked to an adjacent substituent via (C3-C60)alkylene or (C3-C60)alkenylene with or without a fused ring to form an alicyclic ring, or a monocyclic or polycyclic aromatic ring; and the alkyl or aryl of R_{401} through R_{404}, or the alicyclic ring, or the monocyclic or polycyclic aromatic ring formed therefrom by linkage via (C3-C60)alkylene or (C3-C60)alkenylene with or without a fused ring may be further substituted by one or more substituent(s) selected from (C1-C60)alkyl with or without halogen substituent(s), (C1-C60)alkoxy, halogen, tri(C1-C60)alkylsilyl, tri(C6-C60)arylsilyl and (C6-C60)aryl.

【Chemical Formula 11】

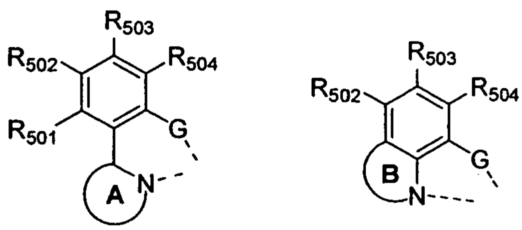


【Chemical Formula 12】



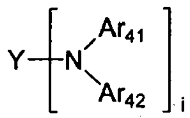
[Chemical Formula 13] $L^4L^5M^2(Q)_h$

[0044] In Chemical Formula (13), the ligands, L^4 and L^5 are independently selected from the following structures:



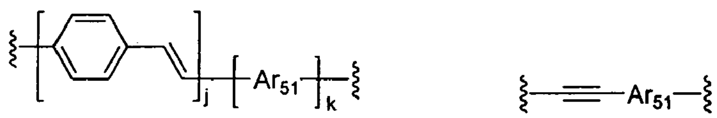
wherein, M^2 is a bivalent or trivalent metal;
h is 0 when M^2 is a bivalent metal, while h is 1 when M^2 is a trivalent metal;
Q represents (C6-C60)aryloxy or tri(C6-C60)arylsilyl, and the aryloxy and triarylsilyl of Q may be further substituted by (C1-C60)alkyl or (C6-C60)aryl;
G represents O, S or Se;
ring A represents oxazole, thiazole, imidazole, oxadiazole, thiadiazole, benzoxazole, benzothiazole, benzimidazole, pyridine or quinoline;
ring B represents pyridine or quinoline, and ring B may be further substituted by (C1-C60)alkyl, or phenyl or naphthyl with or without (C1-C60)alkyl substituent(s);
R_{501} through R_{504} independently represent hydrogen, (C1-C60)alkyl, halogen, tri(C1-C60)alkylsilyl, tri(C6-C60)arylsilyl or (C6-C60)aryl, or each of them may be linked to an adjacent substituent via (C3-C60)alkylene or (C3-C60)alkenylene to form a fused ring, and the pyridine or quinoline may form a chemical bond with R_{501} to form a fused ring;
ring A or the aryl group of R_{501} through R_{504} may be further substituted by (C1-C60)alkyl, halogen, (C1-C60)alkyl with halogen substituent(s), phenyl, naphthyl, tri(C1-C60)alkylsilyl, tri(C6-C60)arylsilyl or amino group.

【Chemical Formula 14】



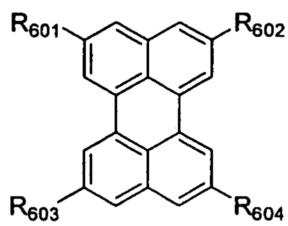
[0045] In Chemical Formula (14), Ar_{41} and Ar_{42} independently represent (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, (C6-C60)arylamino, (C1-C60)alkylamino, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, 0 and S, or (C3-C60)cycloalkyl, or Ar_{41} and Ar_{42} may be linked via (C3-C60)alkylene or (C3-C60)alkenylene with or without a fused ring to form an alicyclic ring, or a monocyclic or polycyclic aromatic ring; the alkyl, aryl, heteroaryl, arylamino, alkylamino, cycloalkyl or heterocycloalkyl of Ar_{41} and Ar_{42} may be further substituted by one or more substituent(s) selected from a group consisting of halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5-or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkyloxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl,

(C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro and hydroxyl;
Y represents (C6-C60)arylene, (C4-C60)heteroarylene or arylene represented by one of the following structural formulas:



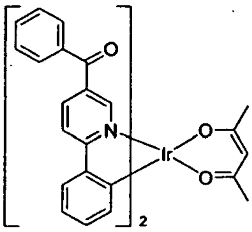
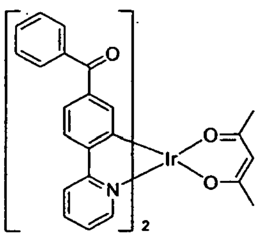
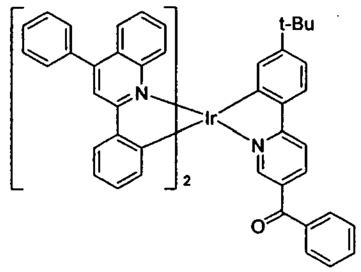
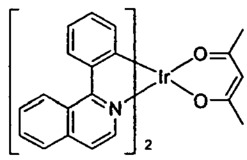
wherein, Ar_{51} represents (C6-C60)arylene or (C4-C60)heteroarylene,
the arylene or heteroarylene of Y and Ar_{51} may be further substituted by one or more substituent(s) selected from a group consisting of halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkyloxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro and hydroxyl;
i is an integer from 1 to 4;
j is an integer from 1 to 4; and
k is an integer of 0 or 1.

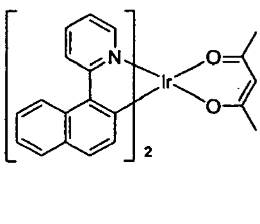
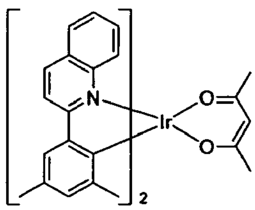
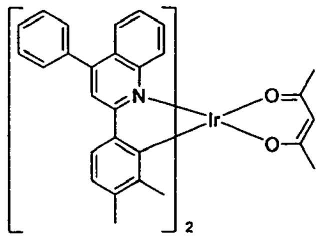
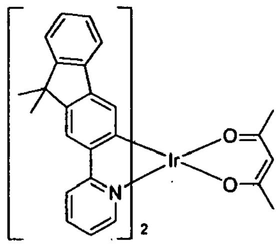
【Chemical Formula 15】

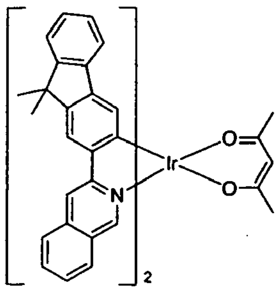
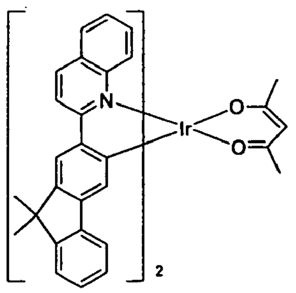
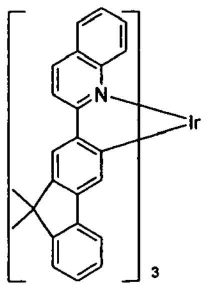
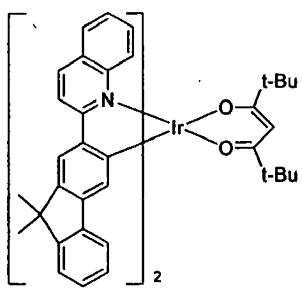


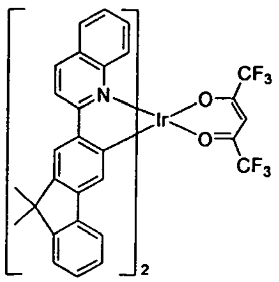
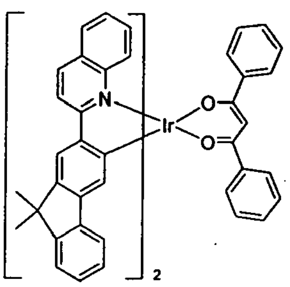
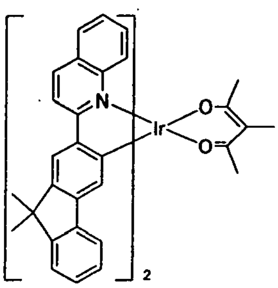
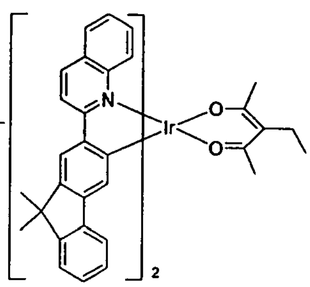
[0046] In Chemical Formula (15), R_{601} through R_{604} independently represent hydrogen, halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro or hydroxyl, or each of R_{601} through R_{604} may be linked to an adjacent substituent via (C3-C60)alkylene or (C3-C60)alkenylene with or without a fused ring to form an alicyclic ring, or a monocyclic or polycyclic aromatic ring;
the alkyl, alkenyl, alkynyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, arylsilyl, alkylsilyl, alkylamino or arylamino of R_{601} through R_{604}, or the alicyclic ring, or the monocyclic or polycyclic aromatic ring formed therefrom by linkage to an adjacent substituent via (C3-C60)alkylene or (C3-C60)alkenylene with or without a fused ring may be further substituted by one or more substituent(s) selected from halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5-or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro and hydroxyl.

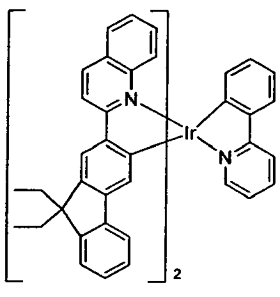
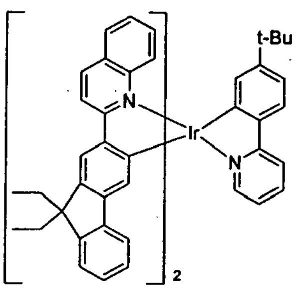
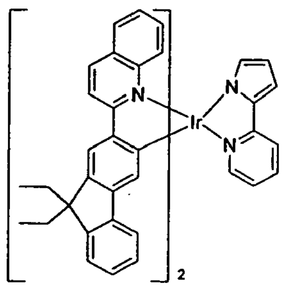
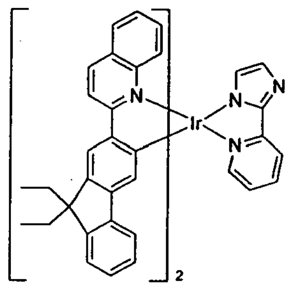
[0047] The compounds having electroluminescent peak of wavelength of not more than 500 nm, or those having electroluminescent peak of wavelength of not less than 560 nm, can be exemplified by the following compounds, but they are not restricted thereto.

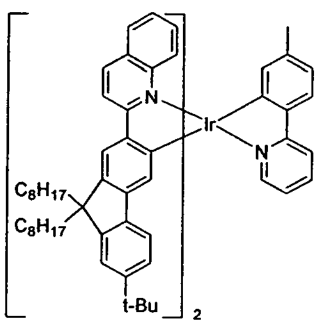
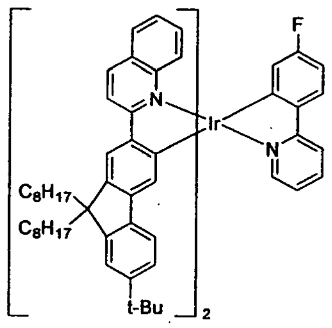
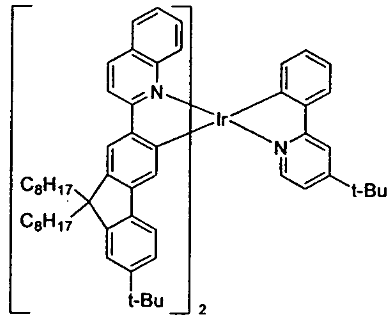
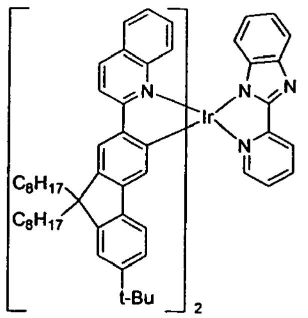
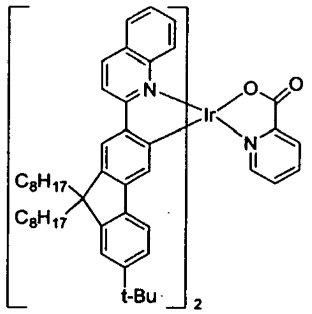
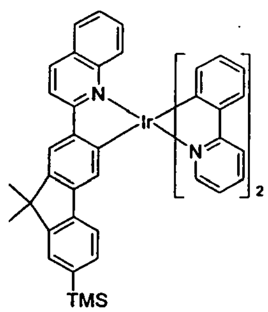
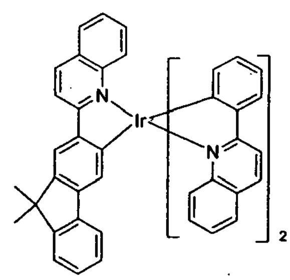
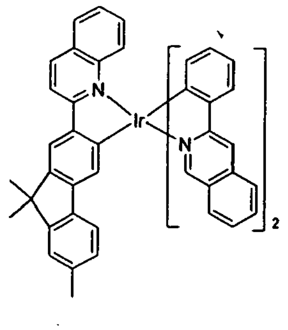
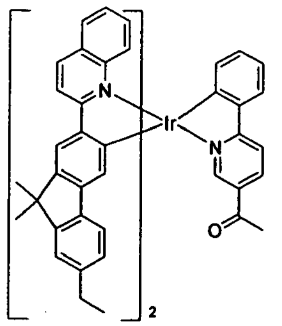
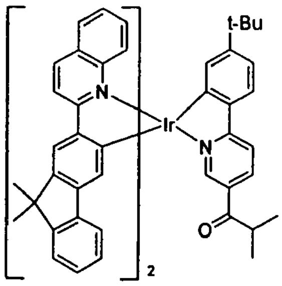
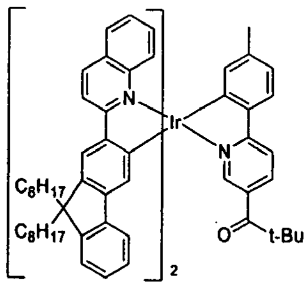
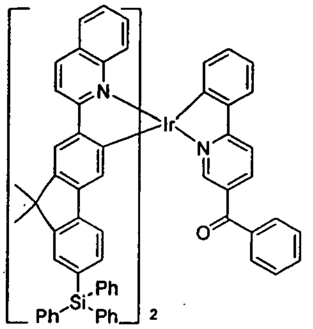
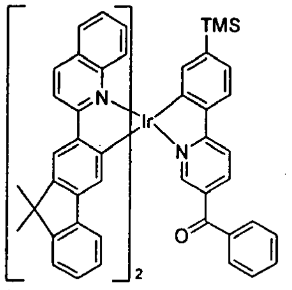
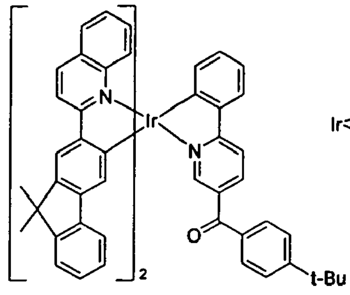
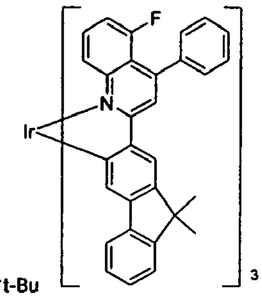
   

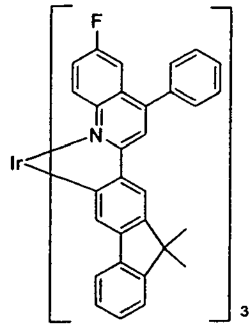
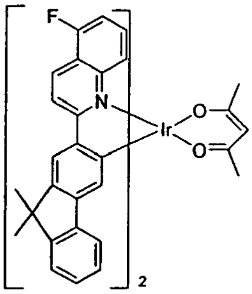
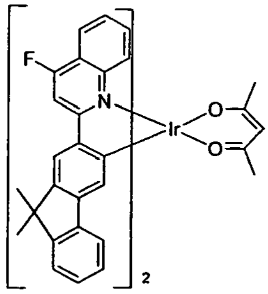
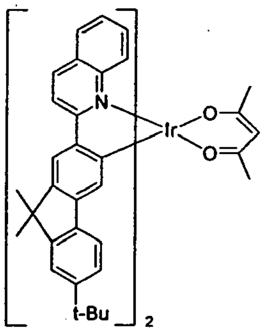
   

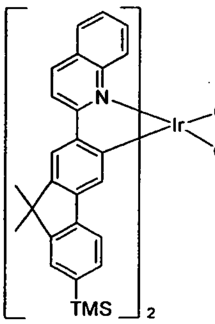
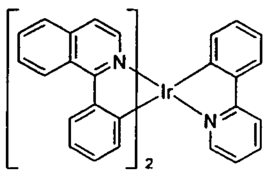
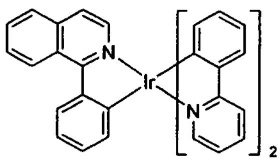
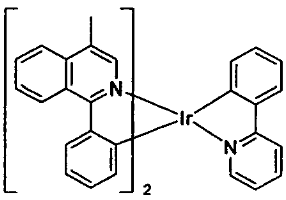
   

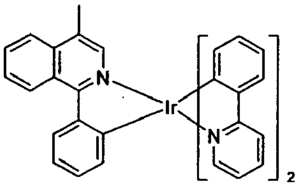
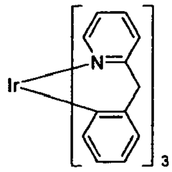
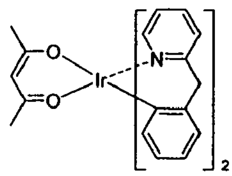
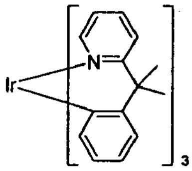
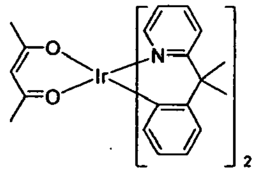
   

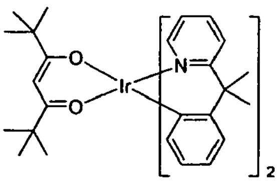
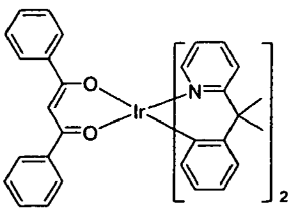
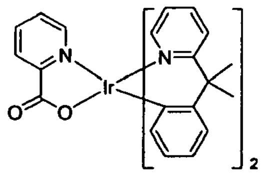
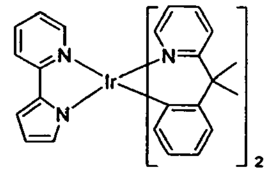
   

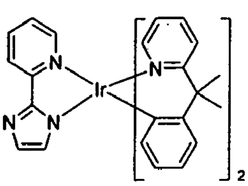
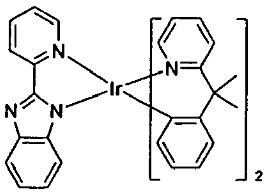
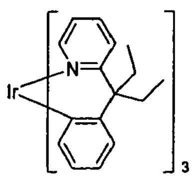
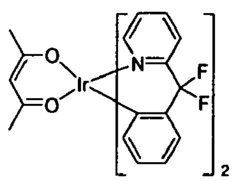
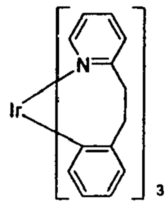
















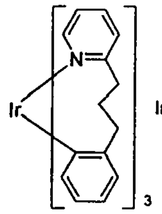
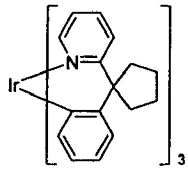
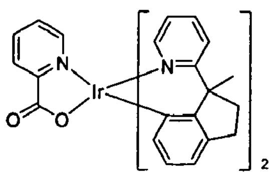
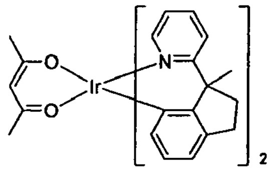
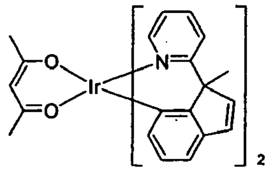
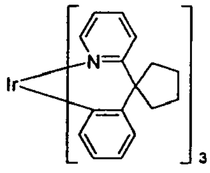
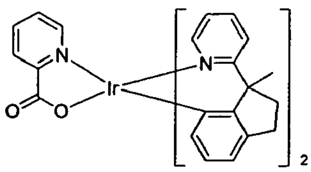
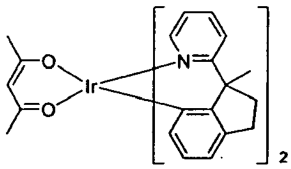
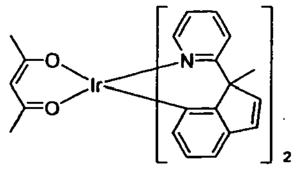
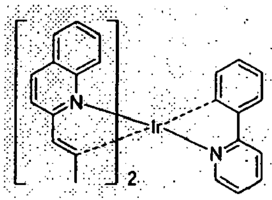
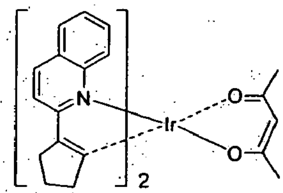
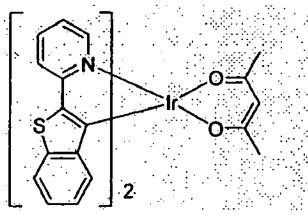
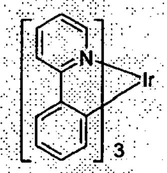
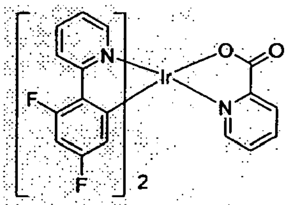
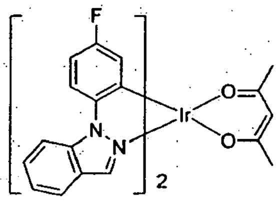
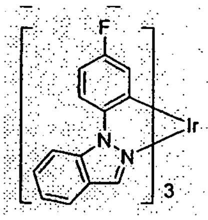
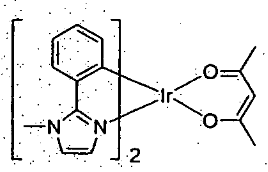
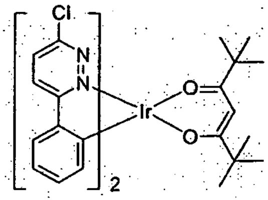
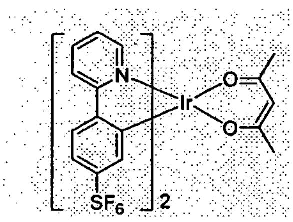
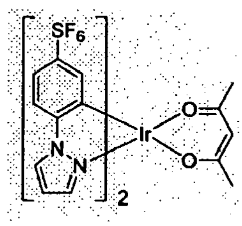
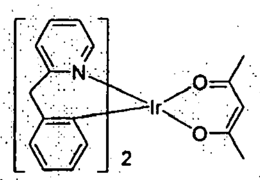
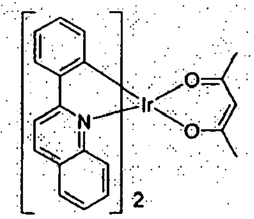
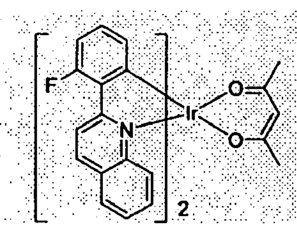





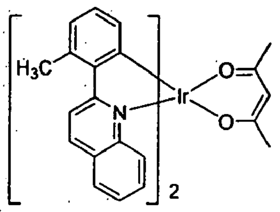
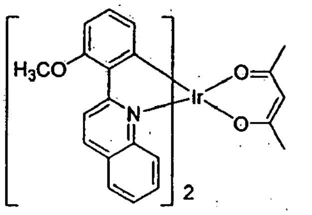
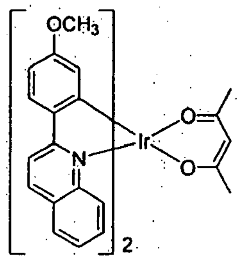
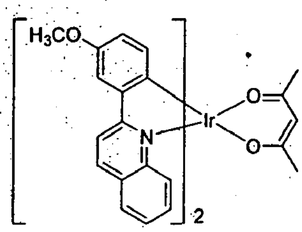
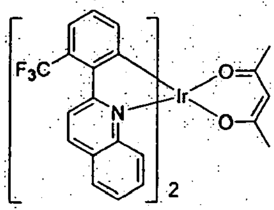
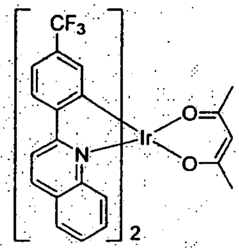
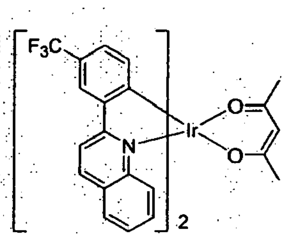
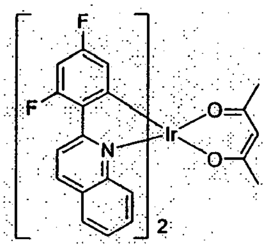
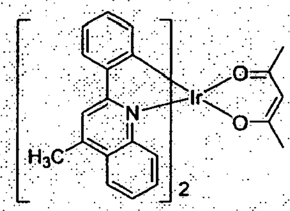
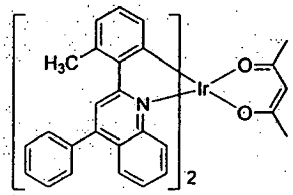
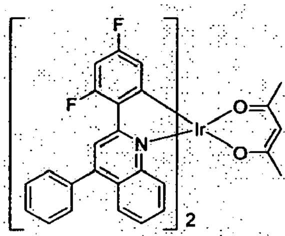
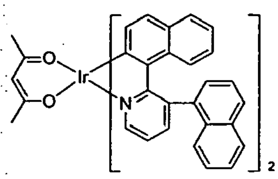
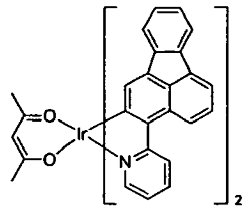
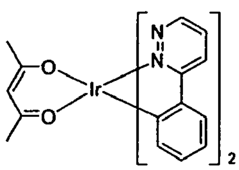
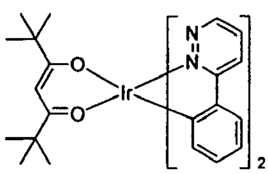
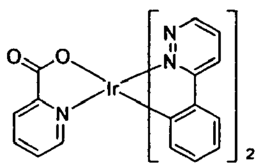
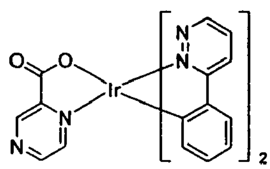





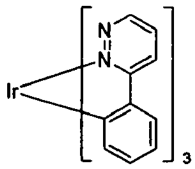
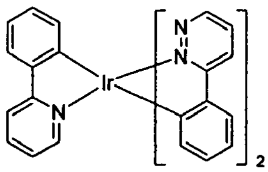
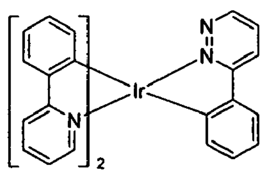
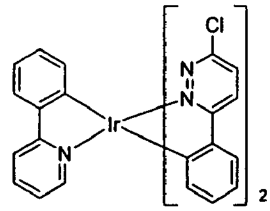






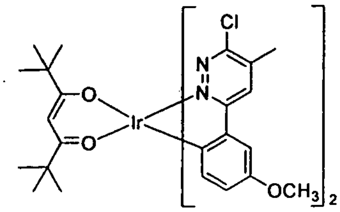
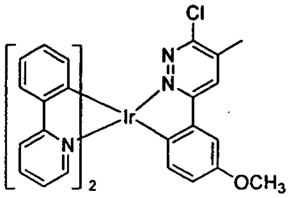
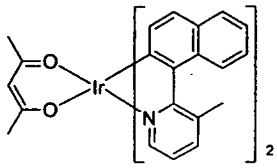
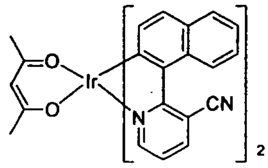





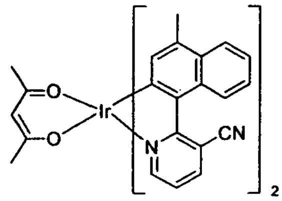
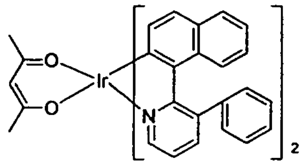
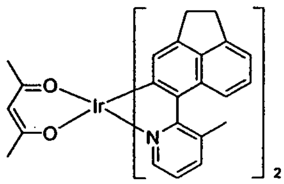
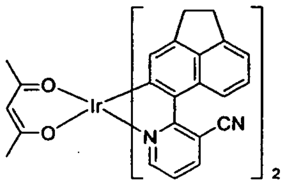






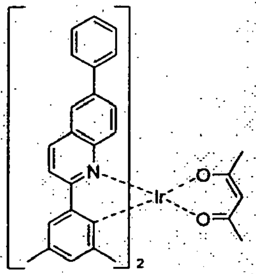
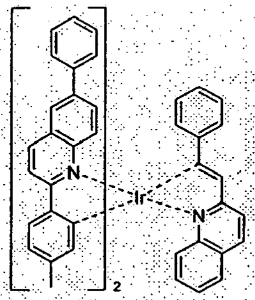
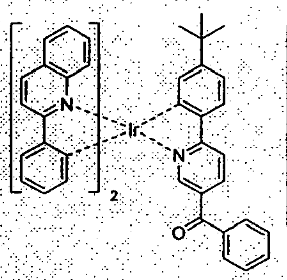
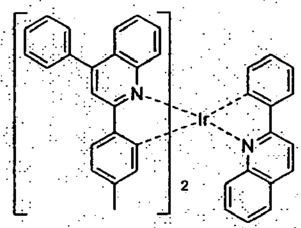
























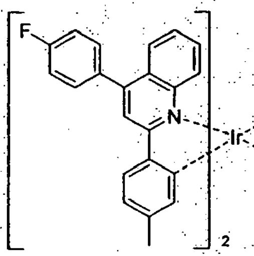
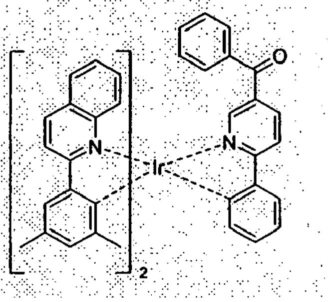
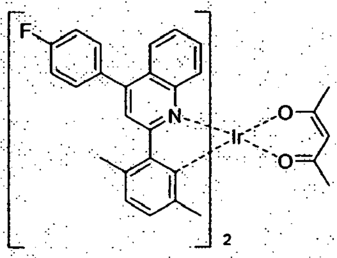


















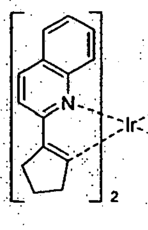
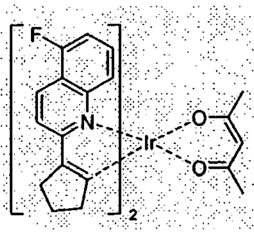
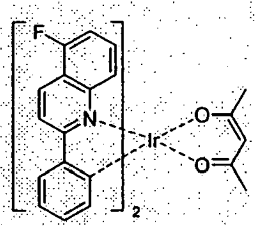





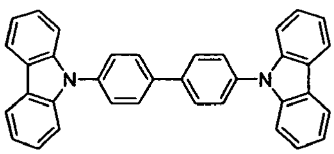
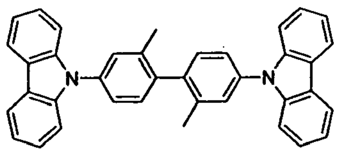
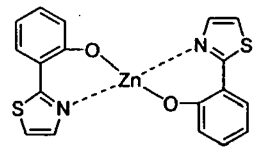





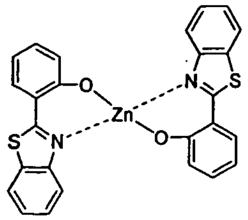
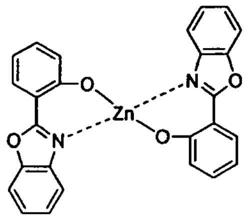
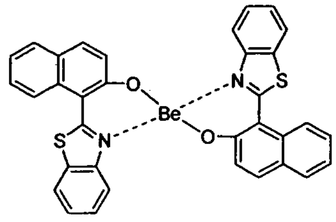





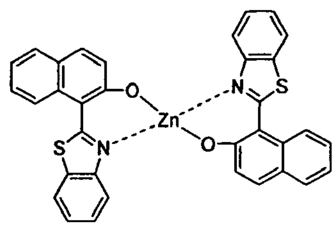
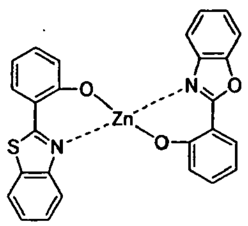
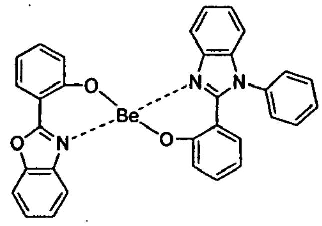





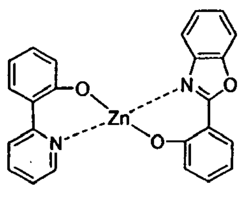
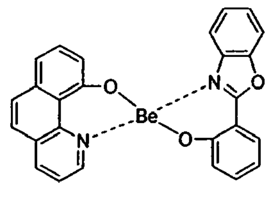
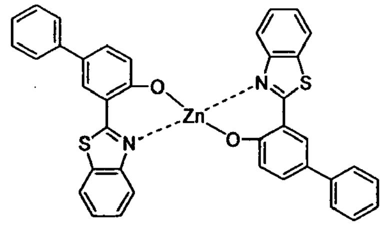




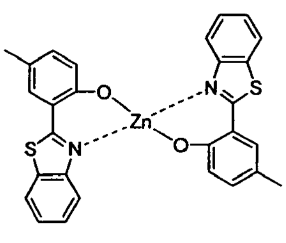
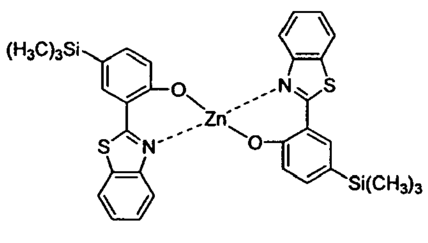
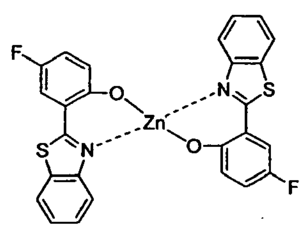




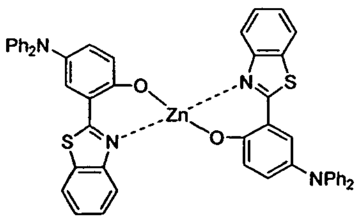


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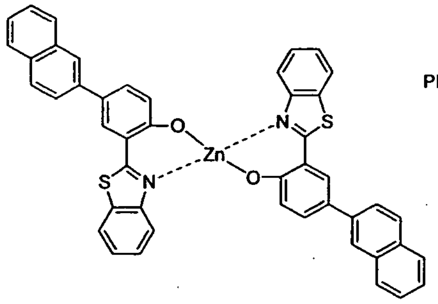

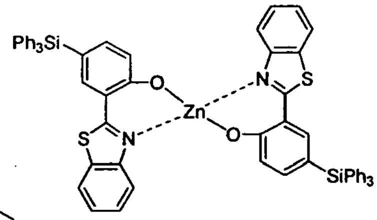
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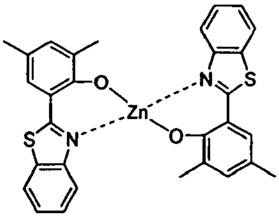

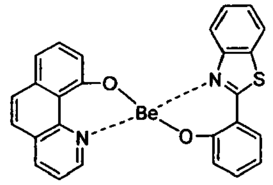

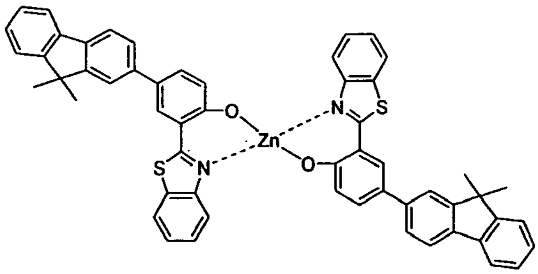

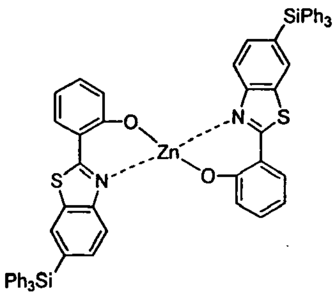
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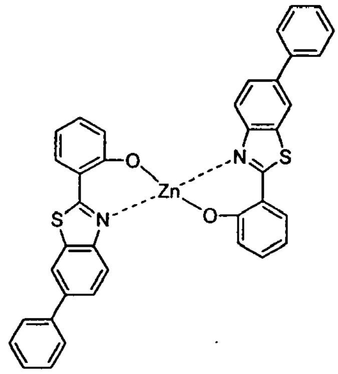

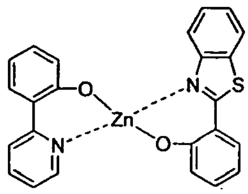

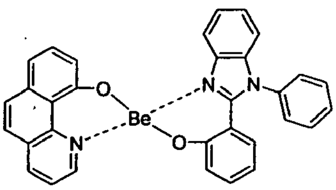

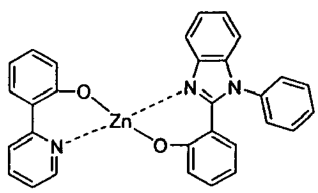

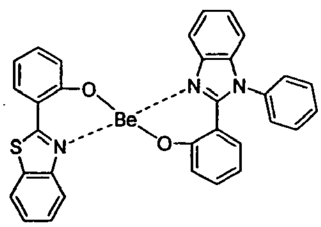

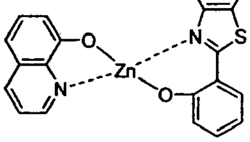

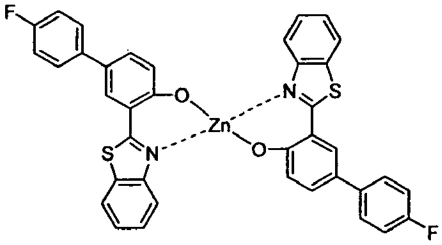
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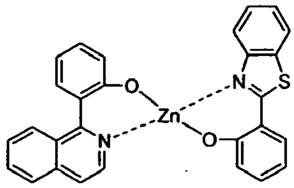
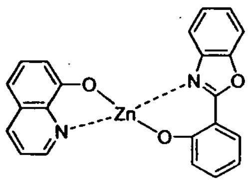
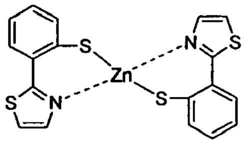
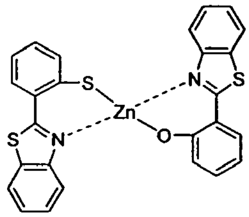
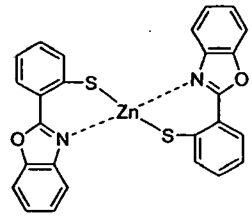
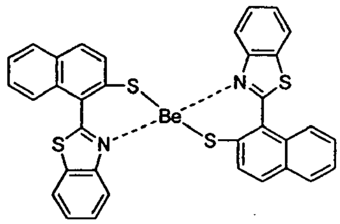
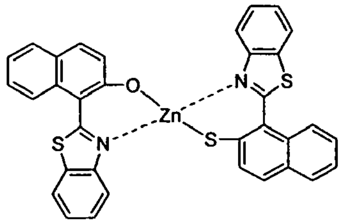
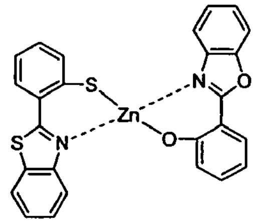
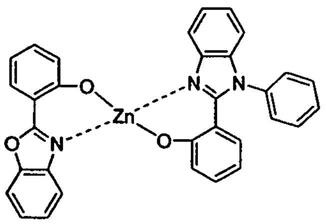
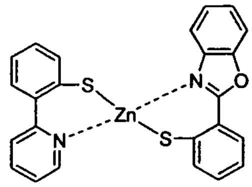
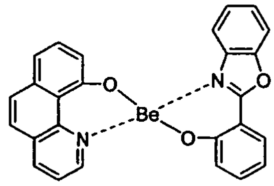
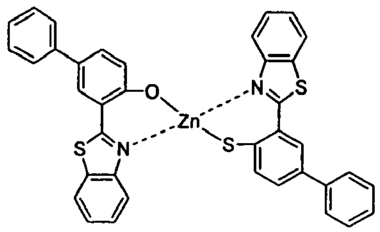
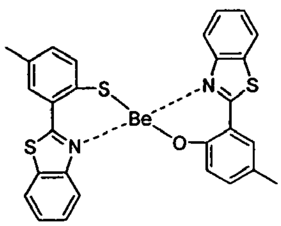
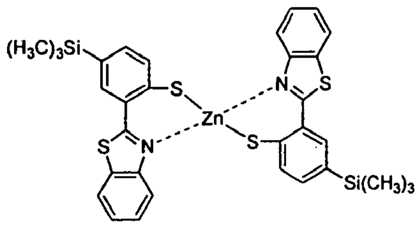
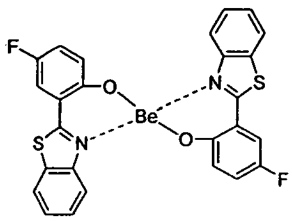
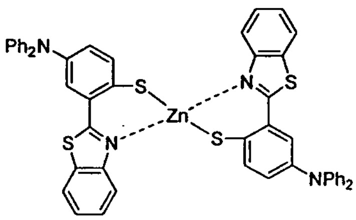
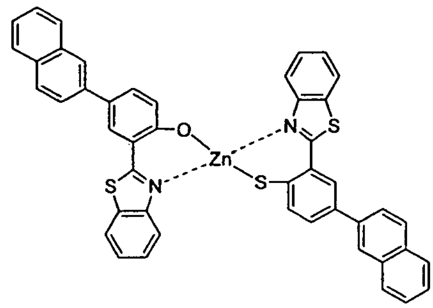


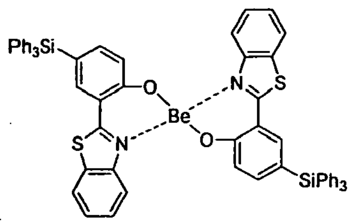
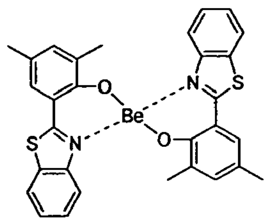
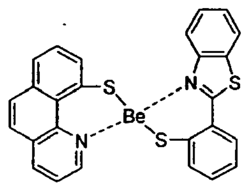
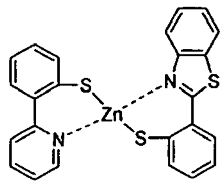





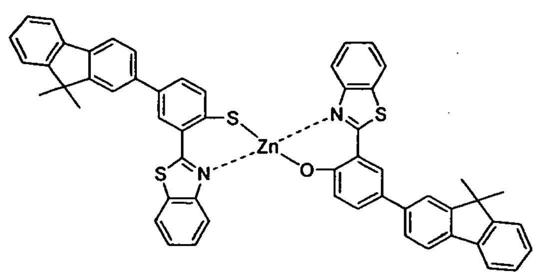
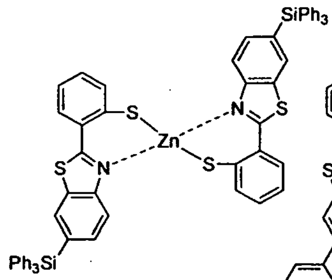
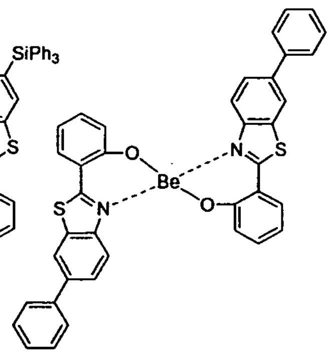
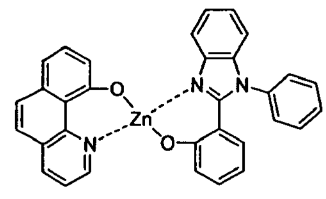
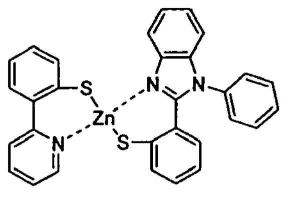
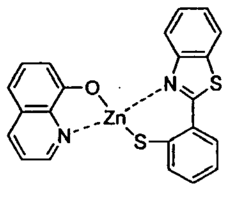
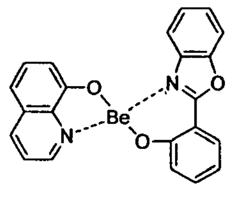
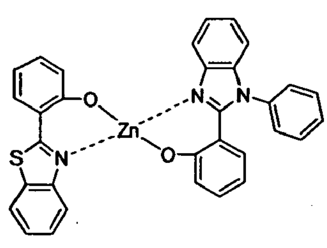
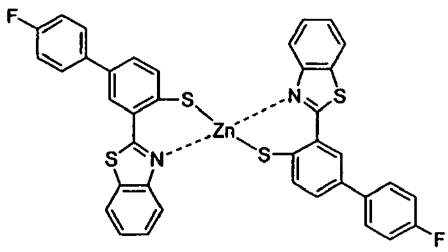
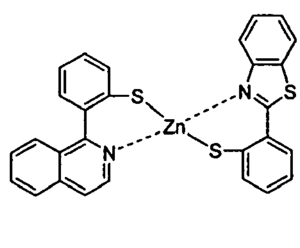
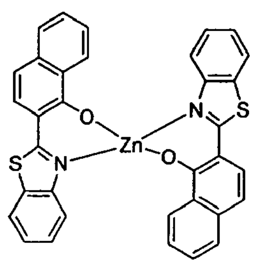
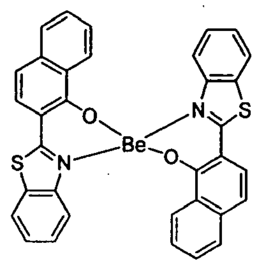
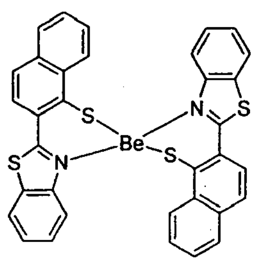
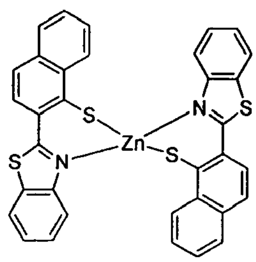
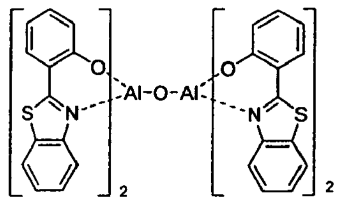
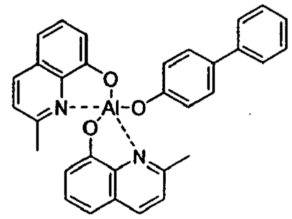
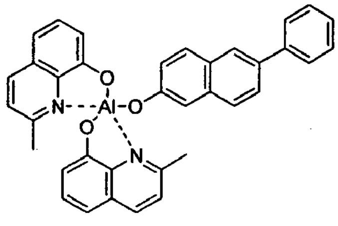




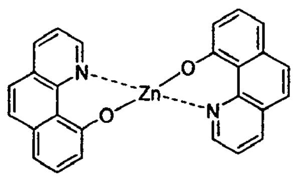
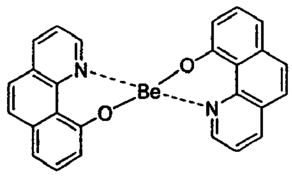
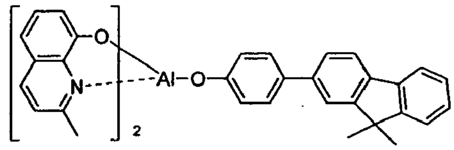




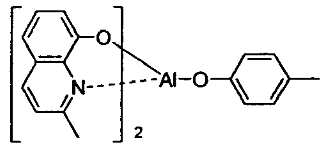
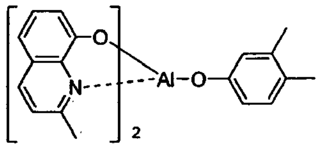
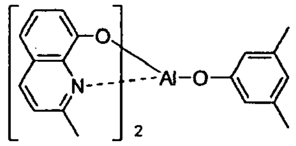




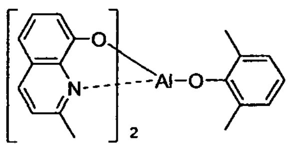
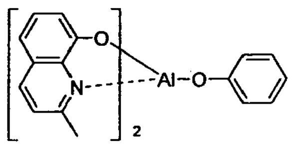
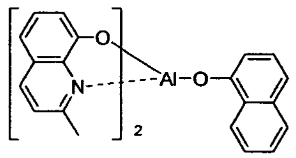




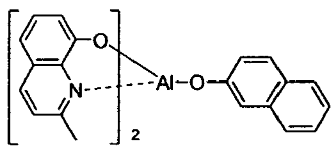
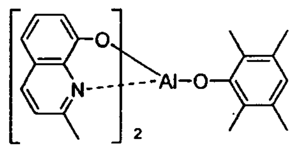
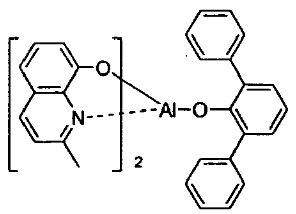





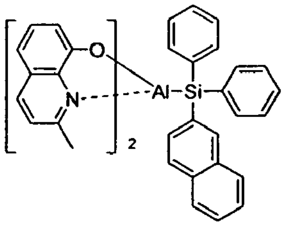
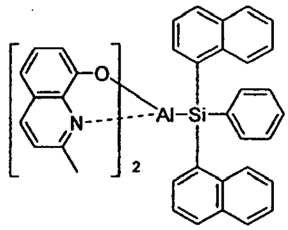
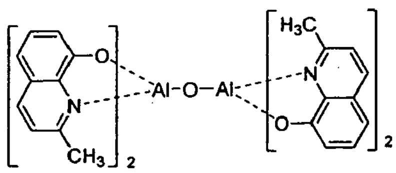


















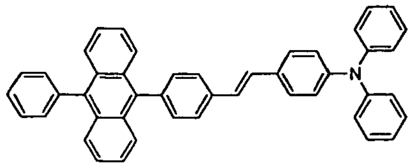
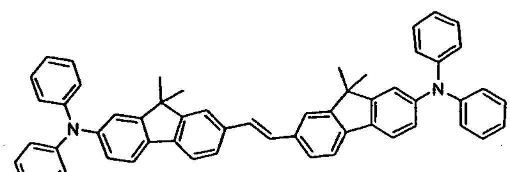




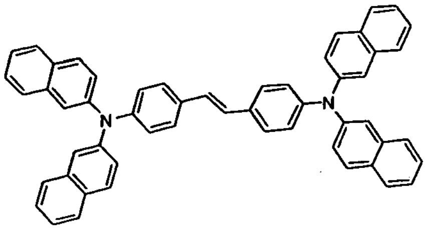
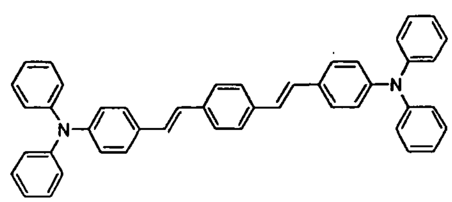




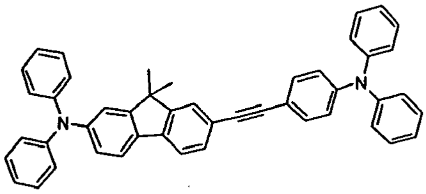
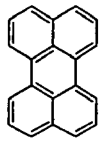
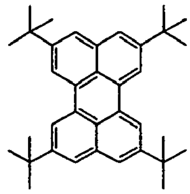




[0048] In an organic electroluminescent device according to the present invention, it is preferable to arrange one or more layer(s) (here-in-below, referred to as the "surface layer") selected from chalcogenide layers, metal halide layers and metal oxide layers, on the inner surface of at least one side of the pair of electrodes. Specifically, it is preferable to arrange a chalcogenide layer of silicon and aluminum metal (including oxides) on the anode surface of the EL medium layer, and a metal halide layer or a metal oxide layer on the cathode surface of the EL medium layer. As the result, stability in operation can be obtained.

[0049] Examples of chalcogenides preferably include SiO_x ($1 \leq X \leq 2$), AlO_x ($1 \leq X \leq 1.5$), SiON, SiAlON, or the like. Examples of metal halides preferably include LiF, MgF_2, CaF_2, fluorides of rare earth metal or the like. Examples of metal oxides preferably include Cs_2O, Li_2O, MgO, SrO, BaO, CaO, or the like.

[0050] In an organic electroluminescent device according to the present invention, it is also preferable to arrange, on at least one surface of the pair of electrodes thus manufactured, a mixed region of electron transport compound and a reductive dopant, or a mixed region of a hole transport compound with an oxidative dopant. Accordingly, the electron transport compound is reduced to an anion, so that injection and transportation of electrons from the mixed region to an EL medium are facilitated. In addition, since the hole transport compound is oxidized to form a cation, injection and transportation of holes from the mixed region to an EL medium are facilitated. Preferable oxidative dopants include various Lewis acids and acceptor compounds. Preferable reductive dopants include alkali metals, alkali metal compounds, alkaline earth metals, rare-earth metals, and mixtures thereof.

[0051] The organic electroluminescent compounds according to the present invention, having high luminous efficiency and excellent life property of material, are advantageous in that they can be employed to manufacture organic light emitting diodes (OLED's) having very good operation life.

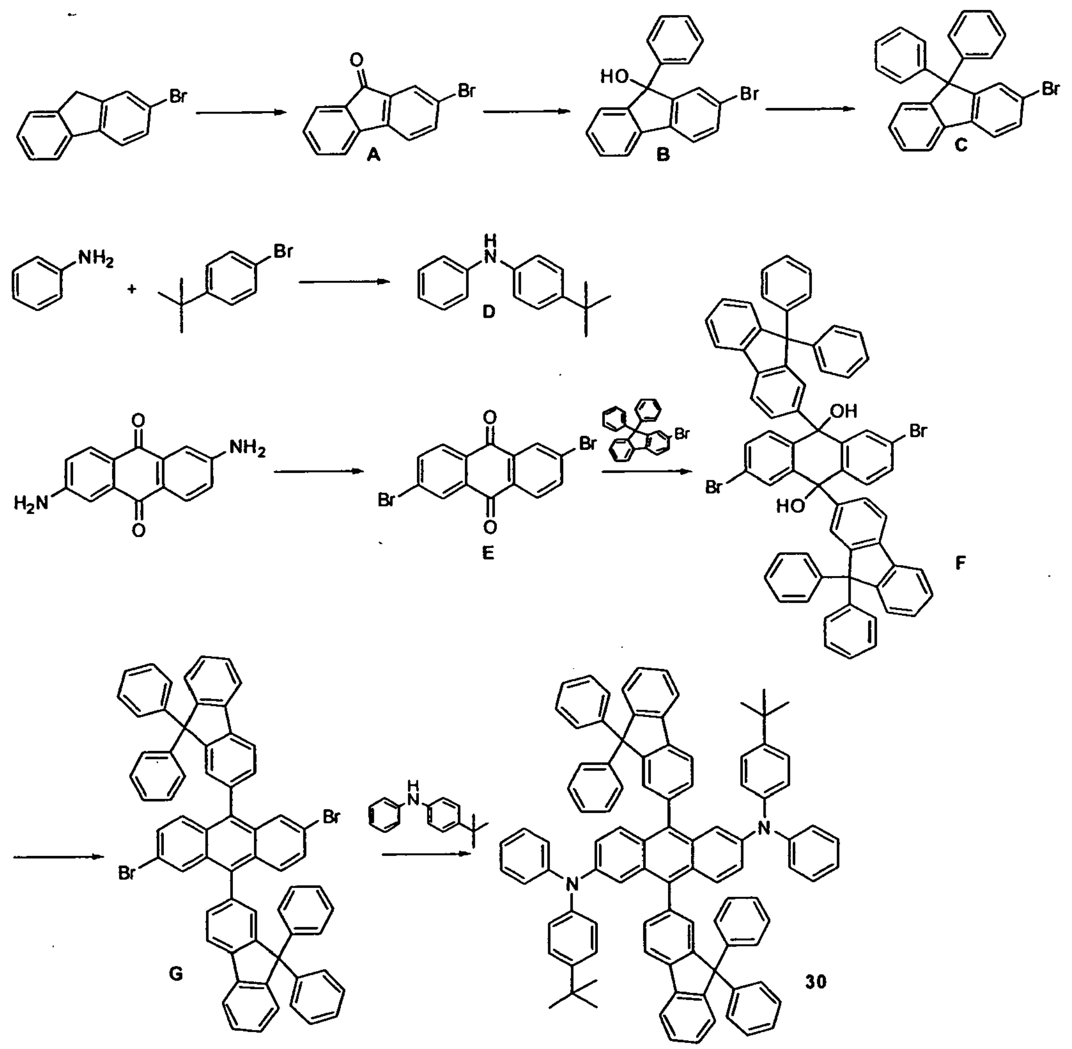
[Best Mode]

[0052] The present invention is further described by referring to representative compounds with regard to the organic electroluminescent compounds according to the invention, preparation thereof and luminescent properties of the devices manufactured therefrom, but those examples are provided for illustration of the embodiments only, not being intended to limit the scope of the invention by any means.

[Preparation Examples]

[Preparation Example 1] Preparation of Compound (30)

[0053]



Preparation of Compound (A)

[0054] A reaction vessel was charged with 2-bromofluorene (19.6 g, 79.96 mmol) and tetrabutylammonium hydroxide (6.4 mL, 6.4 mmol), and pyridine (80 mL) was added thereto with stirring. Air was blown to the mixture with vigorous stirring. After 3 days, acetic acid (100 mL) was added thereto to neutralize the reaction mixture. Yellow solid thus produced was filtered. The solid was stirred with ethanol (100 mL) and recrystallized therefrom to obtain Compound (A) (10.7 g, 41.3 mmol).

Preparation of Compound (B)

[0055] Under nitrogen atmosphere, Compound (A) (7.0 g, 27.02 mmol) was charged to a reaction vessel and dissolved in dry tetrahydrofuran solvent (500 mL). Phenyl magnesium bromide (18.01 mL, 54.03 mmol) was slowly added dropwise thereto. Then, the temperature was raised to 80°C, and the mixture was stirred under reflux. After 18 hours, saturated ammonium chloride solution was slowly added thereto to quench the reaction. After one hour, the mixture was extracted with ethyl acetate (300 mL), and the extract was washed with water (500 mL). The organic layer was dried over magnesium sulfate, and distilled under reduced pressure. The solid obtained was recrystallized from dichloromethane (300 mL) and n-hexane (300 mL) to provide Compound (B) (8.0 g, 23.72 mmol) as white powder.

Preparation of Compound (C)

[0056] Compound (B) (10.0 g, 29.65 mmol) was dissolved in benzene solvent (200 mL) in a reaction vessel, and the solution was stirred under reflux at 50°C. Trifluoromethane sulfonate (5.45 mL, 59.31 mmol) was slowly added dropwise thereto. After 20 hours, saturated ammonium chloride (NH_4Cl) solution was slowly added to the reaction mixture to quench the reaction. The organic layer obtained from extraction with dichloromethane (300 mL) was dried over magnesium sulfate, and distilled under reduced pressure. Recrystallization of the solid thus obtained from dichloromethane (100 mL) and methanol (300 mL) gave Compound (C) (7.8 g, 19.63 mmol).

Preparation of Compound (D)

[0057] In a reaction vessel, bis(dibenzylidenacetone)palladium (0) (4.05 g, 4.69 mmol) and cesium carbonate (305.77 g, 938.48 mmol) were added to 1-bromo-4-tert-butylbenzene (100.0 g, 469.24 mmol) and aminobenzene (48.06 g, 516.16 mmol), and toluene solvent (4 L) was added thereto under nitrogen atmosphere. While stirring the mixture, tri-tert-butylphosphine was added thereto. Upon raising the temperature to 120°C, the mixture was stirred under reflux for 3 hours. The reaction was quenched by adding water (2 L), and the resultant mixture was extracted with ethyl acetate (2 L). The organic layer was dried over magnesium sulfate, and distilled under reduced pressure. The solid obtained was recrystallized from dichloromethane (300 mL) and n-hexane (300 mL) to provide Compound (D) (80.0 g, 75.6%).

Preparation of Compound (E)

[0058] In a reaction vessel, copper bromide (101.0 g, 0.45 mmol), tert-butyl nitrate (58.34 mL, 0.49 mmol) and acetonitrile (800 mL) were stirred at 70°C. After 1 hour, 2,6-diaminoanthraquinone (45.0 g, 0.19 mmol) was added thereto, and the mixture was stirred at 85°C for 48 hours. Then, 20% hydrochloric acid (1 L) was added thereto, and the resultant mixture was stirred for 1 hour. The precipitate produced was filtered and washed several times with water and methanol. Additional washing twice with acetone and dichloromethane, respectively, gave Compound (E) (50.0 g, 72%).

Preparation of Compound (F)

[0059] Compound (C) (20.0 g, 50.34 mmol) was dissolved in dry tetrahydrofuran solvent (200 mL) under nitrogen atmosphere, and 2.5 M n-butyllithium (in n-hexane) (26.85 mL, 67.12 mmol) was slowly added dropwise thereto at -78°C. After stirring for 1 hour, Compound (E) obtained as described above (6.14 g, 16.78 mmol) was added thereto. While slowly raising the temperature to room temperature, the mixture was stirred. After 17 hours, water was added, and the resultant mixture was stirred for 30 minutes. The mixture was extracted with ethyl acetate (500 mL) and the extract was washed with water (500 mL) to obtain organic layer. The organic layer was then dried over magnesium sulfate, and distilled under reduced pressure to obtain solid. Recrystallization of the solid from dichloromethane (300 mL) and n-hexane (300 mL) gave Compound (F) (7.3 g, 45%).

Preparation of Compound (G)

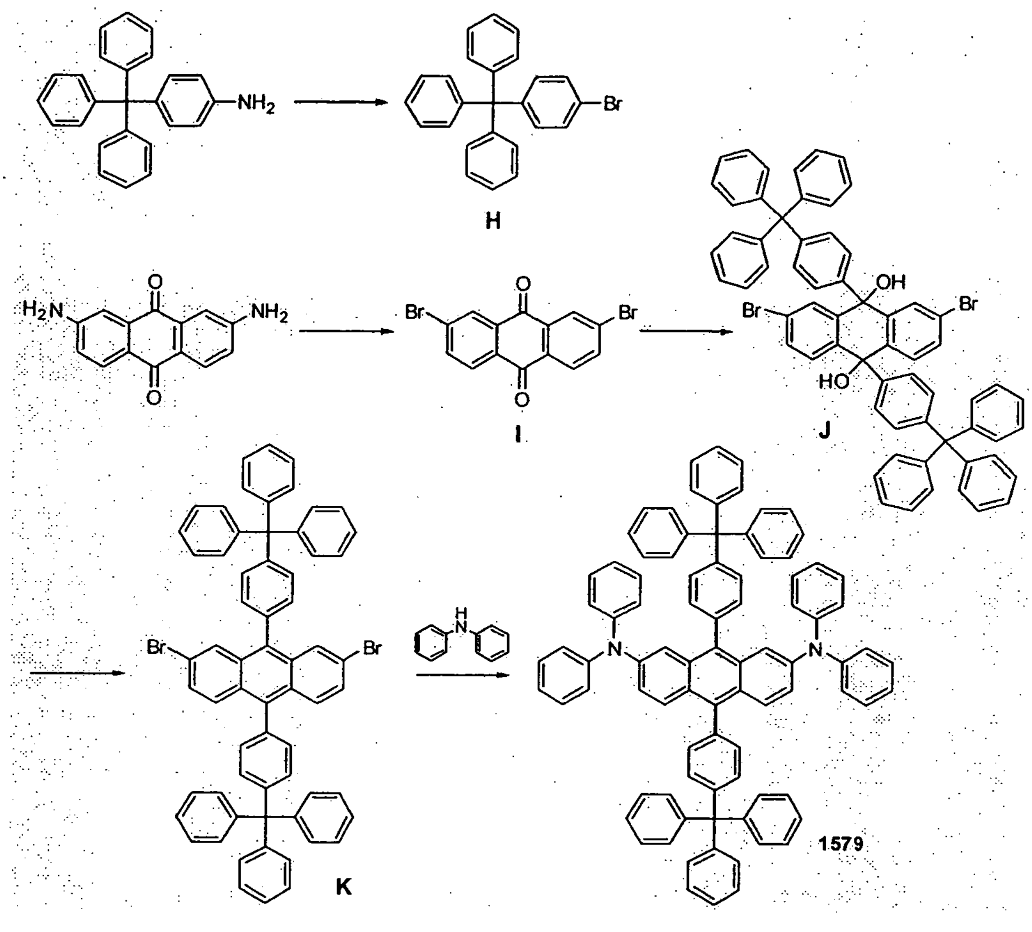
[0060] Compound (F) (7.0 g, 6.98 mmol), potassium iodide (4.64 g, 27.92 mmol), sodium hydrophosphite (4.44 g, 41.88 mmol) and acetic acid (100 mL) were stirred under reflux in a reaction vessel. After 15 hours, water (500 mL) was added thereto, and the mixture was stirred for 1 hour. The precipitate obtained from filtering under reduced pressure was washed three times with water (300 mL) and once with acetone (300 mL). Recrystallization from dichloromethane (100 mL) and methanol (500 mL) gave Compound (G) (5.0 g, 76%) as yellow solid.

Preparation of Compound (30)

[0061] A reaction vessel was charged with Compound (G) (4.0 g, 4.13 mmol), Compound (D) (2.79 g, 12.39 mmol), palladium acetate (II) (0.31 g, 0.34 mmol), tri-tert-butylphosphine (0.2 mL, 0.83 mmol), cesium carbonate (6.05 g, 12.39 mmol), and toluene solvent (50 mL), and the mixture was stirred under reflux in the presence of nitrogen atmosphere. After 8 hours, the mixture was cooled to room temperature, and water (100 mL) was added thereto to quench the reaction. The mixture was extracted with dichloromethane (300 mL) to obtain organic layer, which was dried over magnesium sulfate and distilled under reduced pressure. The organic product thus obtained was purified via column chromatography (dichloromethane: n-hexane = 5:1) to obtain the target compound (Compound 30) (2.0 g, 38%).

[Preparation Example 2] Preparation of Compound (1579)

[0062]



Preparation of Compound (H)

[0063] Copper bromide (20.0 g, 89.43 mmol) was dissolved in acetonitrile solvent (250 mL), and tert-butyl nitrate (10.62 mL, 89.43 mmol) was added thereto. After stirring at 70°C for 1 hour, 4-tritylaniline (20.0 g, 59.62 mmol) was added thereto, and the resultant mixture was stirred at 85°C for 20 hours. Then the reaction mixture was cooled to room temperature, and poured into water. The mixture was extracted with chloroform (500 mL), and the extract washed with saline (500 mL). The organic layer obtained was dried over magnesium sulfate, and distilled under reduced pressure. The organic product was recrystallized from dichloromethane (20 mL) and methanol (100 mL) to obtain the target compound (Compound H) (22.0 g, 92%).

Preparation of Compound (I)

[0064] In a reaction vessel, copper bromide (101.0 g, 0.45 mmol), tert-butyl nitrate (58.34 mL, 0.49 mmol) and acetonitrile (800 mL) were stirred at 70°C for 1 hour. Then, 2,7-diaminoanthraquinone (45.0 g, 0.19 mmol) was added thereto, and the mixture was stirred at 85°C for 48 hours. To the reaction mixture, 20% hydrochloric acid (1 L) was added, and the resultant mixture was stirred for one hour. The precipitate produced was filtered and washed several times with water and methanol. Additional washing with acetone and dichloromethane (twice, respectively) gave Compound (I) (50.0 g, 72%).

Preparation of Compound (J)

[0065] Compound (H) (20.0 g, 45.58 mmol) was dissolved in dry tetrahydrofuran solvent (250 mL) under nitrogen atmosphere, and 2.5 M n-butyllithium (in n-hexane) (29.28 mL, 45.58 mmol) was slowly added dropwise thereto at -78°C. After stirring for one hour, Compound (I) obtained as described above (6.69 g, 18.30 mmol) was added thereto, and the resultant mixture was stirred while slowly raising the temperature to room temperature. After 17 hours, water (300 mL) was added, and the mixture was stirred for 30 minutes and extracted with ethyl acetate (500 mL). The extract was washed with water (500 mL), and the organic layer was dried over magnesium sulfate and distilled under reduced pressure. The solid obtained was recrystallized from dichloromethane (300 mL) and n-hexane (300 mL) to obtain Compound (J) (11.6 g, 65%).

Preparation of Compound (K)

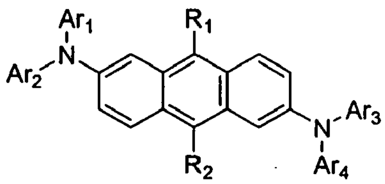
[0066] In a reaction vessel, Compound (J) (11.5 g, 11.42 mmol) and potassium iodide (7.58 g, 45.68 mmol), sodium hydrophosphite (7.26 g, 68.53 mmol) and acetic acid (100 mL) were stirred under reflux for 15 hours. Water (500 mL) was added thereto, and the mixture stirred for 1 hour. The precipitate obtained by filtering the mixture under reduced pressure was washed three times with water (300 mL) and once with acetone (300 mL), and recrystallized from dichloromethane (100 mL) and methanol (500 mL) to obtain Compound (K) (4.5 g, 40%) as pale yellow product.

Preparation of Compound (1579)

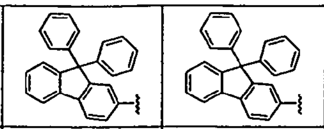
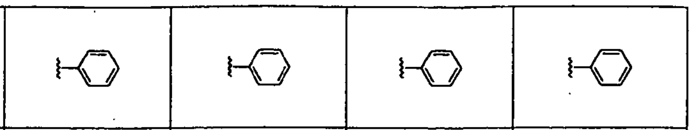
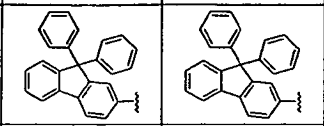
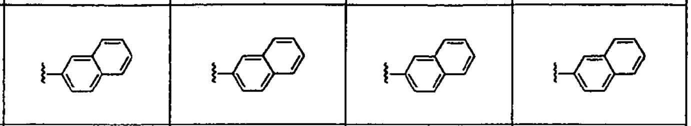
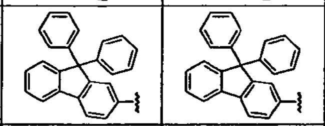
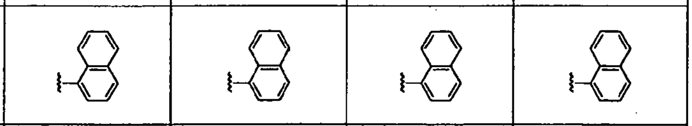
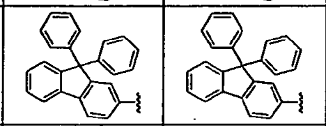
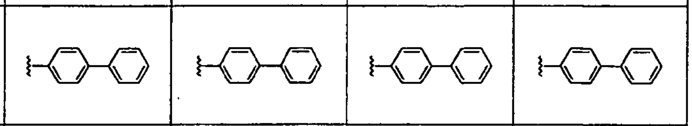
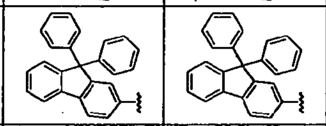
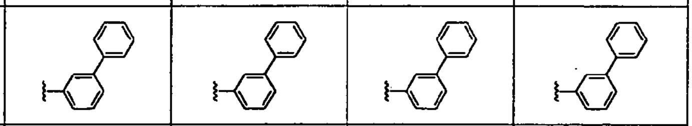
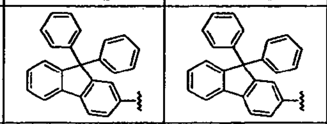
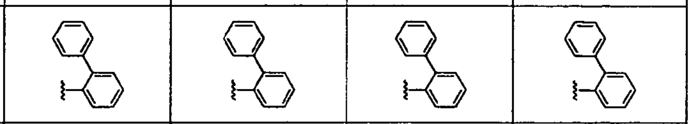
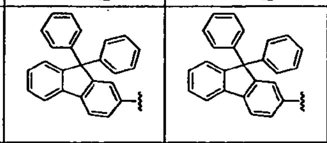
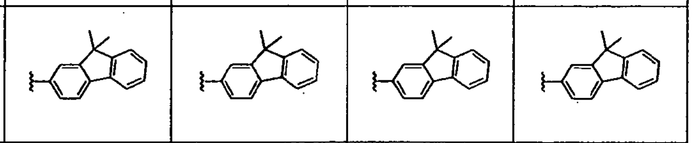
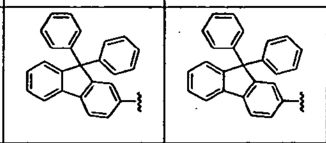
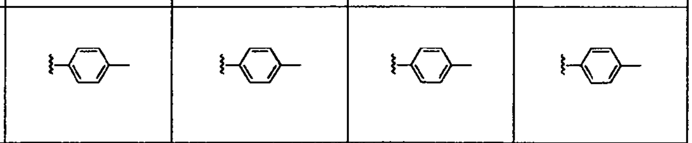
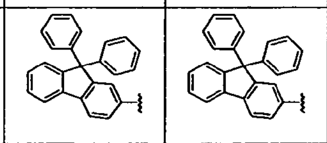
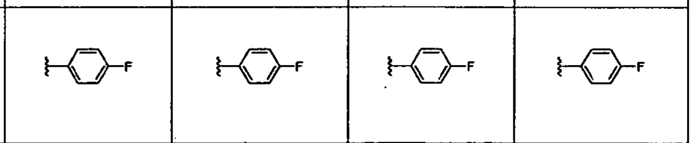
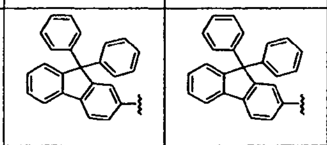
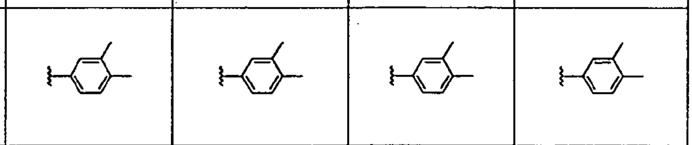
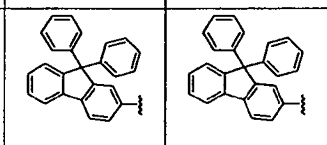
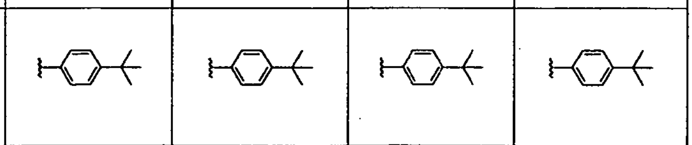
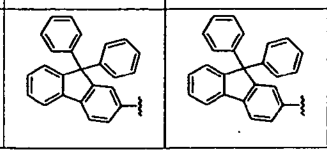
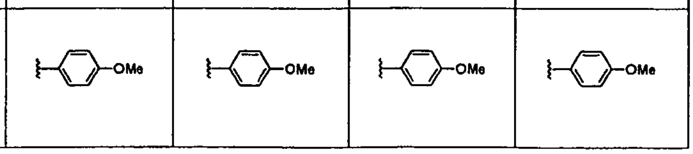
[0067] A reaction vessel was charged with Compound (K) (4.5 g, 4.63 mmol), diphenylamine (2.4 g, 13.88 mmol), palladium acetate (II) (0.1 g, 0.46 mmol), tri-tert-butyl phosphine (0.3 mL, 0.93 mmol), cesium carbonate (6.78 g, 13.88 mmol) and toluene solvent (50 mL), and the mixture was stirred under reflux in the presence of nitrogen atmosphere for 8 hours. Then, the mixture was cooled to room temperature, and the reaction quenched by adding water (100 mL). The organic layer obtained from extraction of the mixture with dichloromethane (300 mL) was dried over magnesium sulfate, and distilled under reduced pressure. Purification of the organic product via column chromatography (dichloromethane: n-hexane = 5:1) gave the target compound (Compound 1579) (2.5 g, 47%).

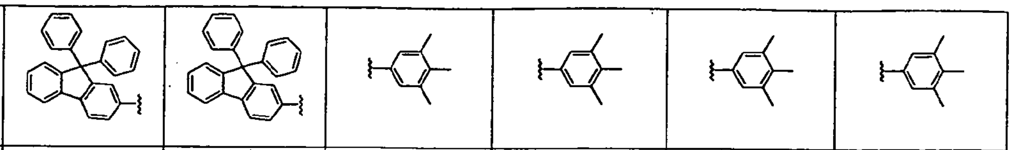
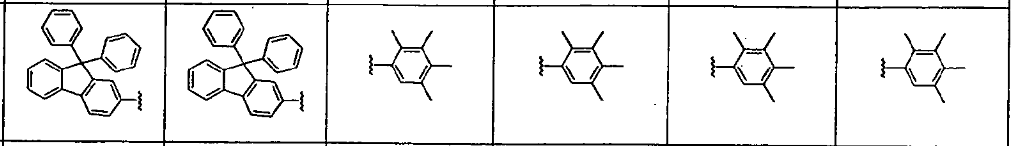
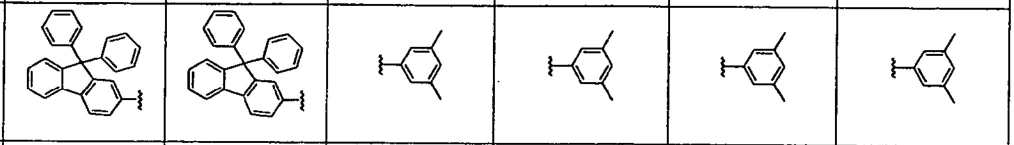
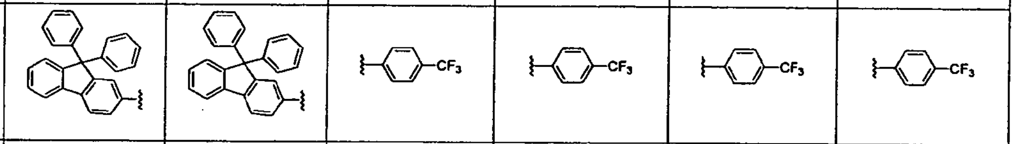
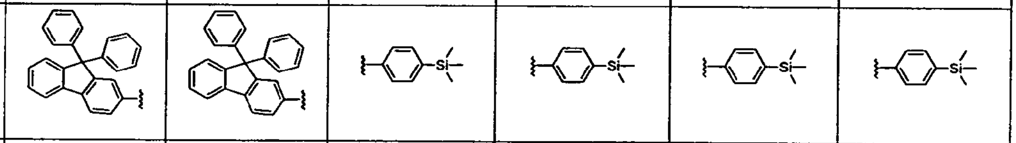
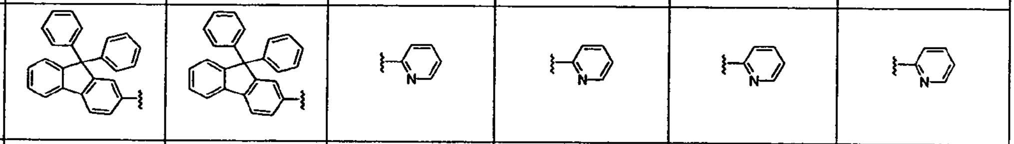
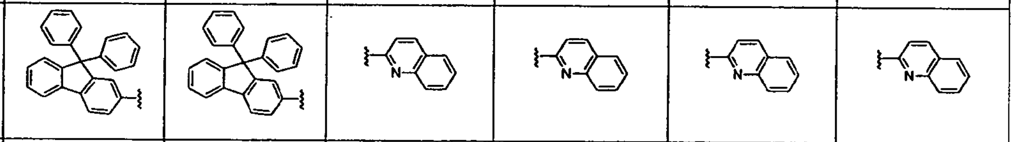
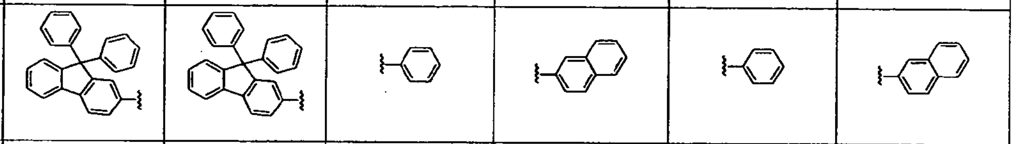
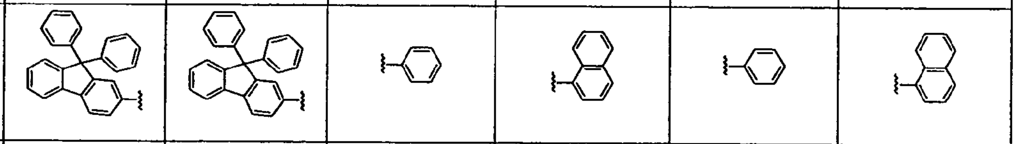
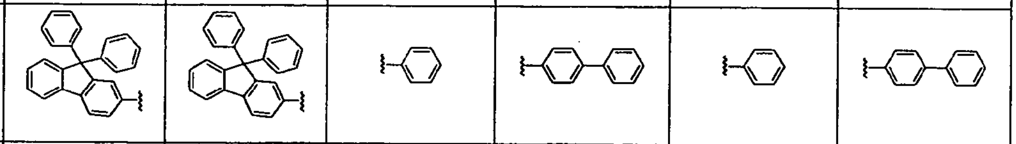
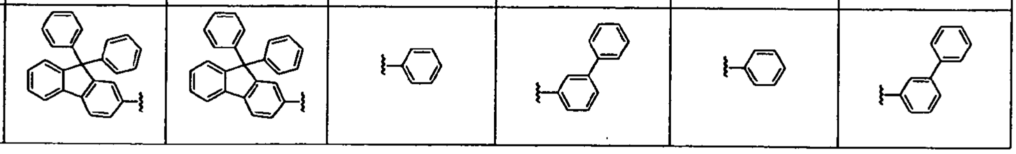
[0068] The organic electroluminescent compounds shown in Table 1 (Compounds 1 to 1315) were prepared according to the same procedure as in Preparation Example 1, and those in Table 2 (Compounds 1316 to 2630) were prepared according to the procedure in Preparation Example 2. The ^1H NMR and MS/FAB data of organic electroluminescent compounds prepared are listed in Table 3.

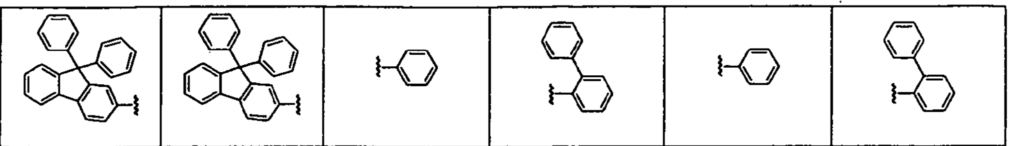
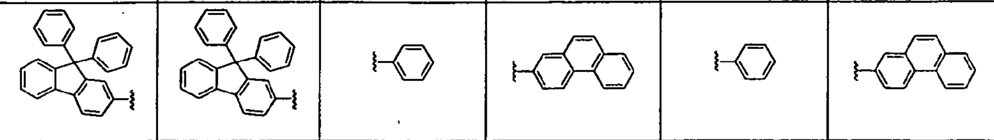
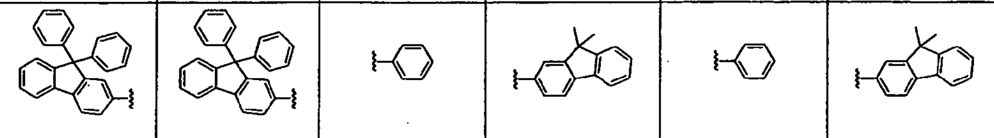
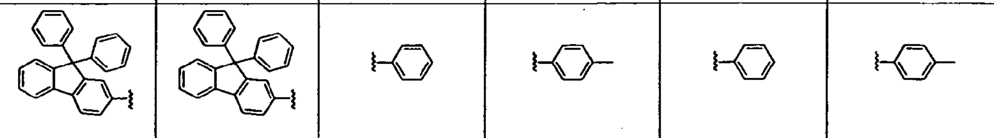
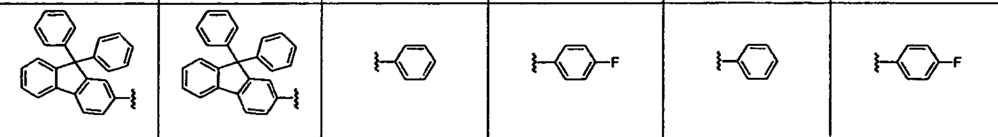
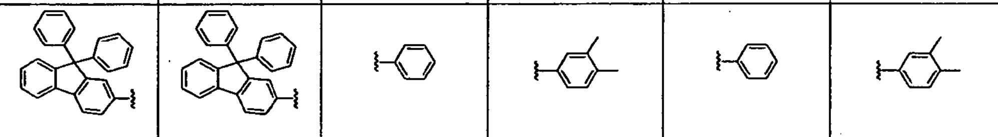
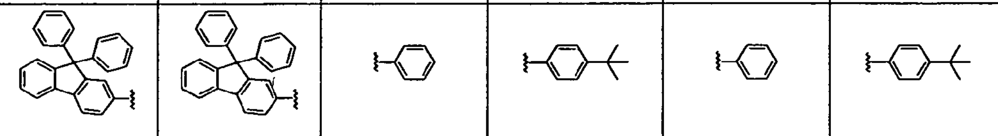
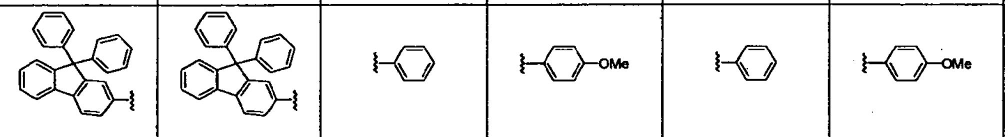
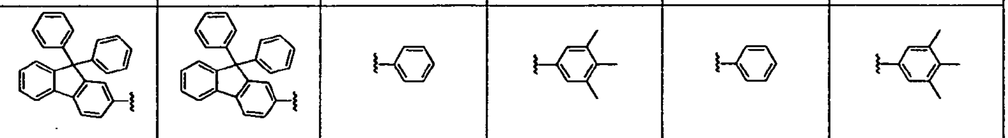
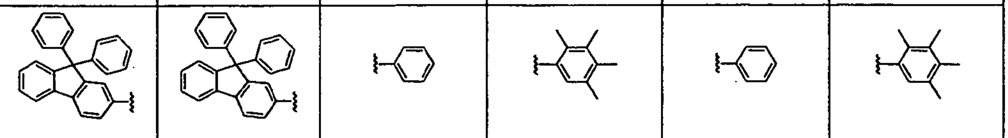
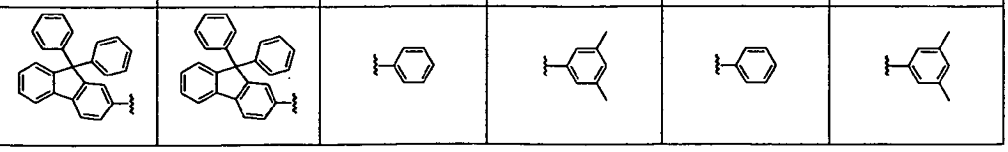
【Table 1】

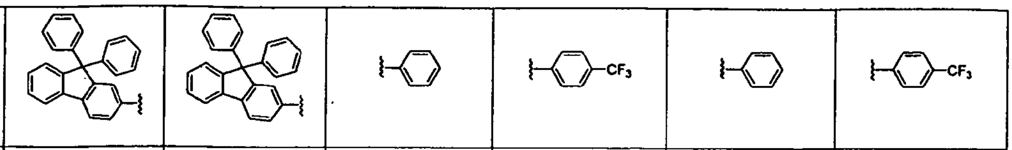
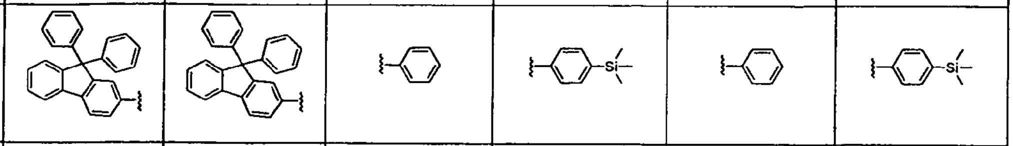
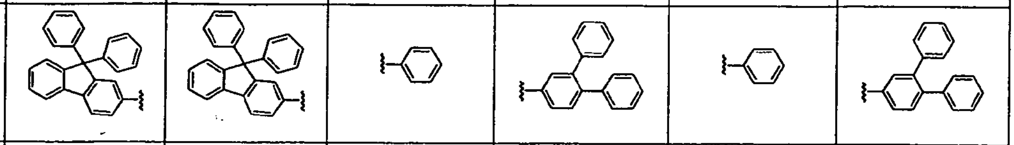
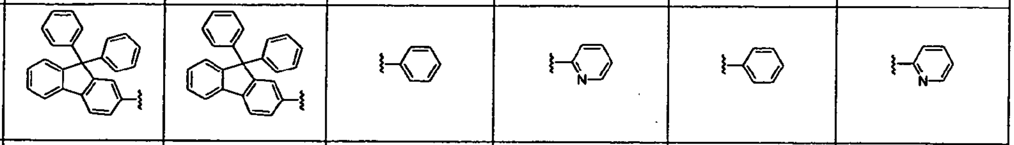
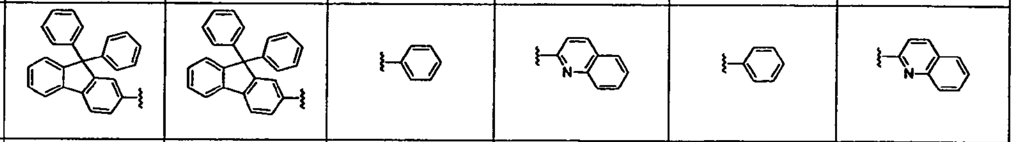
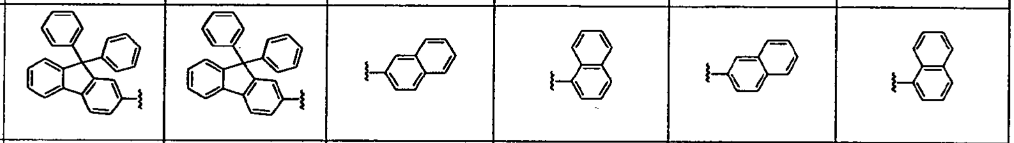
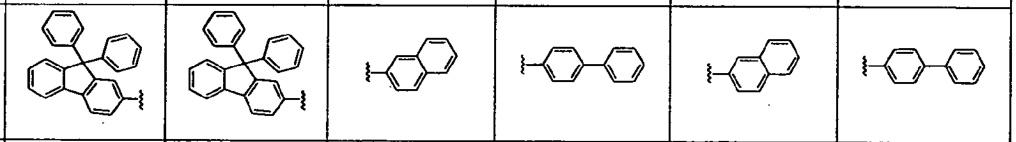
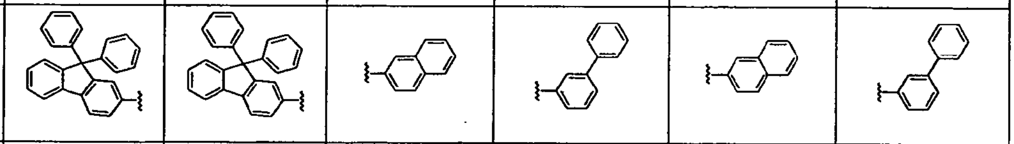
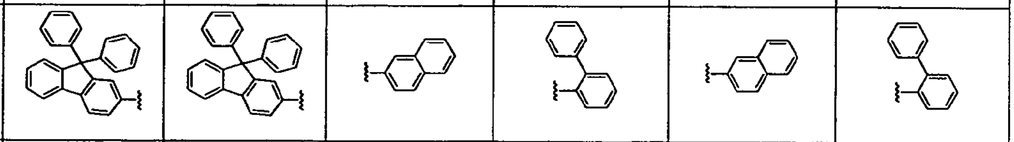
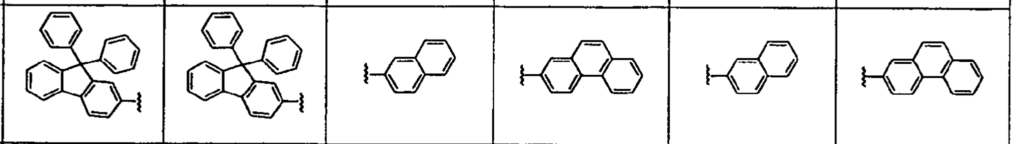
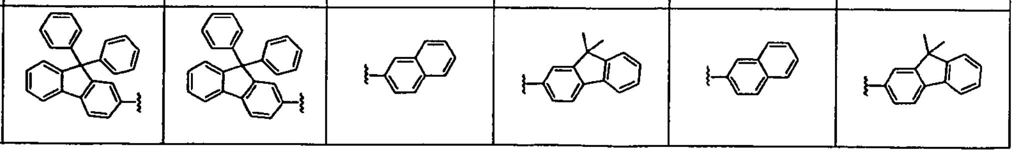


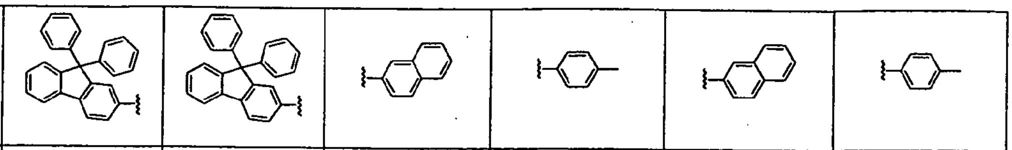
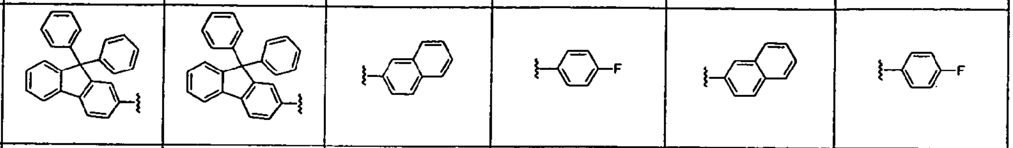
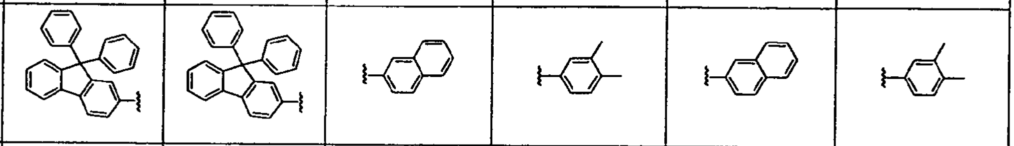
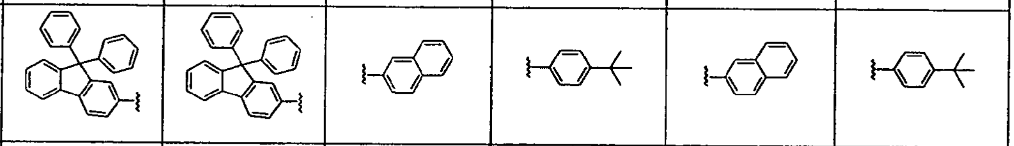
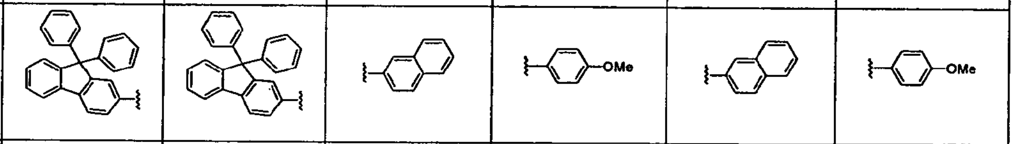
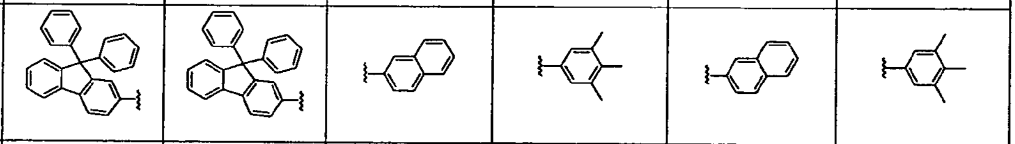
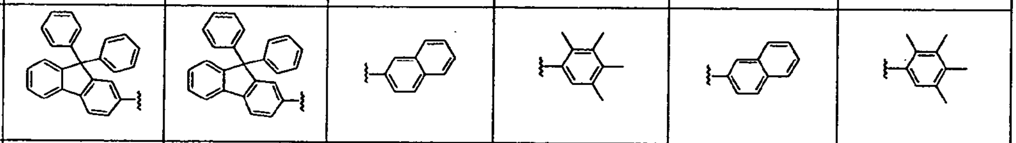
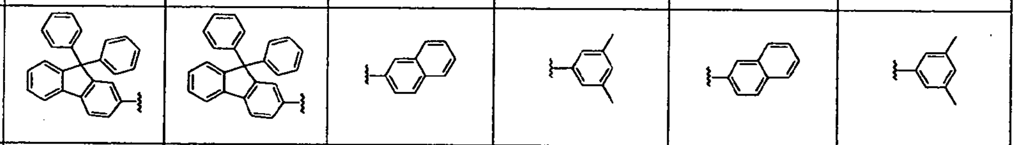
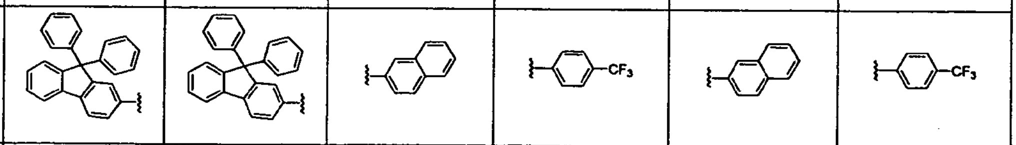
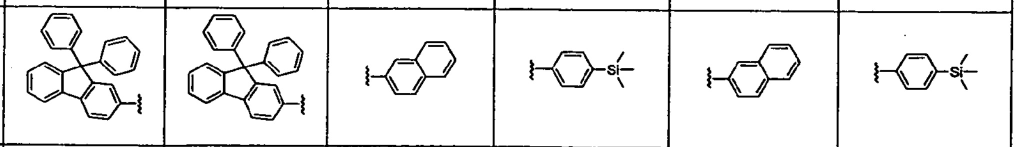
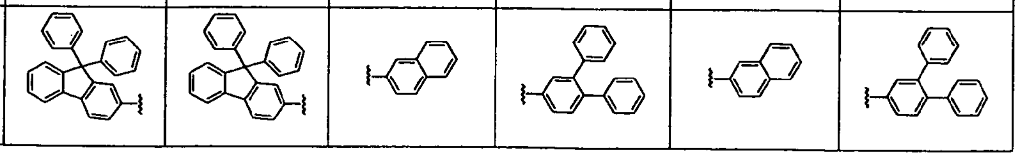
compound	R_1	R_2	Ar_1	Ar_2	Ar_3	Ar_4

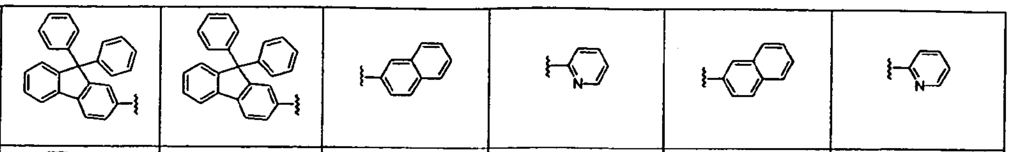
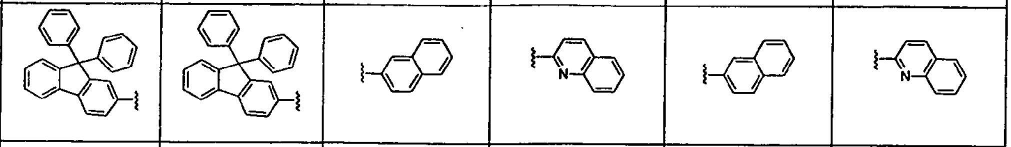
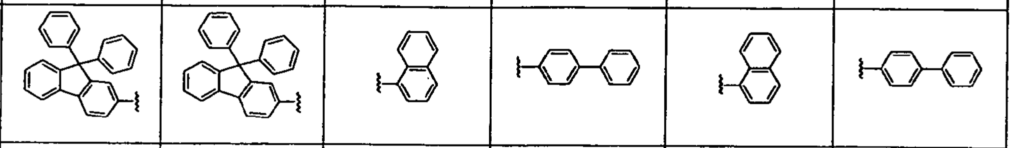
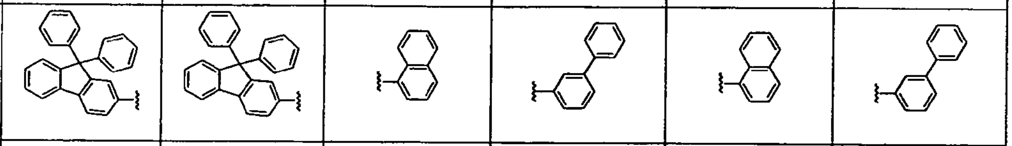
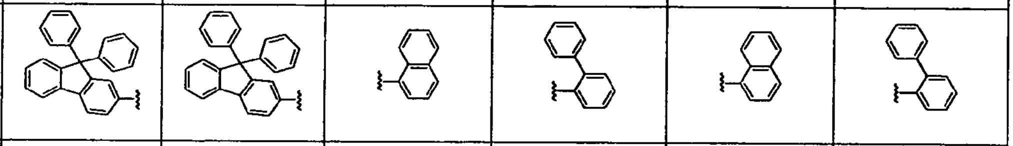
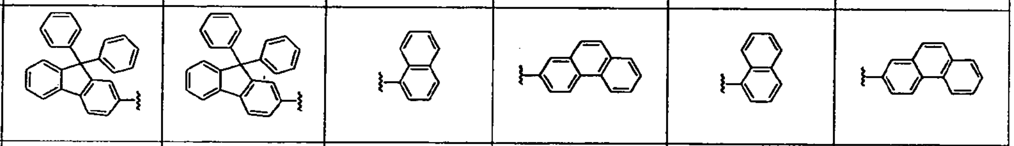
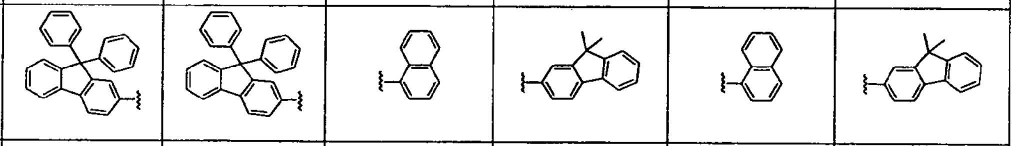
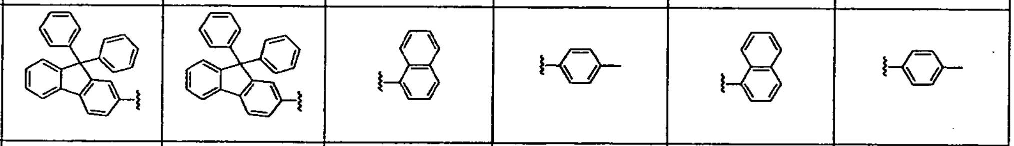
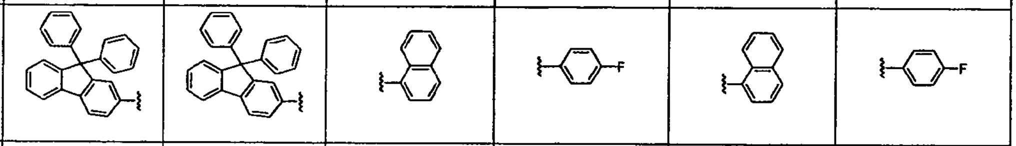
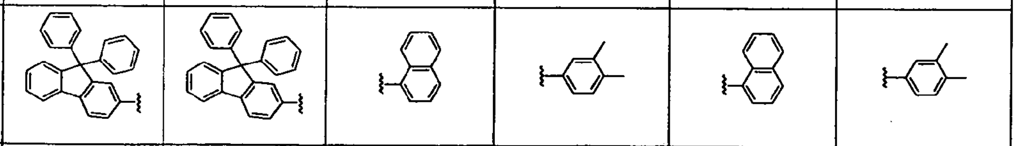
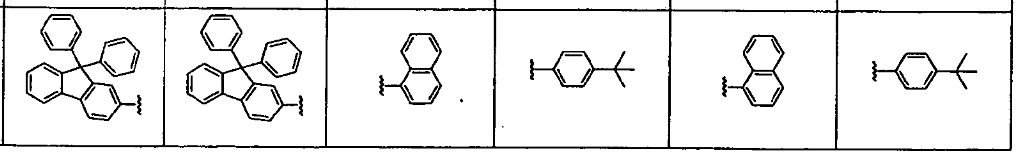
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

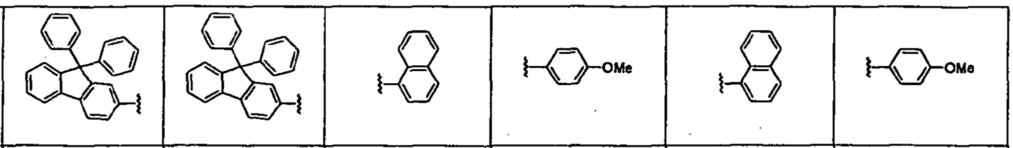
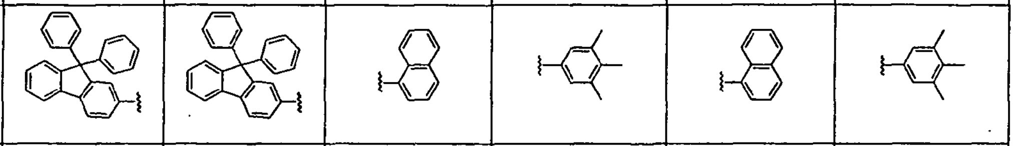
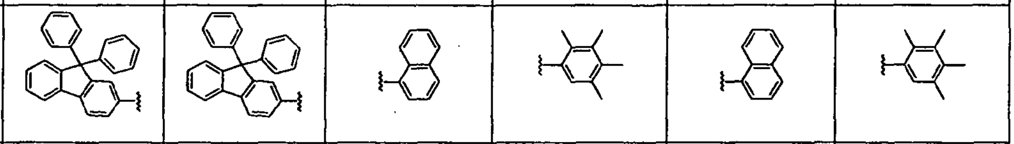
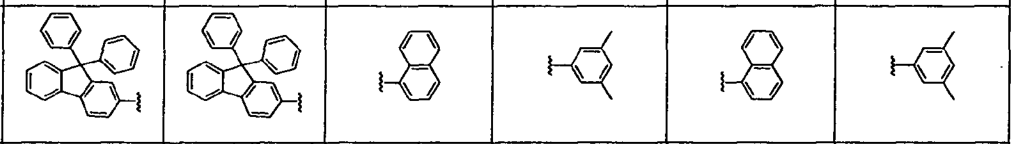
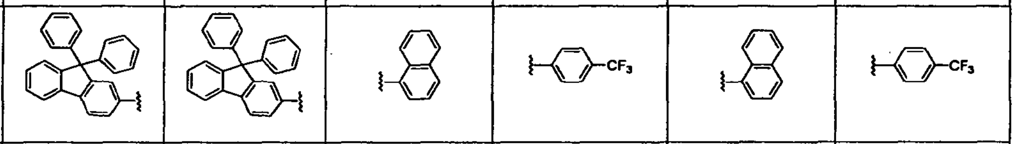
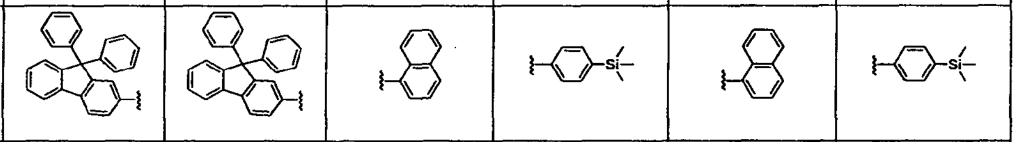
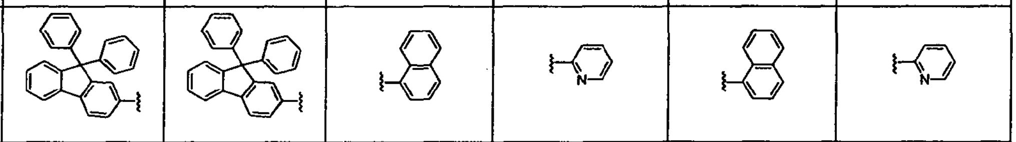
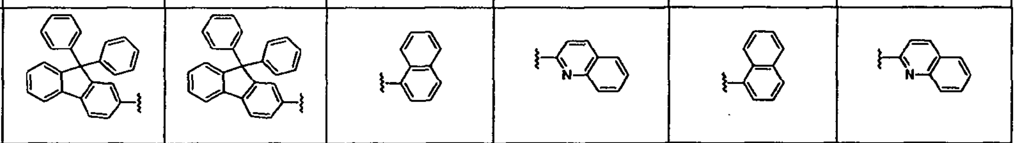
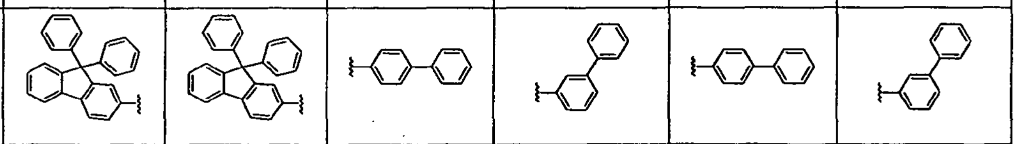
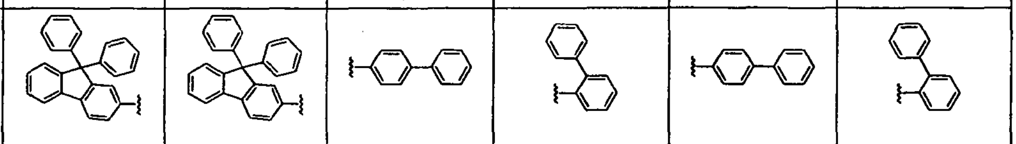
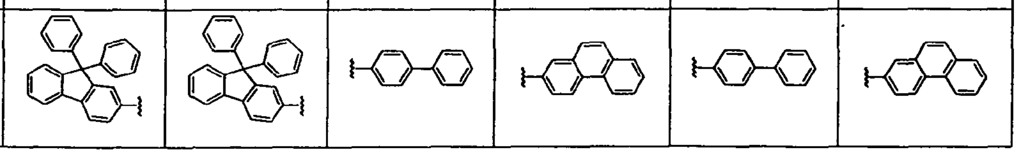
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	

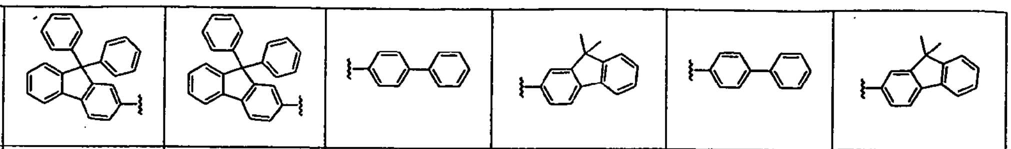
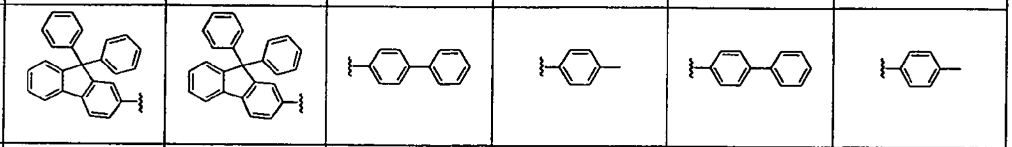
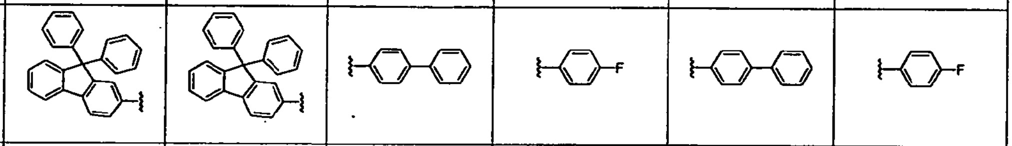
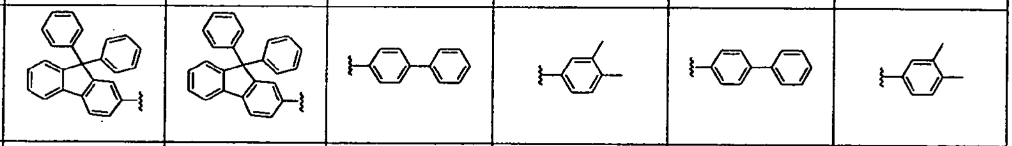
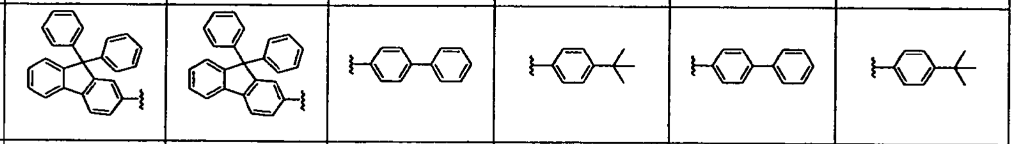
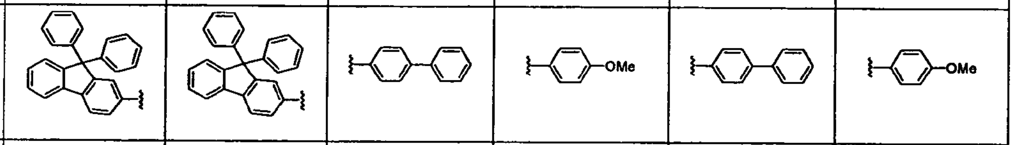
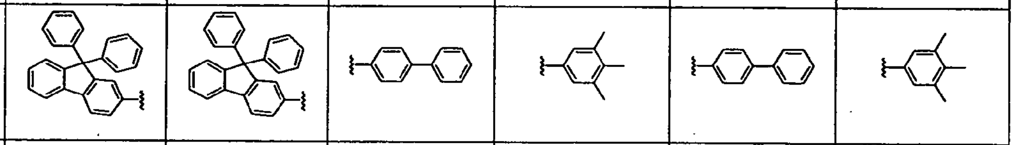
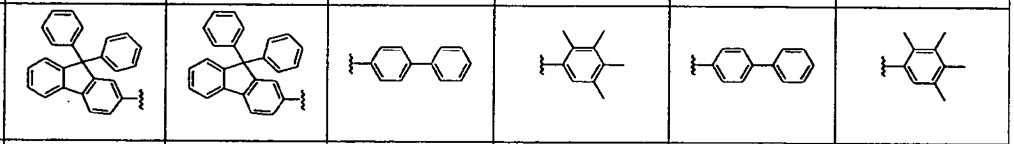
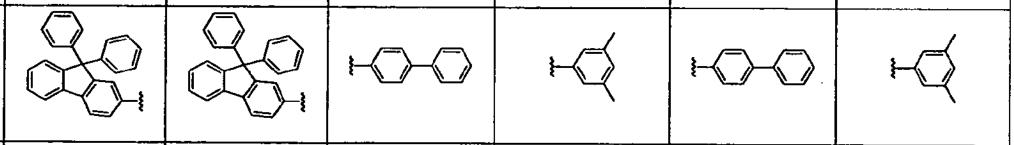
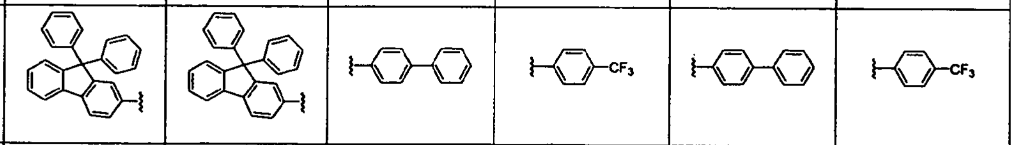
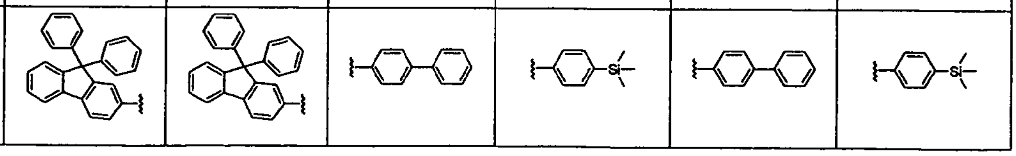
24	
25	
26	
27	
28	
29	
30	
31	
32	
33	
34	

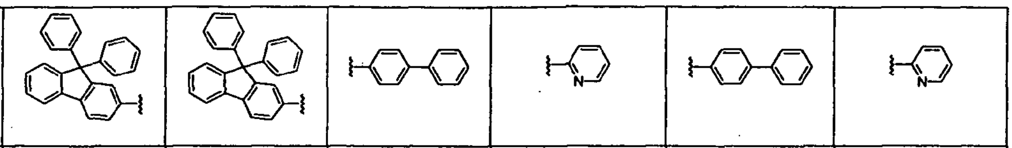
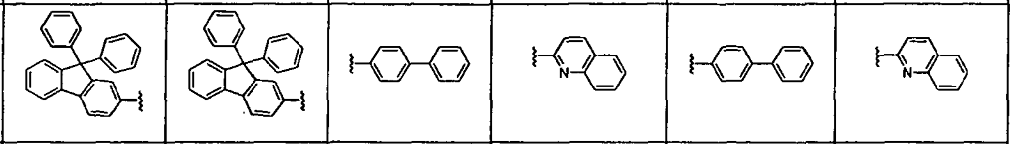
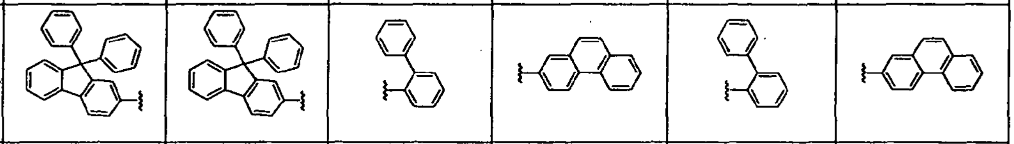
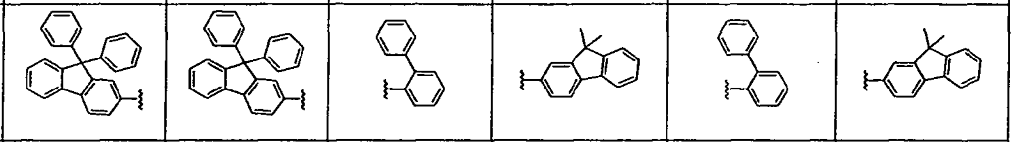
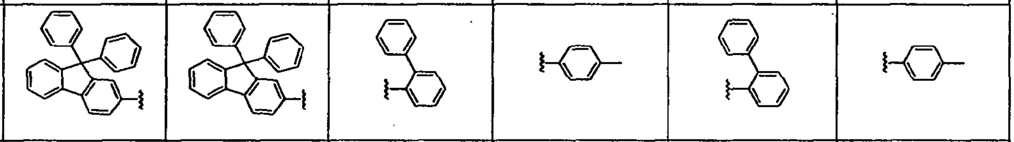
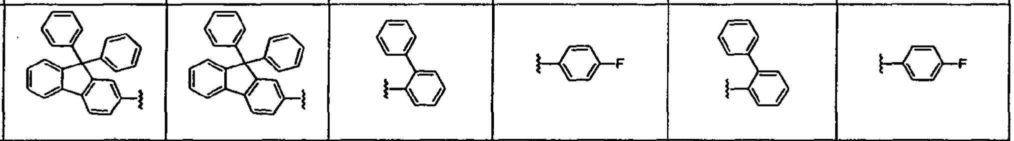
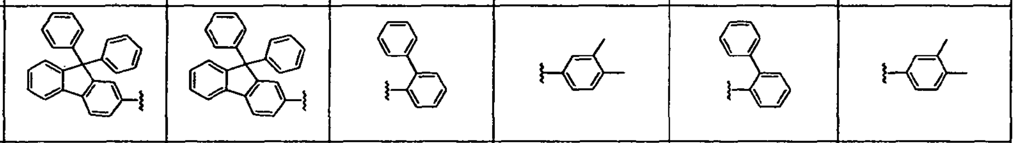
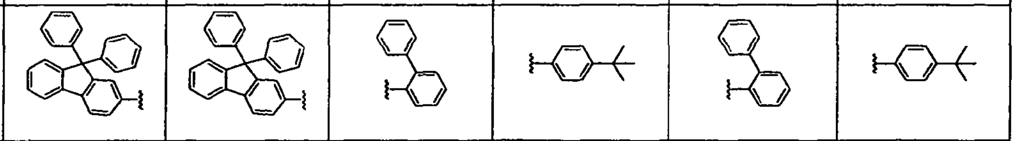
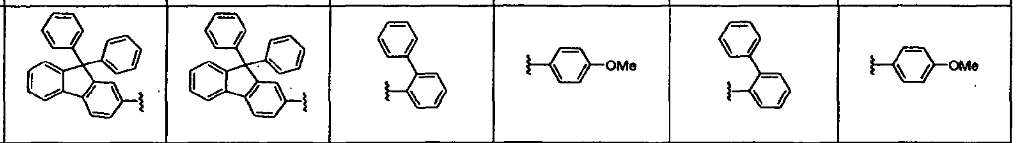
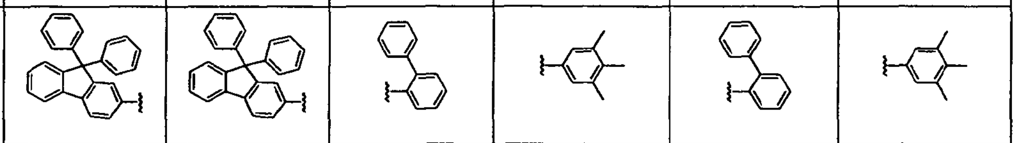
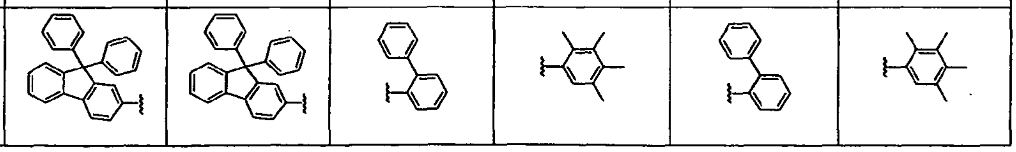
35	
36	
37	
38	
39	
40	
41	
42	
43	
44	
45	

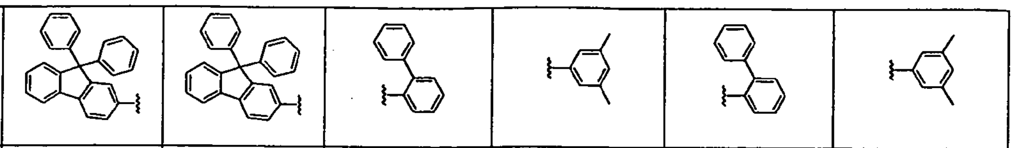
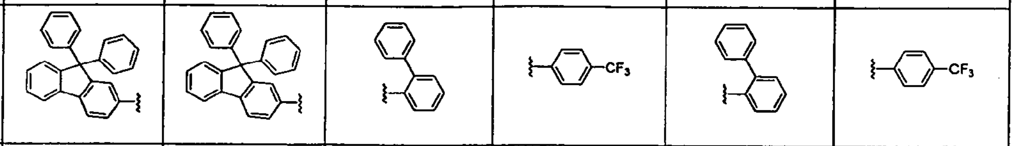
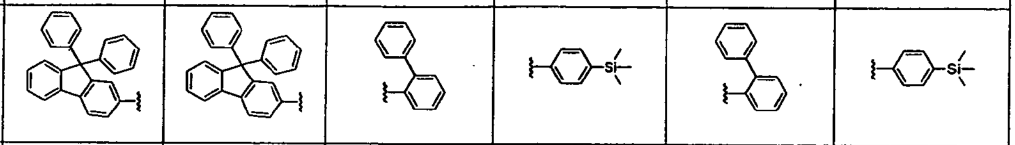
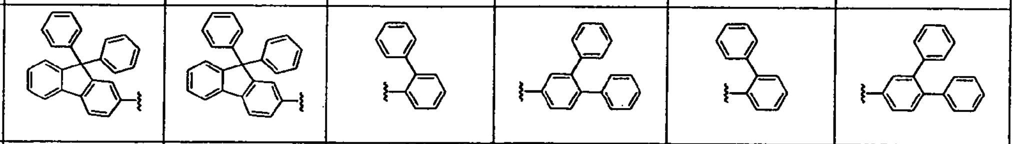
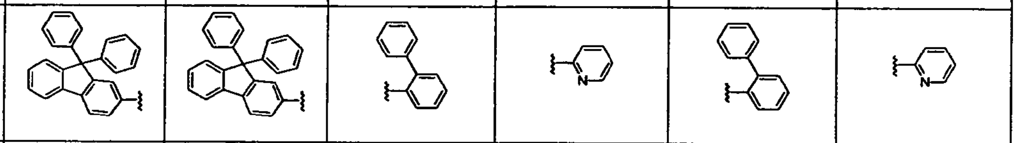
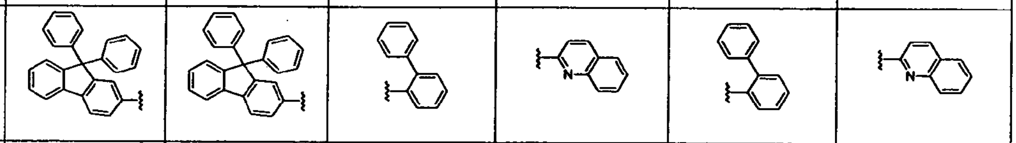
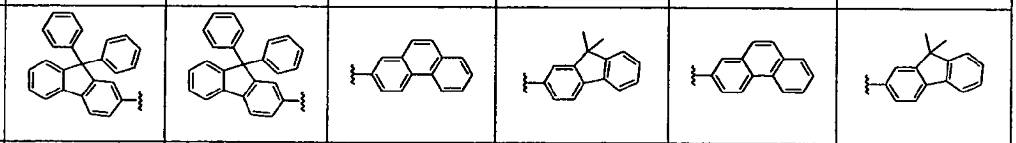
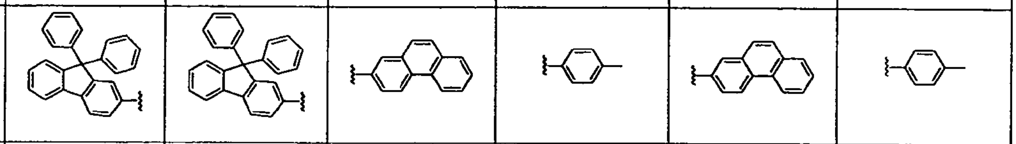
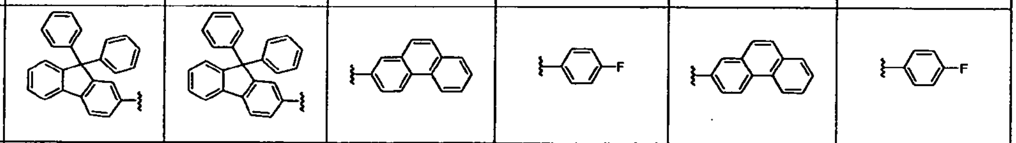
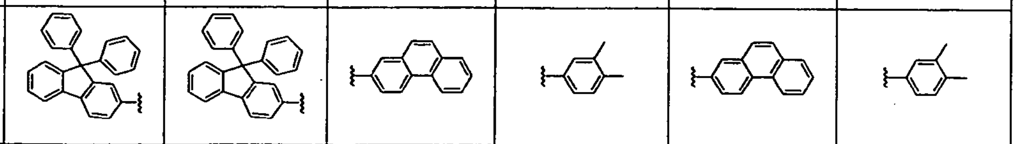
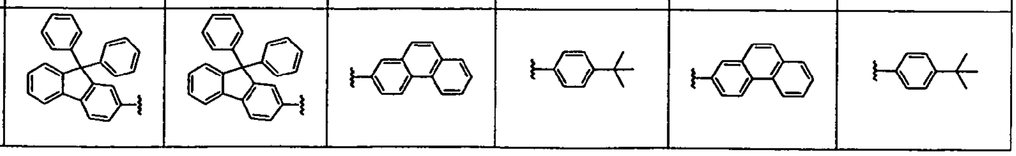
46	
47	
48	
49	
50	
51	
52	
53	
54	
55	
56	

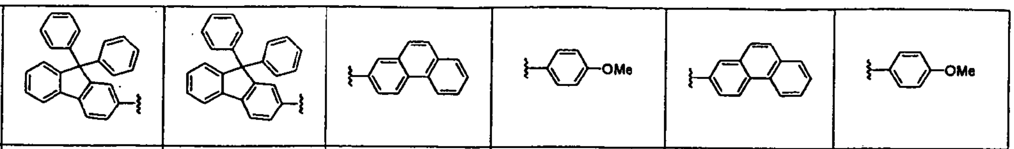
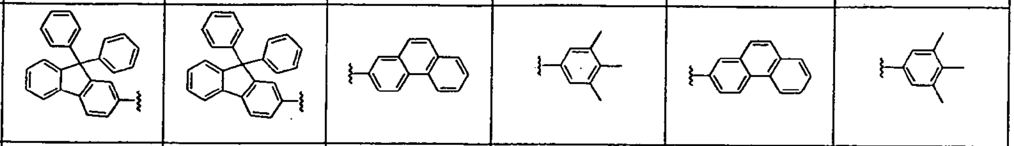
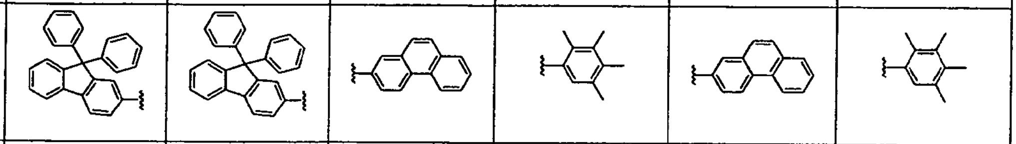
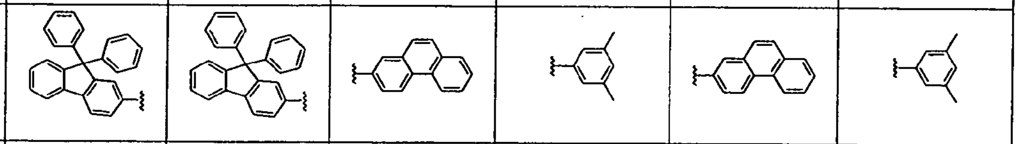
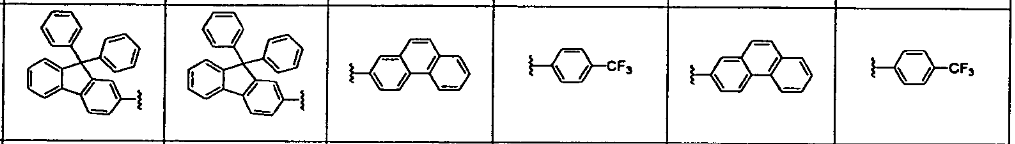
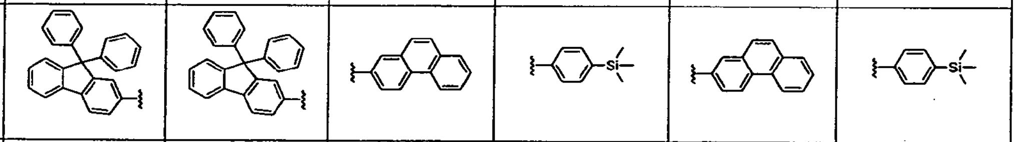
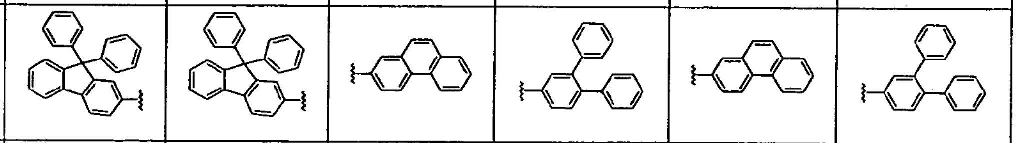
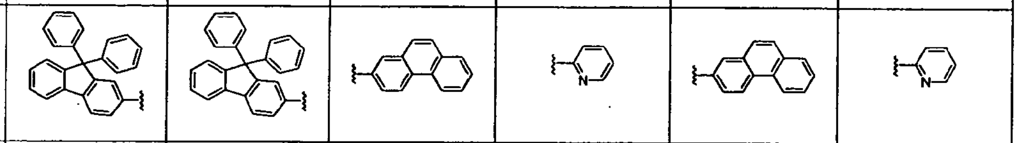
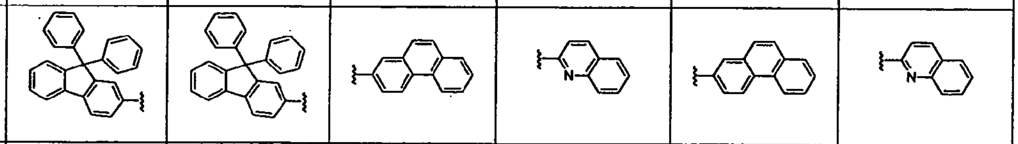
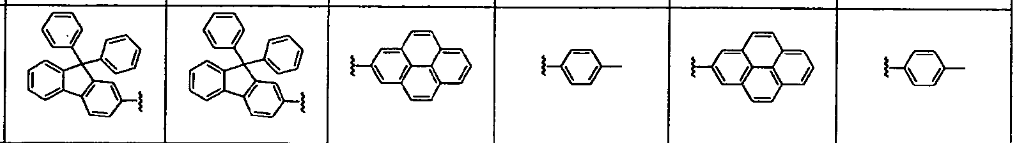
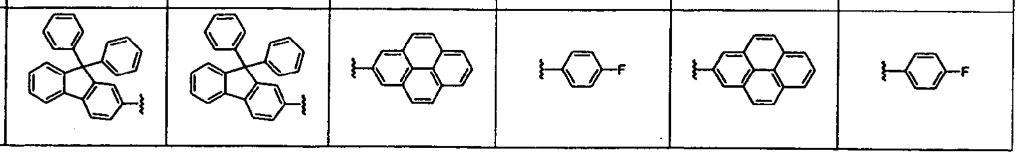
57	
58	
59	
60	
61	
62	
63	
64	
65	
66	
67	

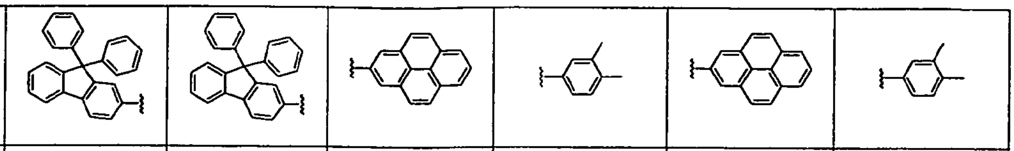
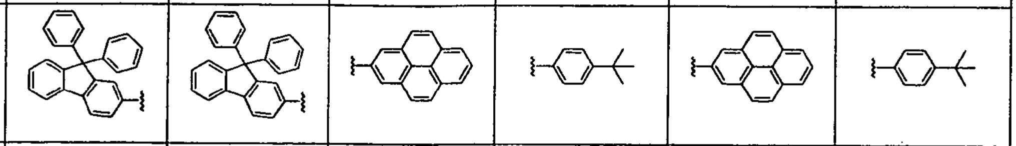
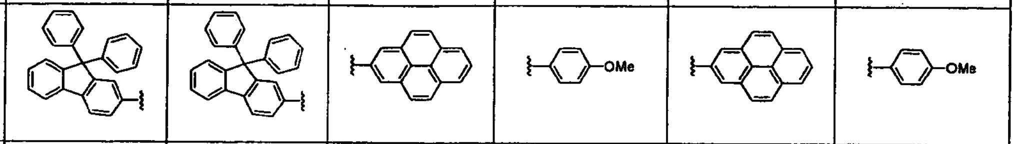
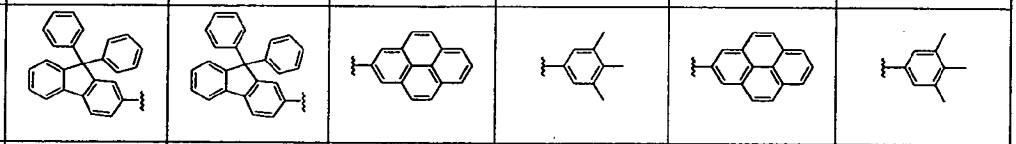
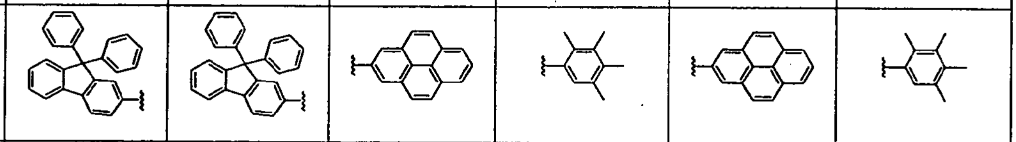
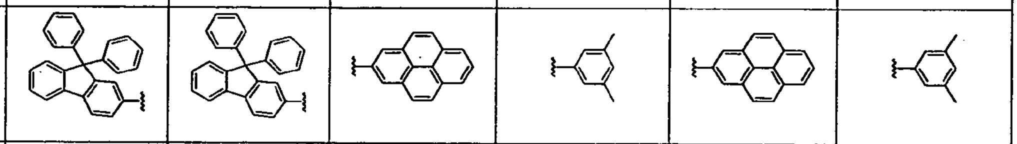
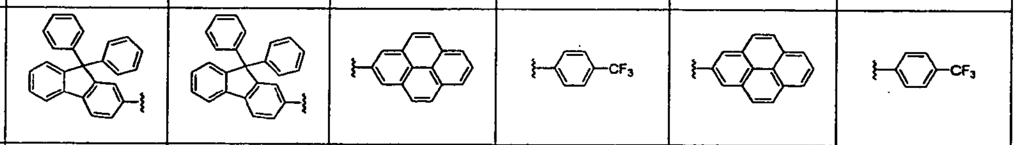
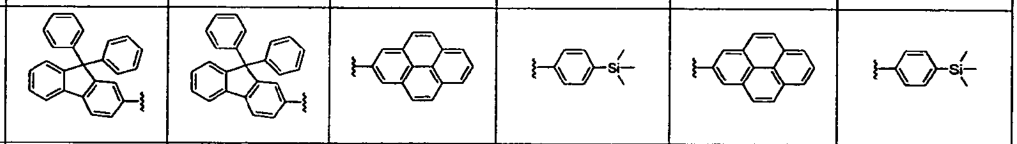
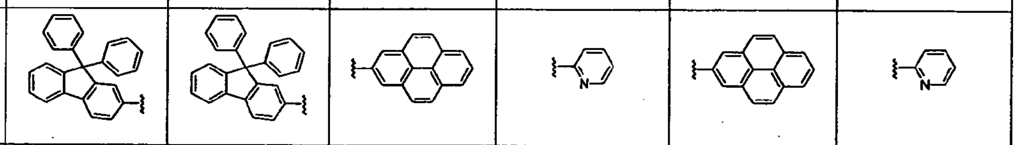
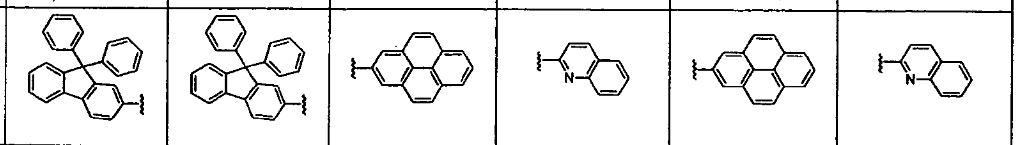
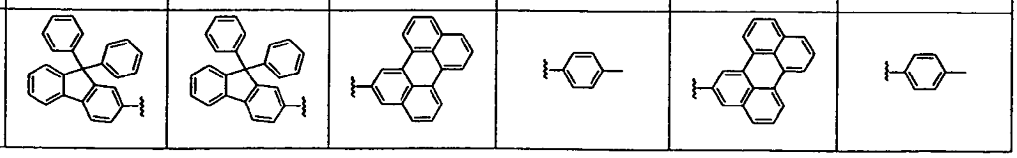
68	
69	
70	
71	
72	
73	
74	
75	
76	
77	
78	

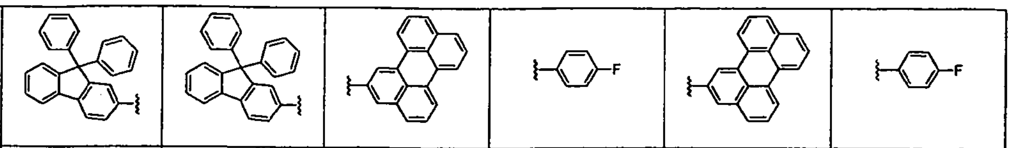
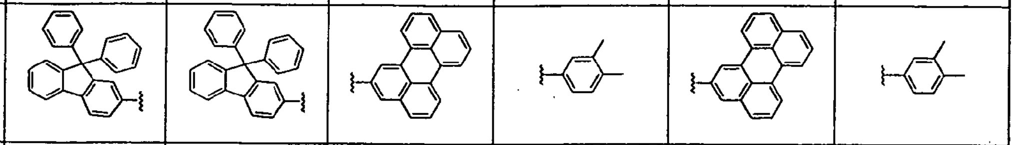
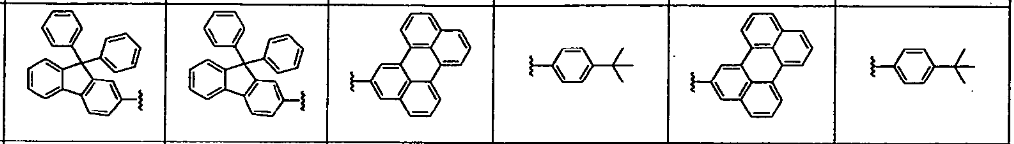
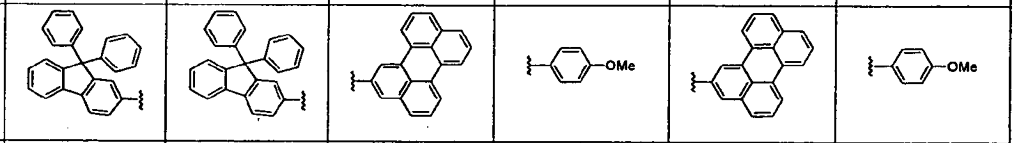
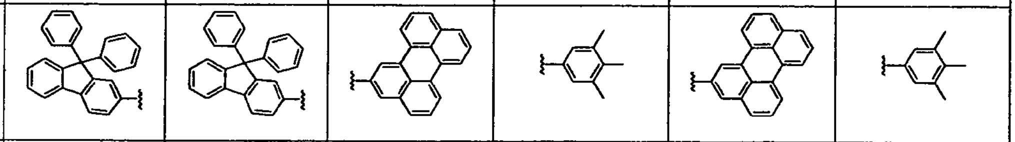
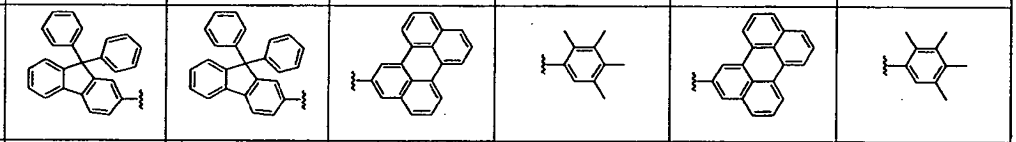
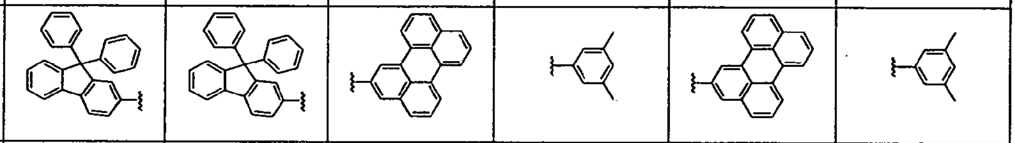
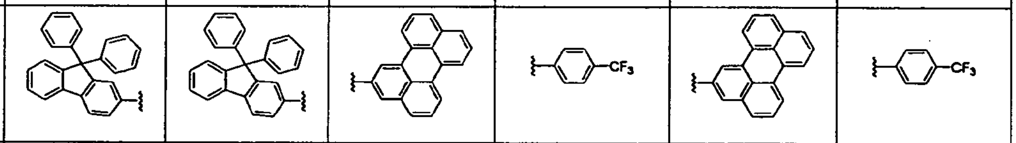
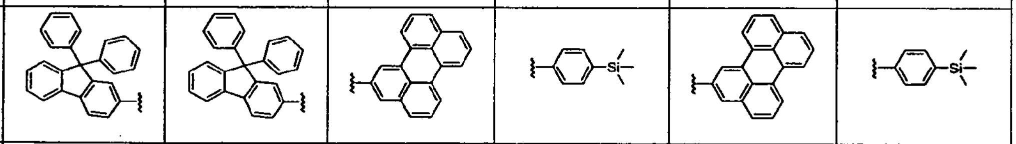
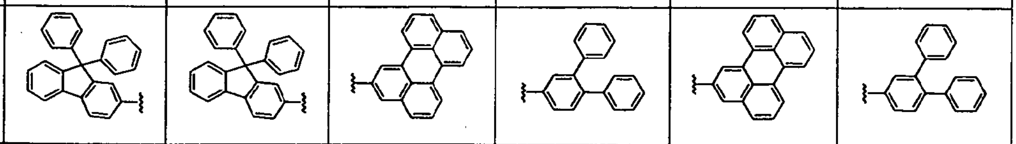
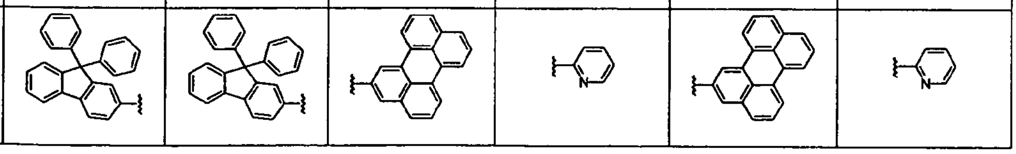
79	
80	
81	
82	
83	
84	
85	
86	
87	
88	
89	

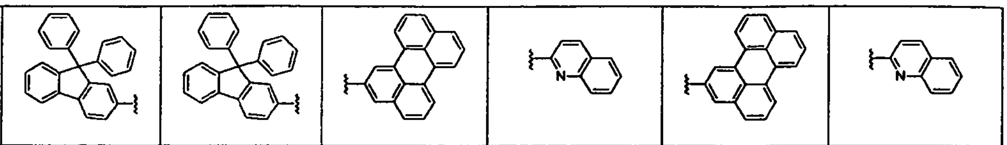
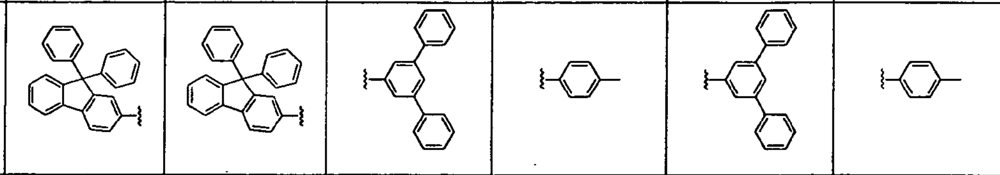
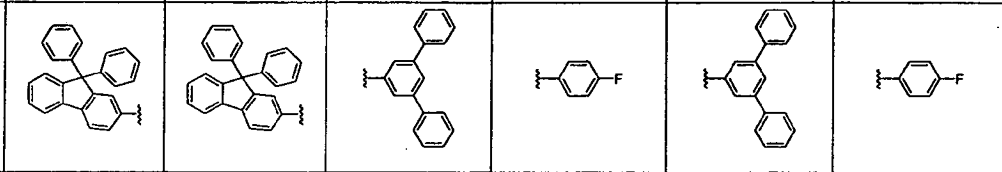
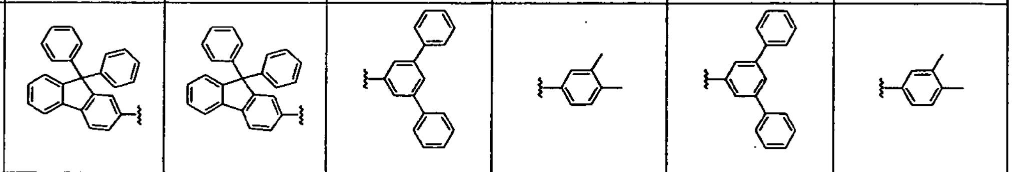
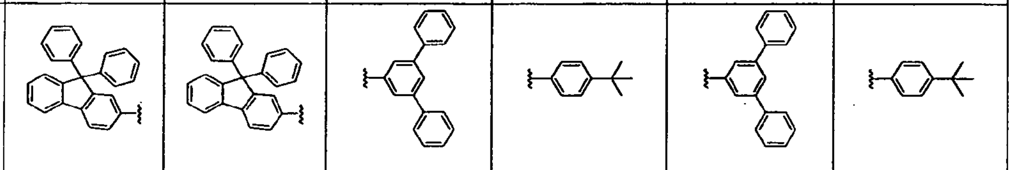
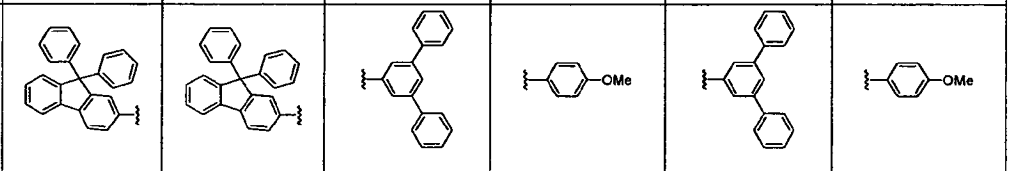
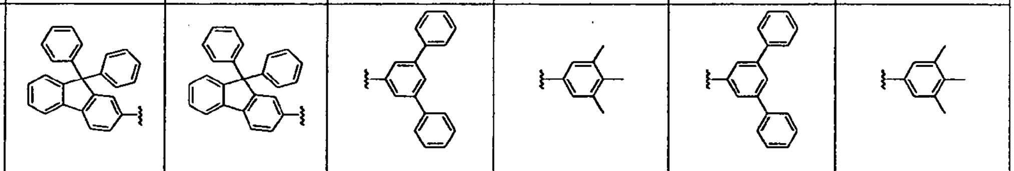
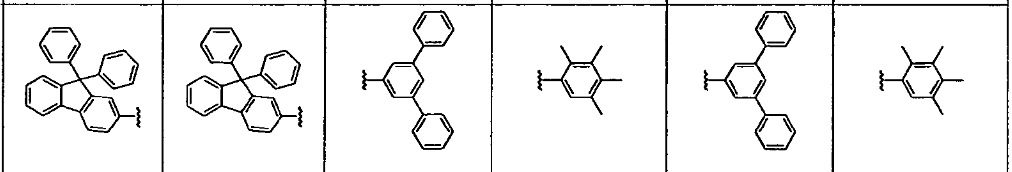
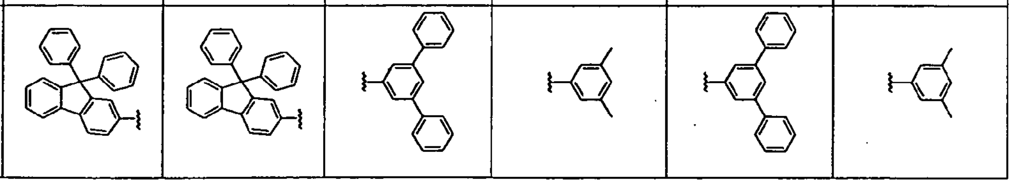
90	
91	
92	
93	
94	
95	
96	
97	
98	
99	
100	

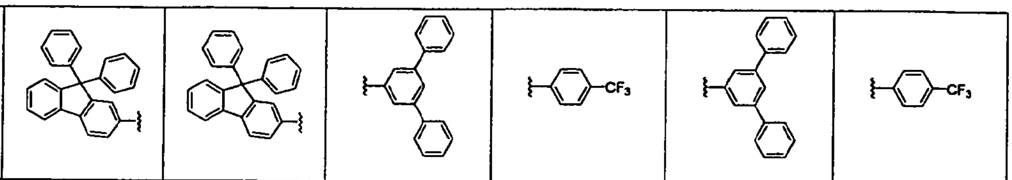
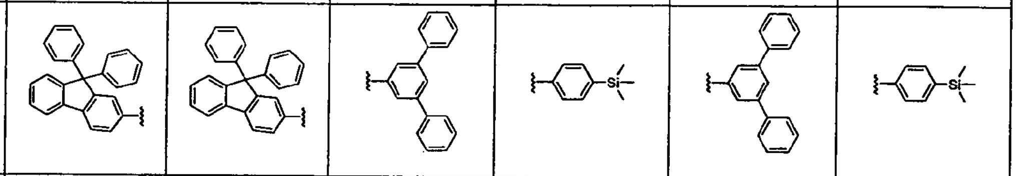
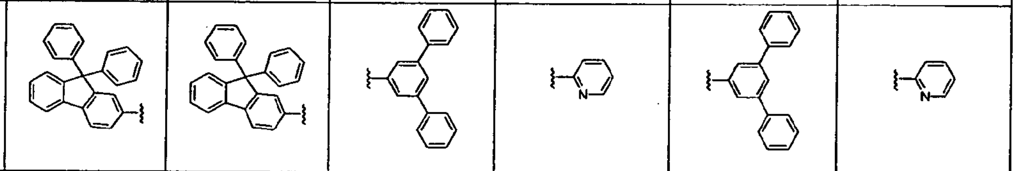
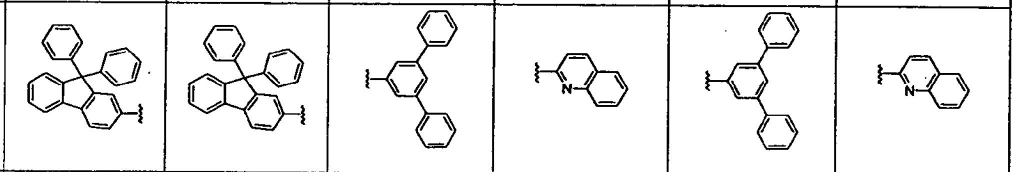
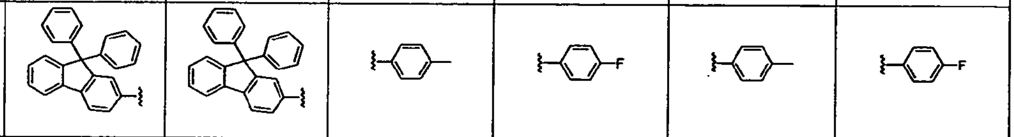
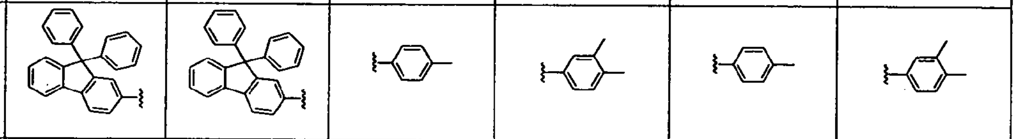
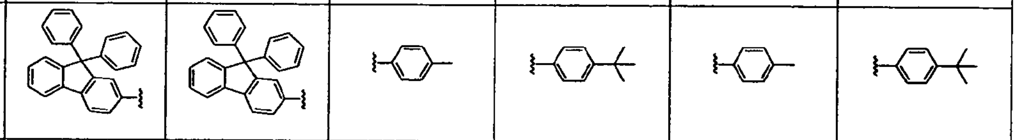
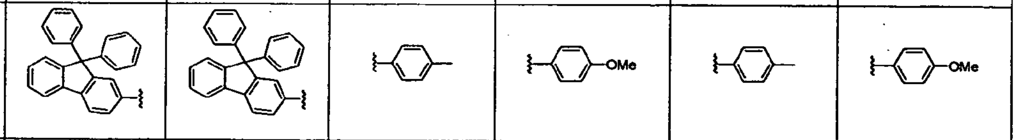
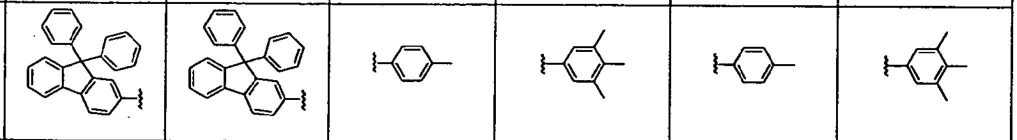
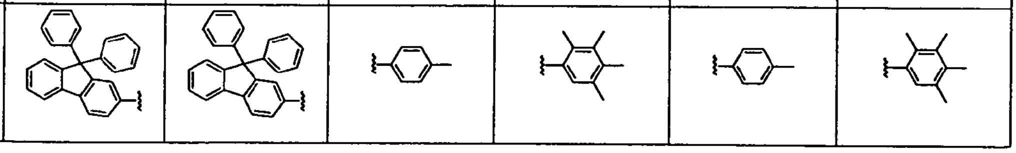
101	
102	
103	
104	
105	
106	
107	
108	
109	
110	
111	

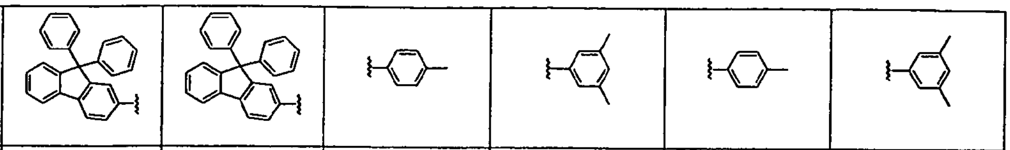
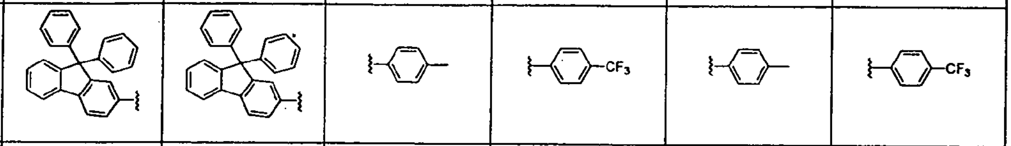
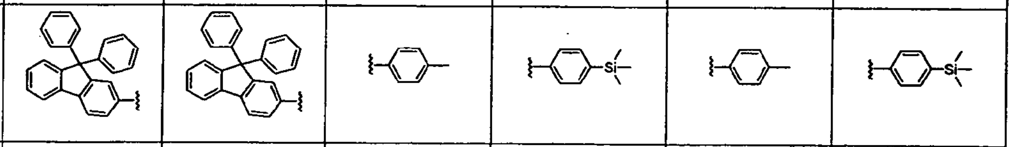
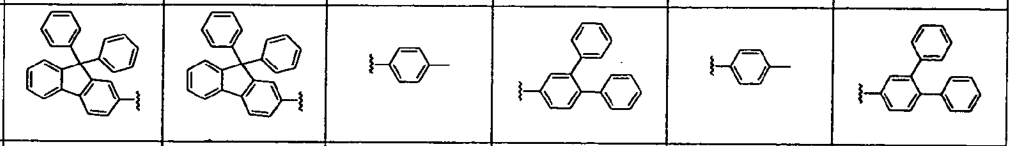
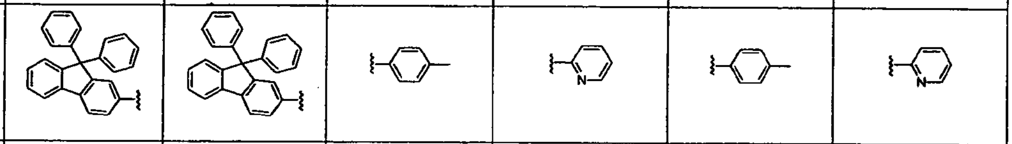
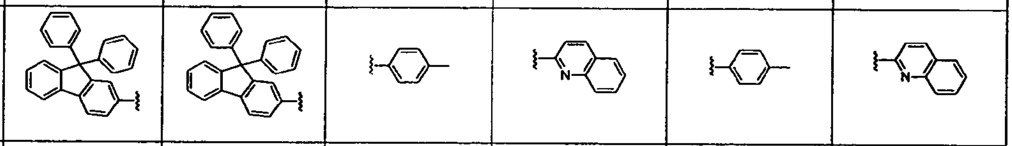
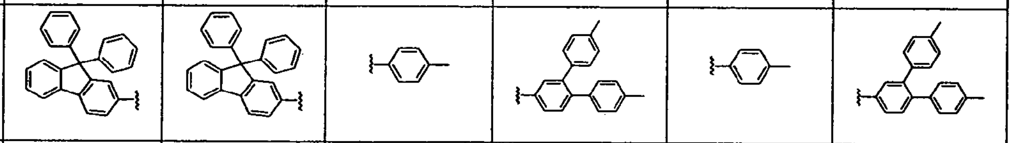
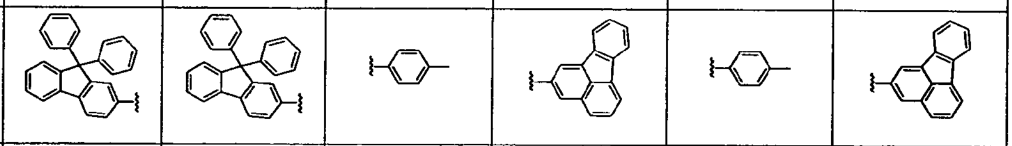
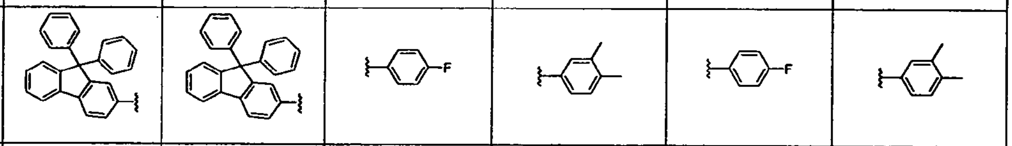
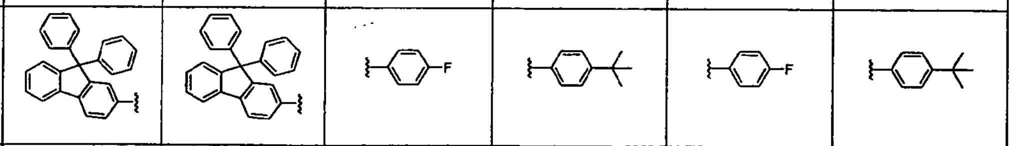
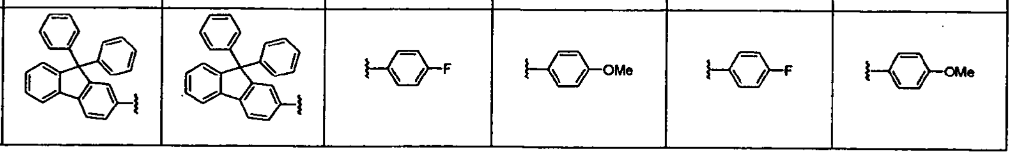
112	
113	
114	
115	
116	
117	
118	
119	
120	
121	
122	

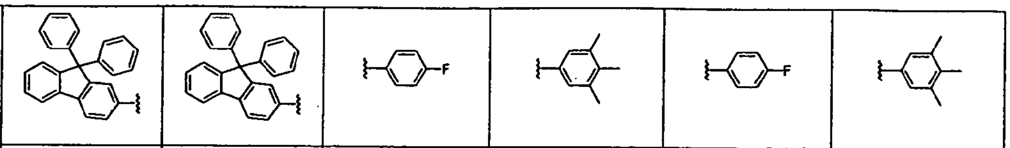
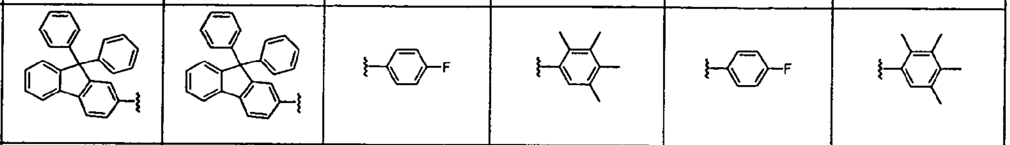
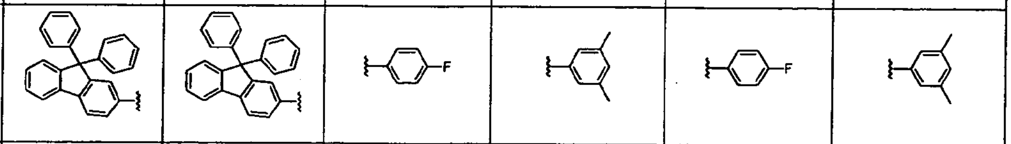
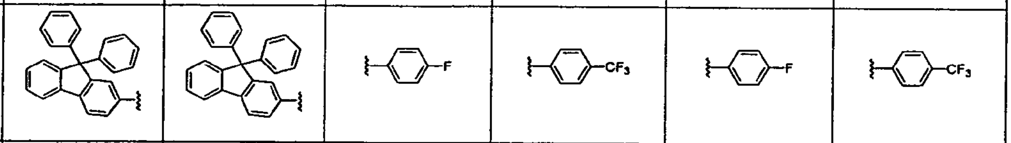
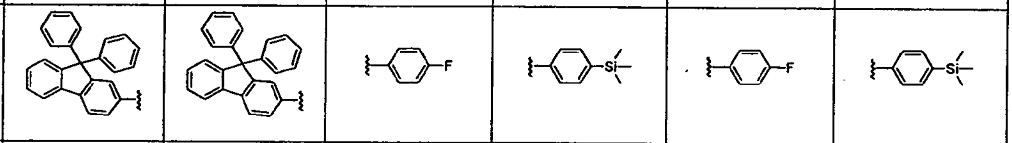
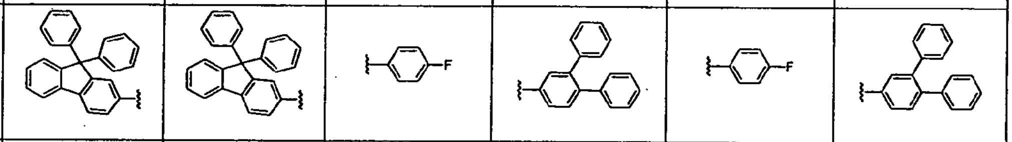
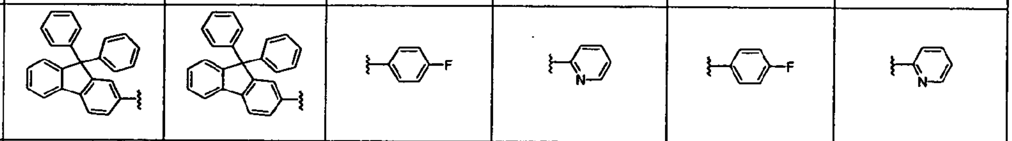
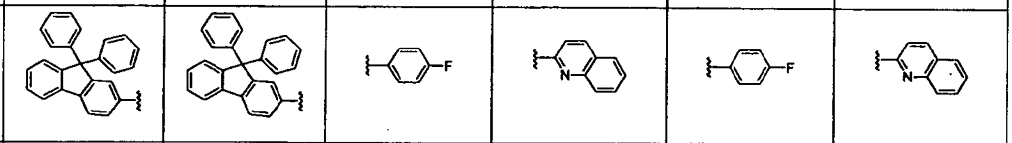
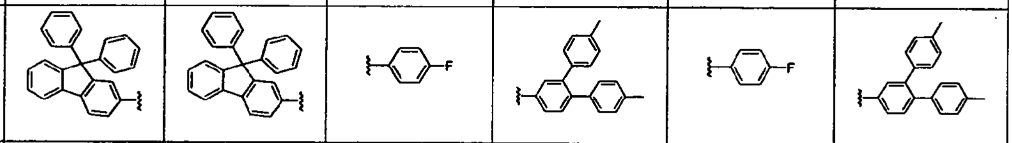
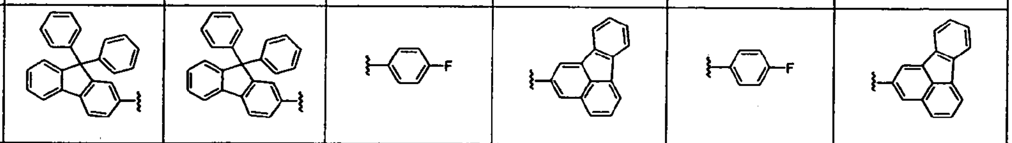
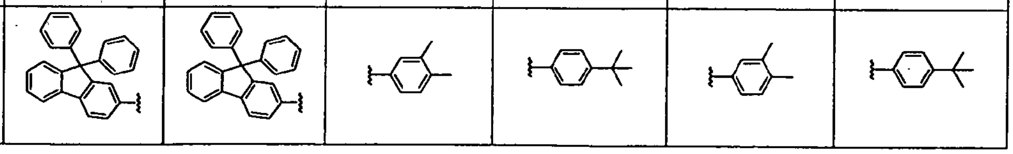
123	
124	
125	
126	
127	
128	
129	
130	
131	
132	
133	

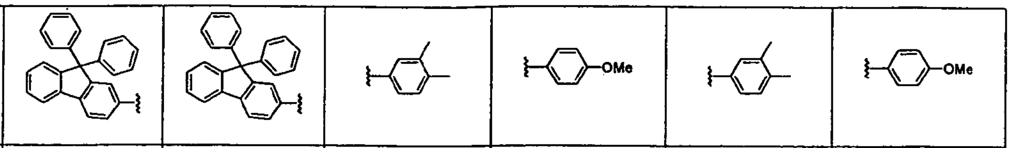
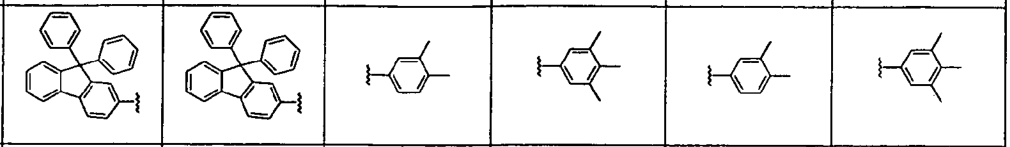
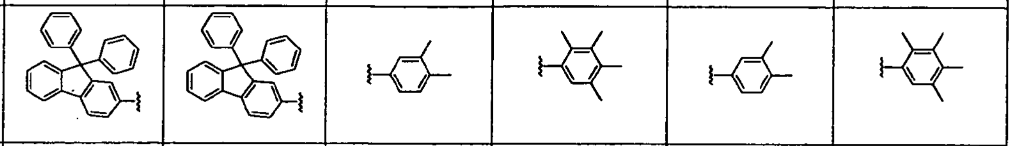
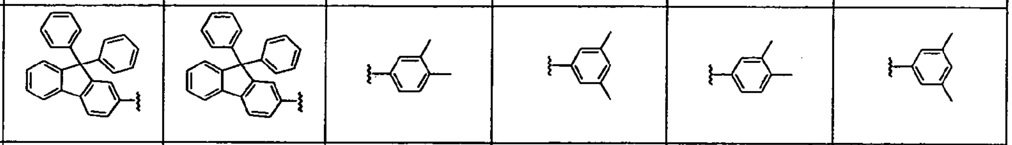
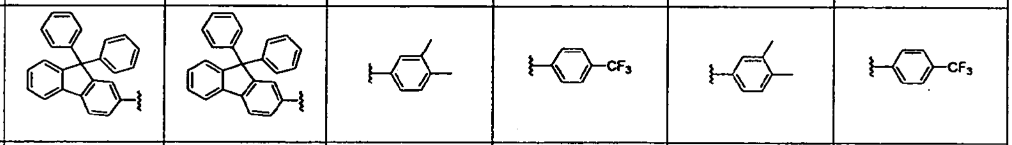
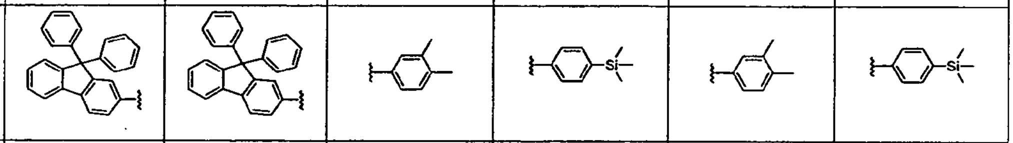
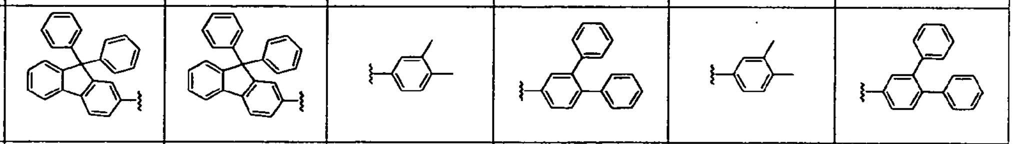
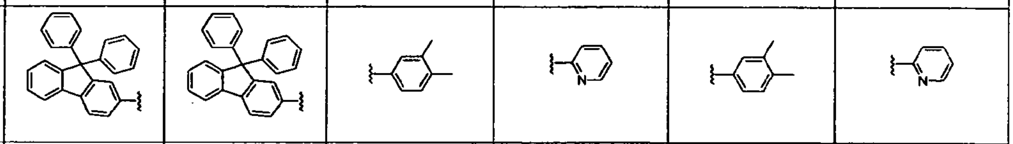
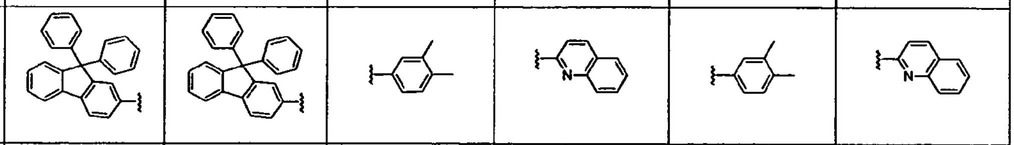
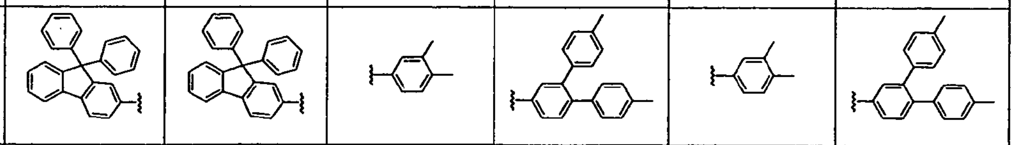
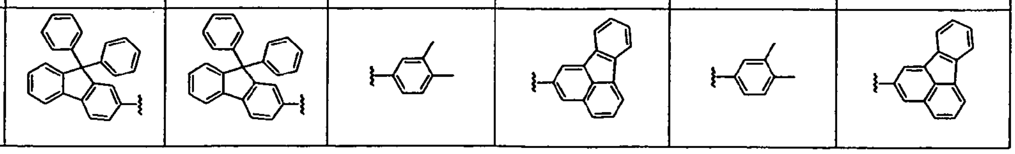
134	
135	
136	
137	
138	
139	
140	
141	
142	
143	
144	

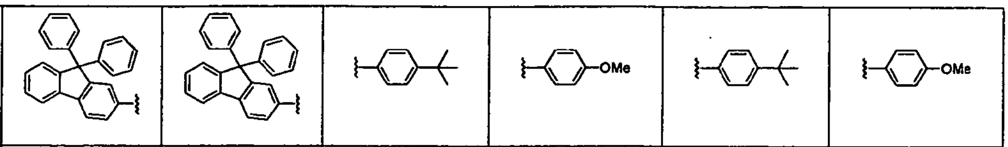
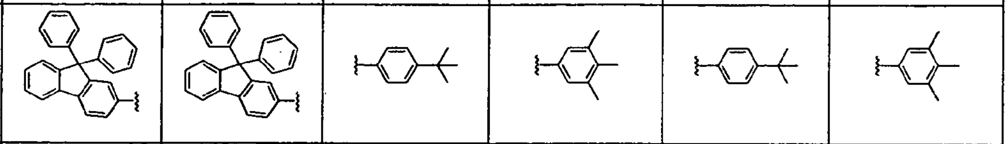
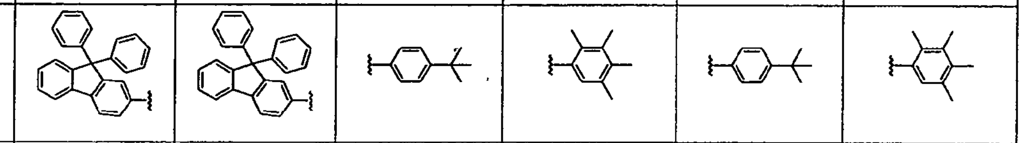
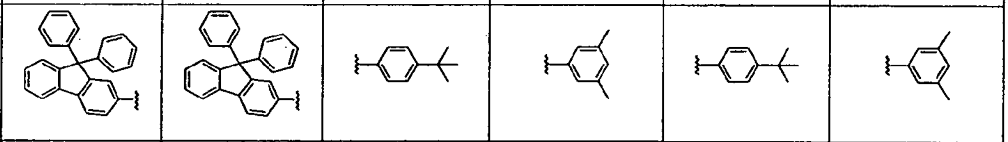
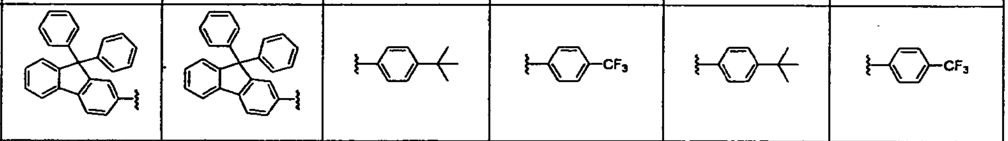
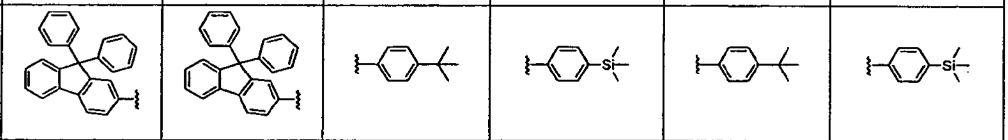
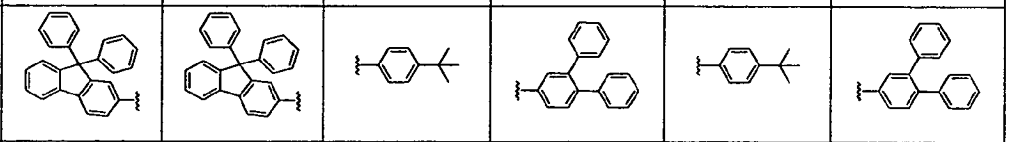
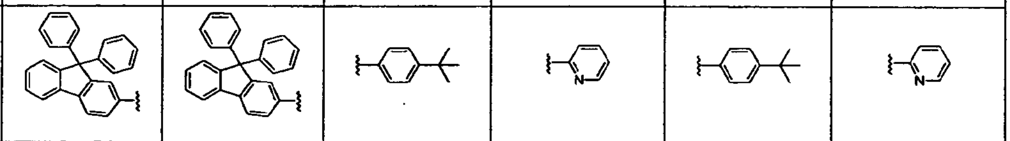
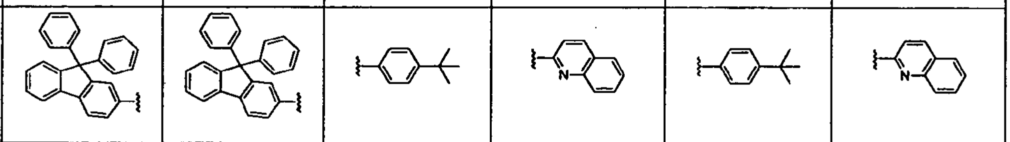
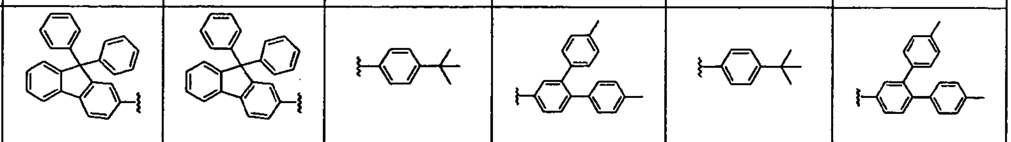
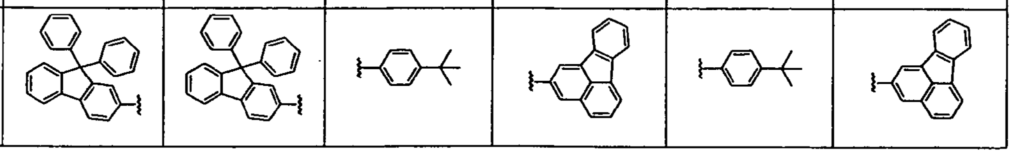
145	
146	
147	
148	
149	
150	
151	
152	
153	

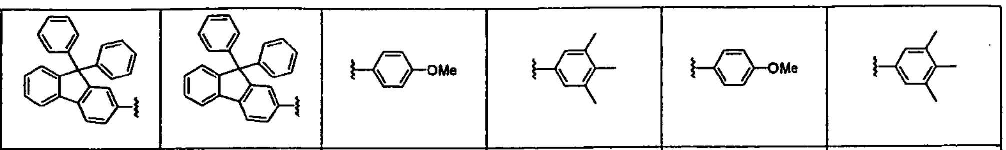
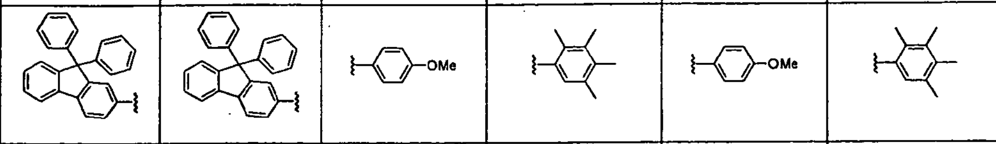
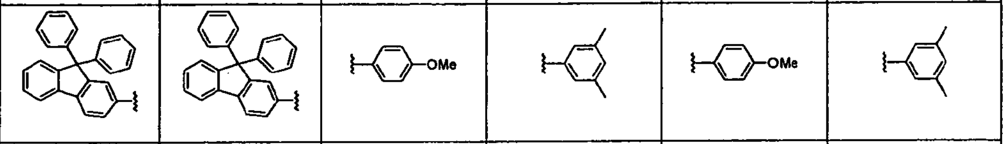
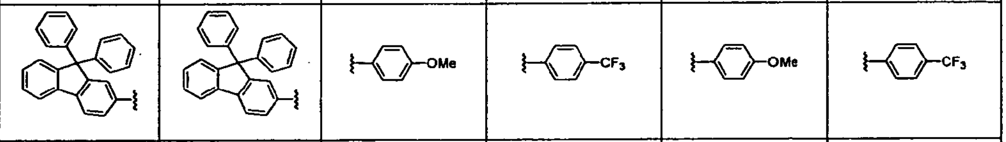
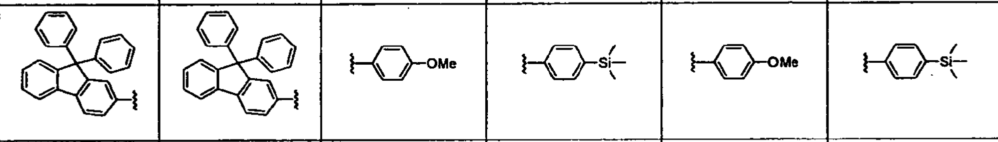
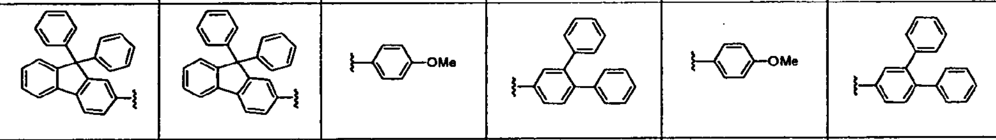
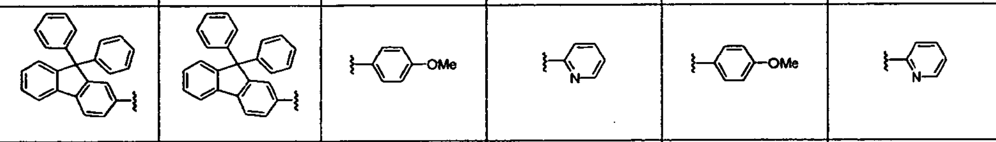
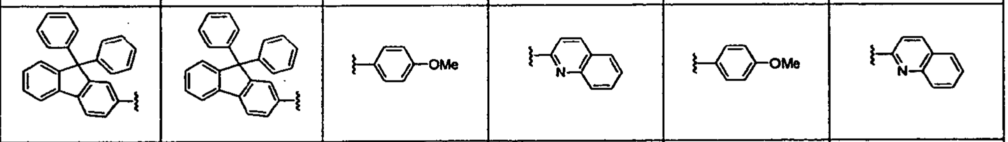
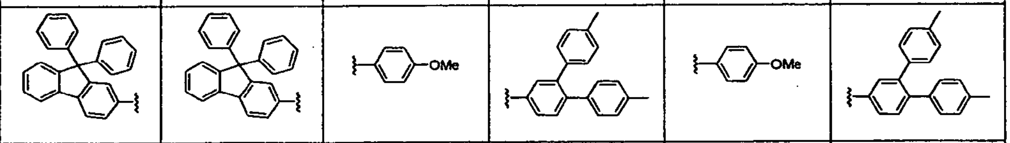
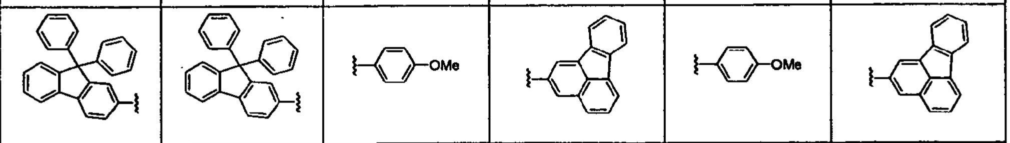
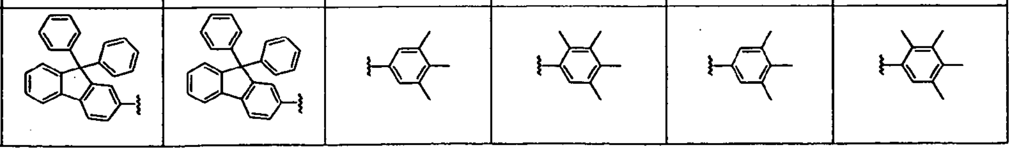
154	
155	
156	
157	
158	
159	
160	
161	
162	
163	

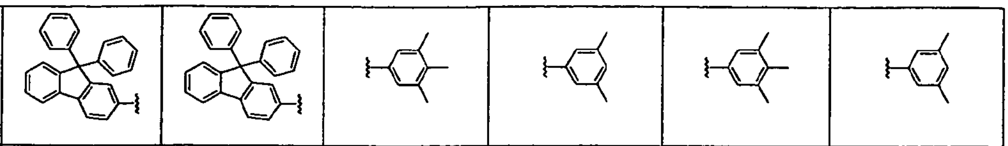
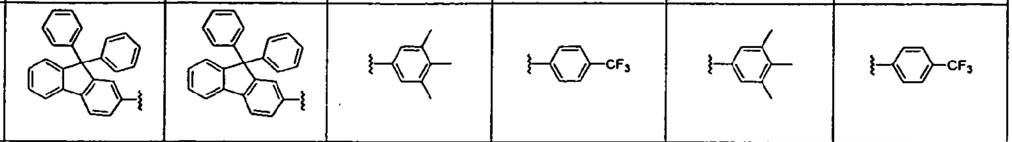
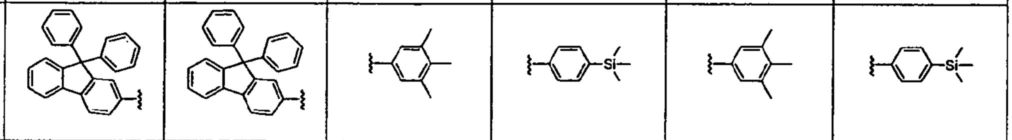
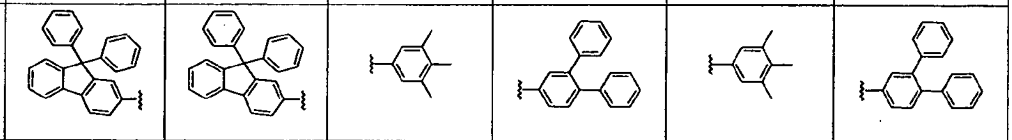
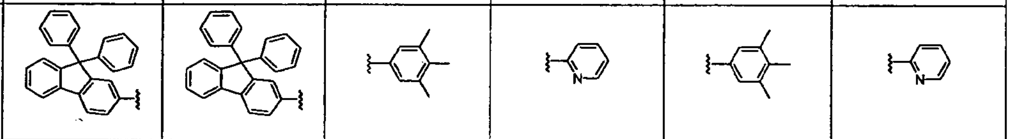
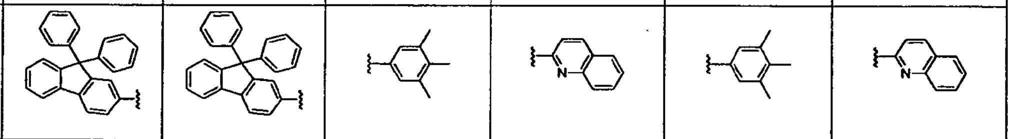
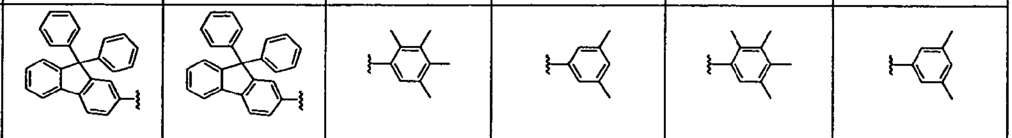
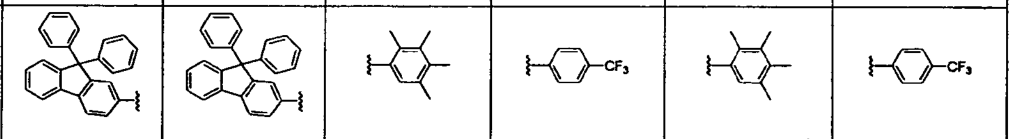
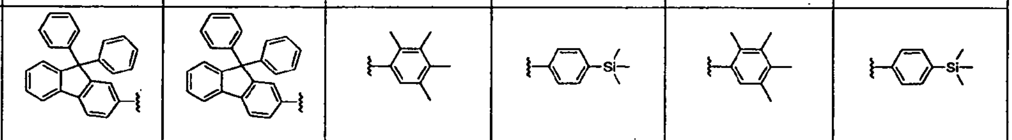
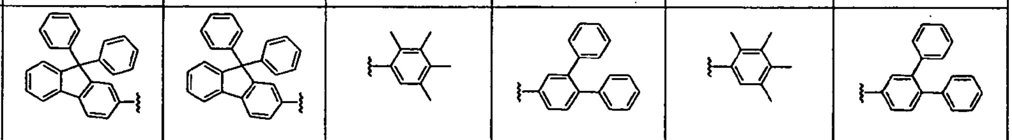
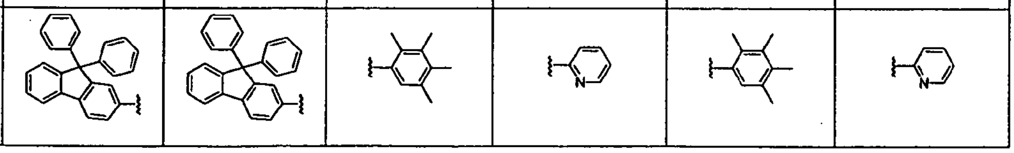
164	
165	
166	
167	
168	
169	
170	
171	
172	
173	
174	

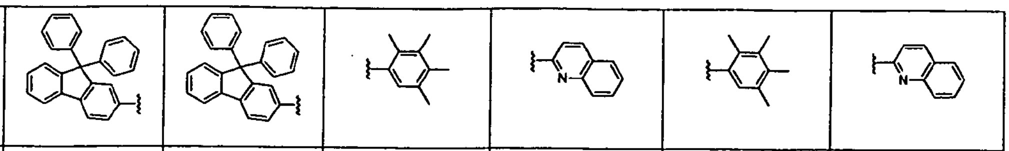
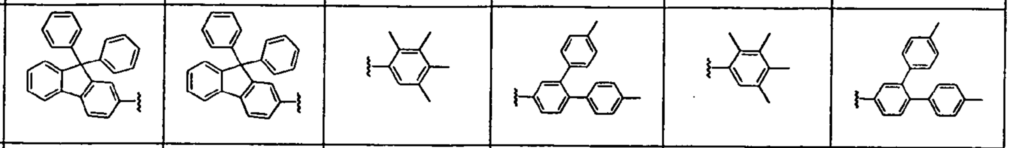
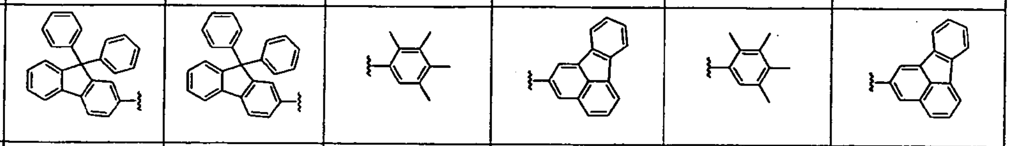
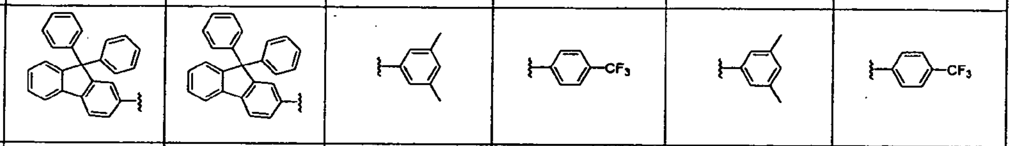
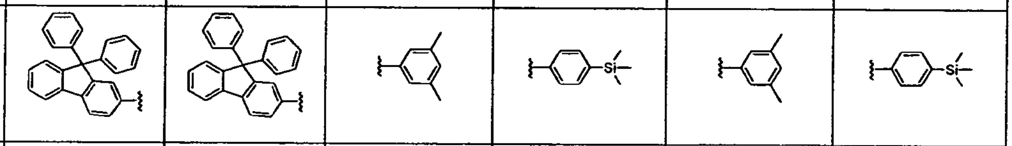
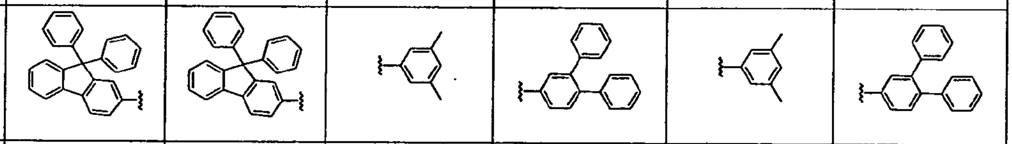
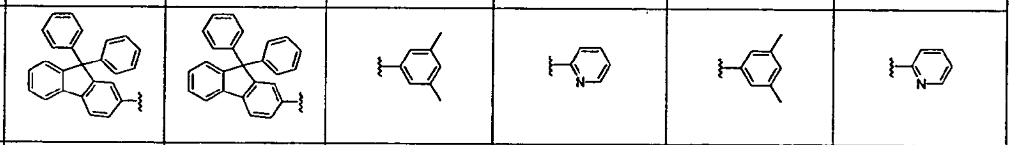
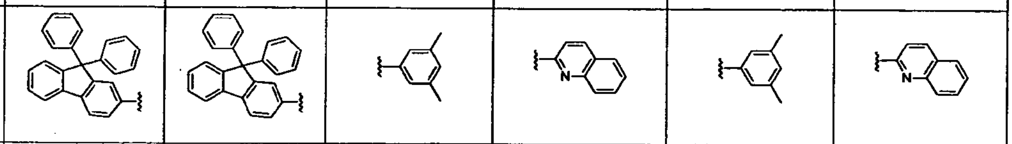
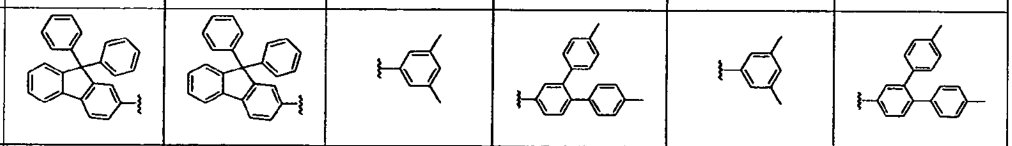
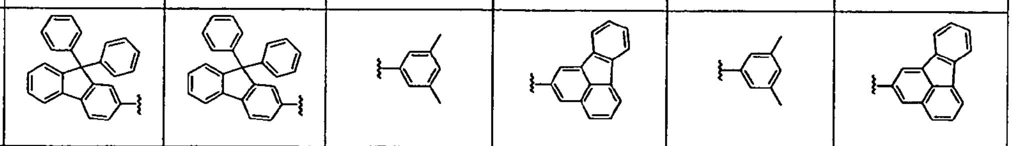
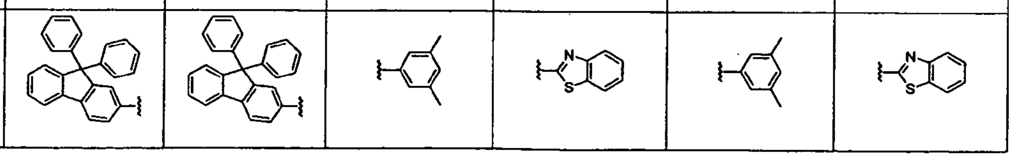
175	
176	
177	
178	
179	
180	
181	
182	
183	
184	
185	

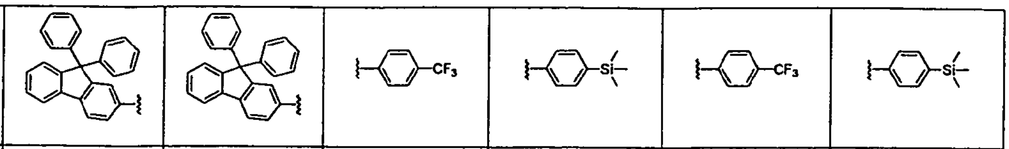
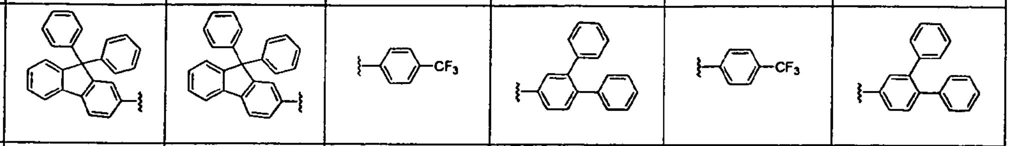
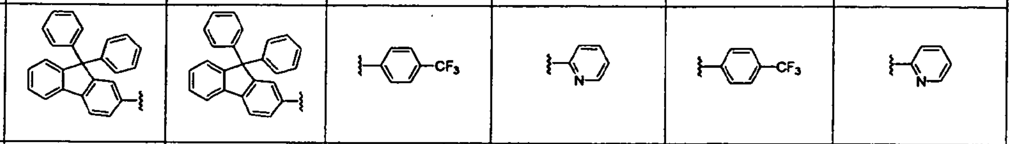
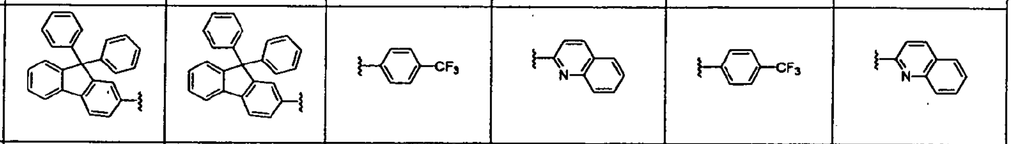
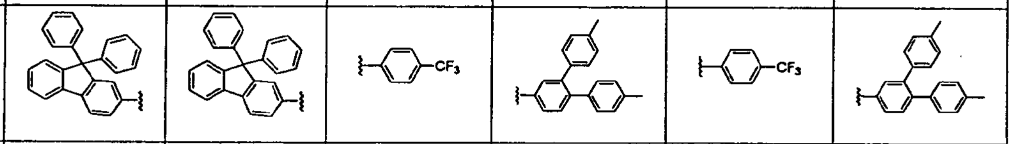
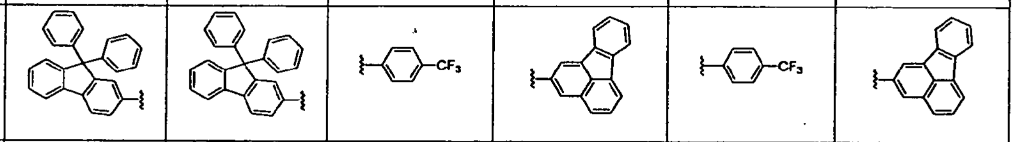
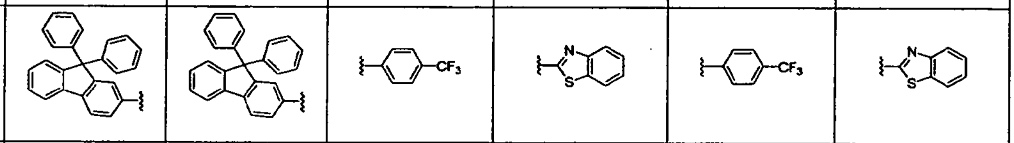
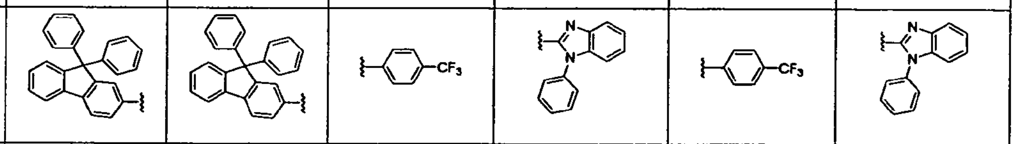
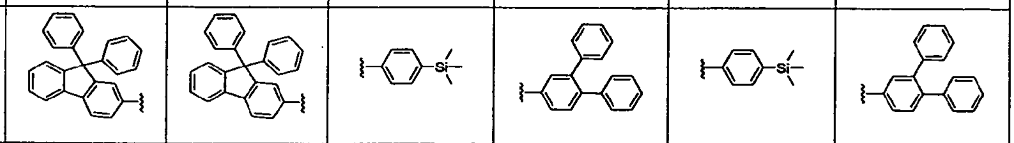
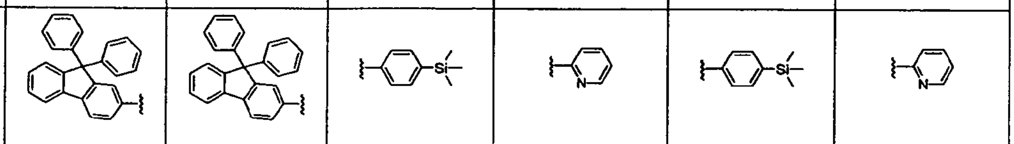
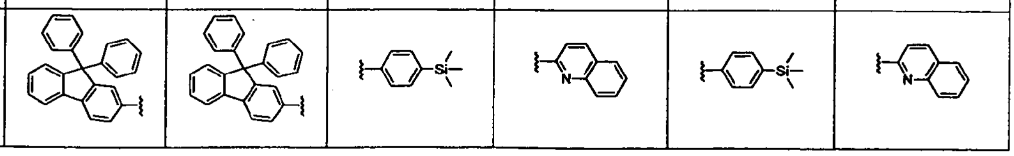
186	
187	
188	
189	
190	
191	
192	
193	
194	
195	
196	

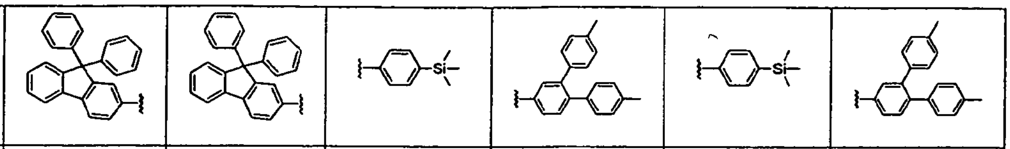
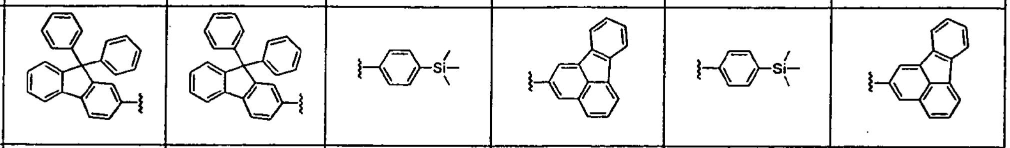
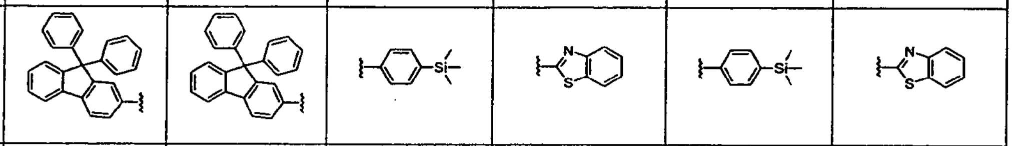
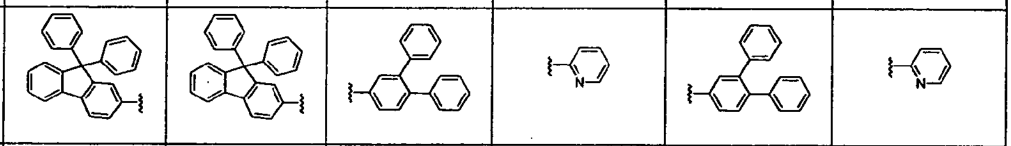
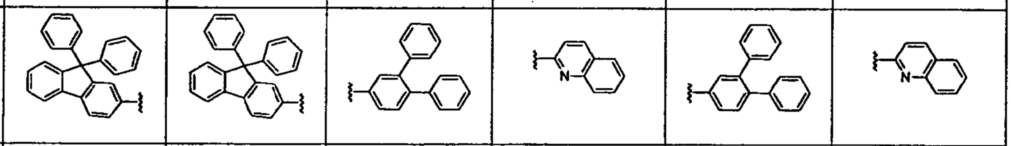
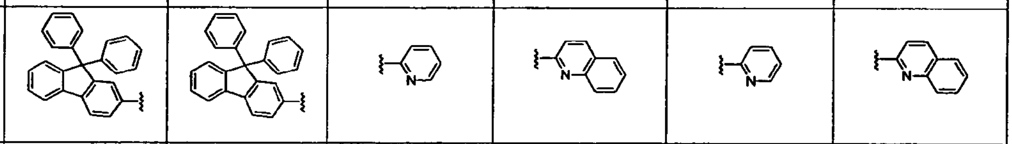
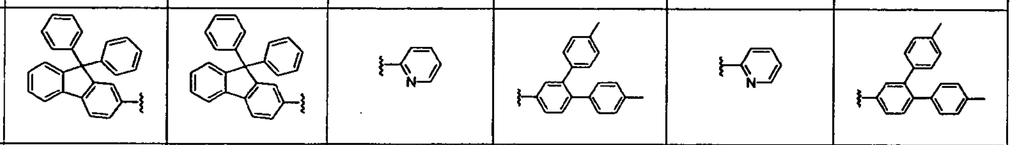
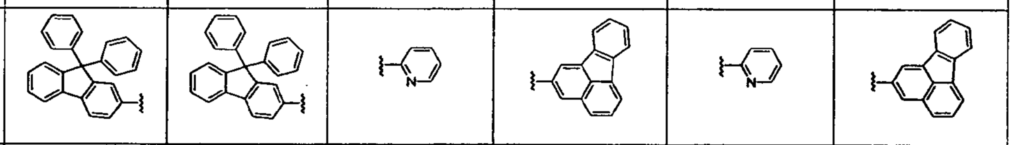
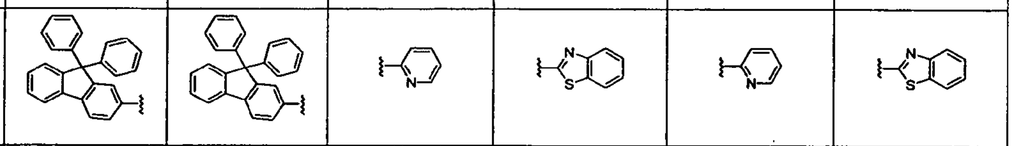
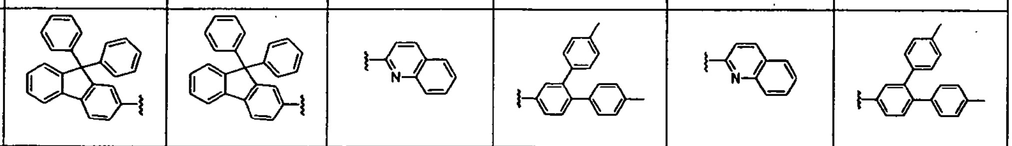
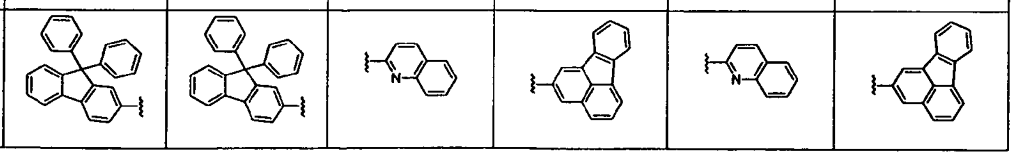
197	
198	
199	
200	
201	
202	
203	
204	
205	
206	
207	

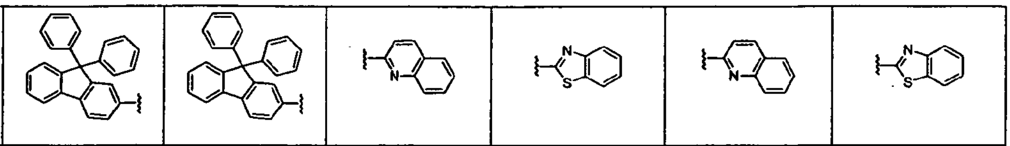
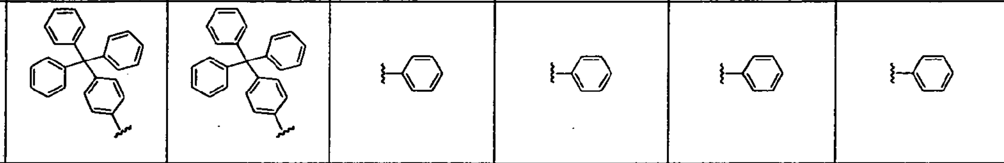
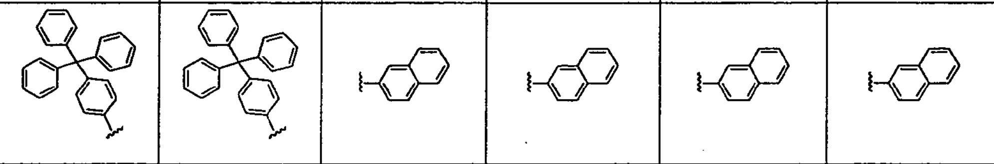
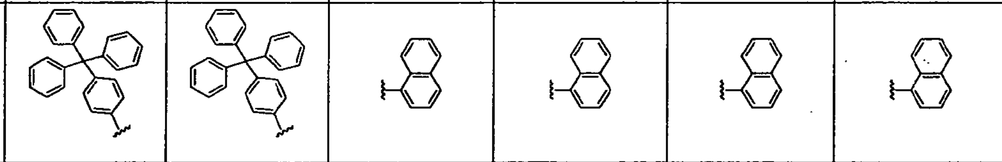
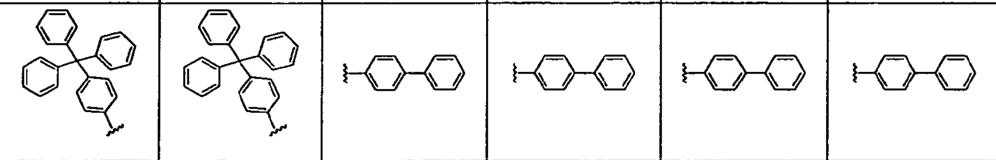
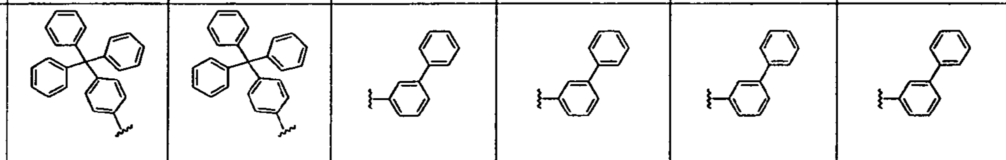
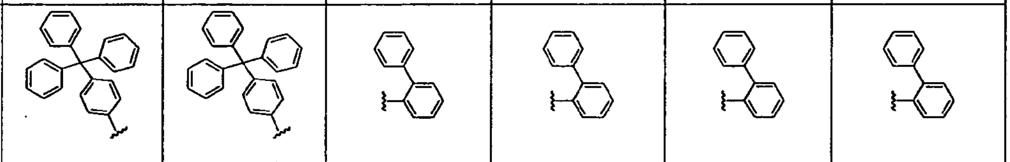
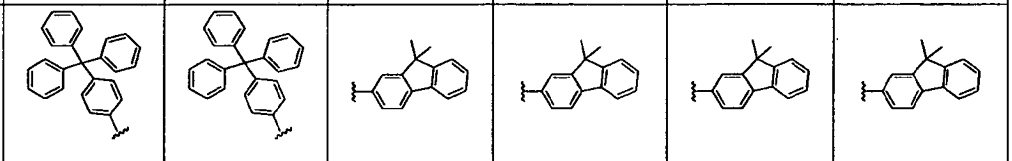
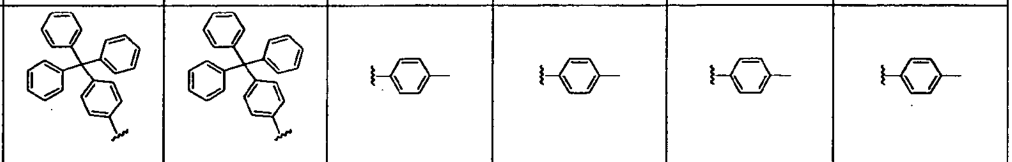
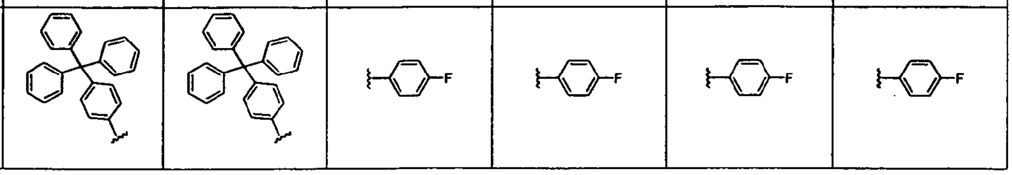
208	
209	
210	
211	
212	
213	
214	
215	
216	
217	
218	

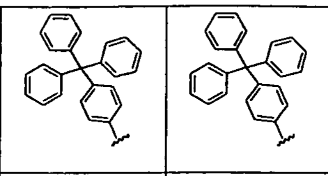
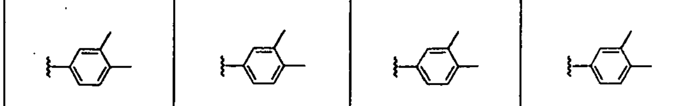
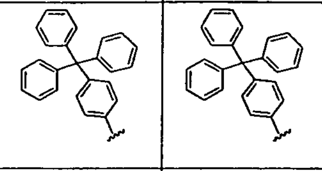
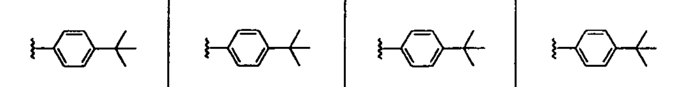
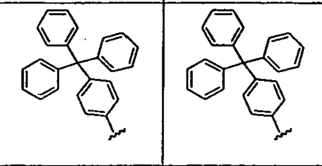
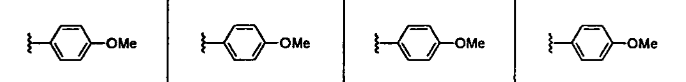
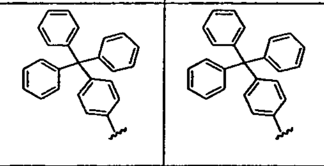
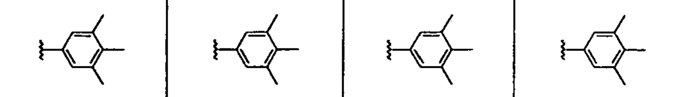
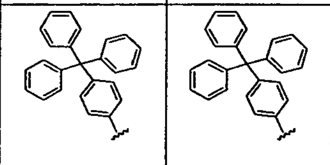
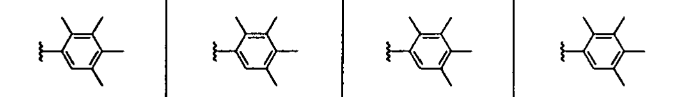
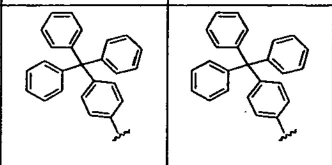
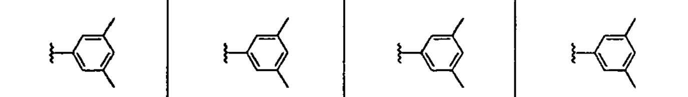
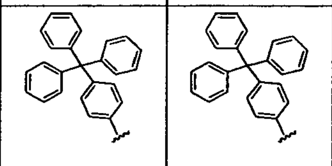
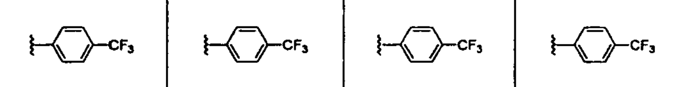
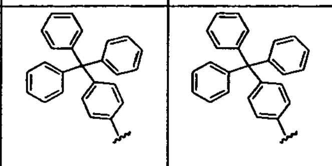
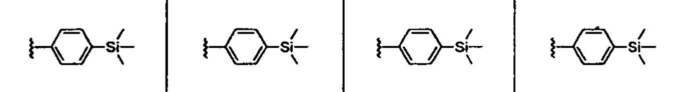
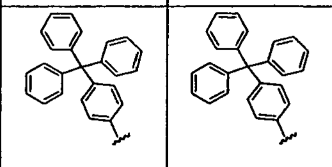
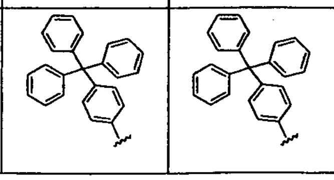
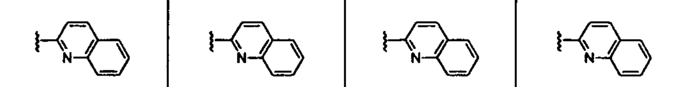
219	
220	
221	
222	
223	
224	
225	
226	
227	
228	
229	

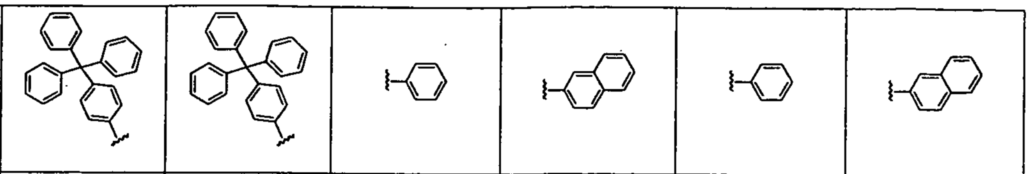
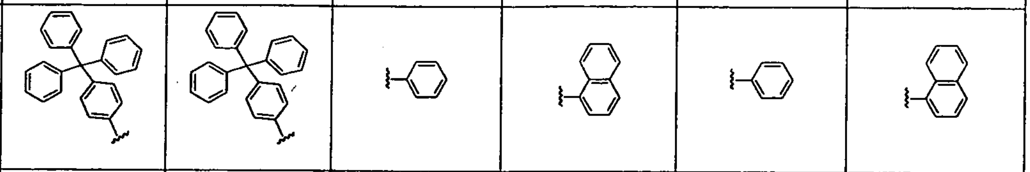
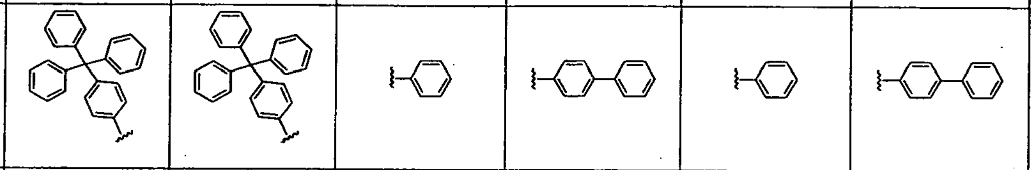
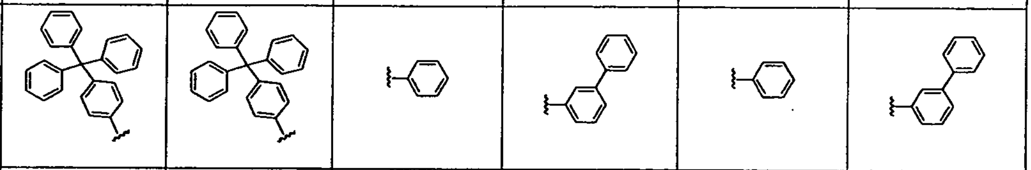
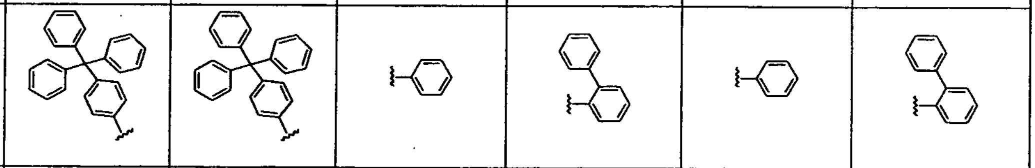
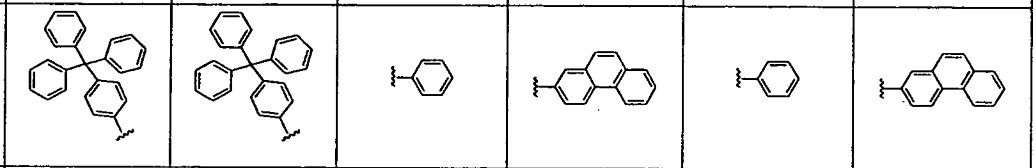
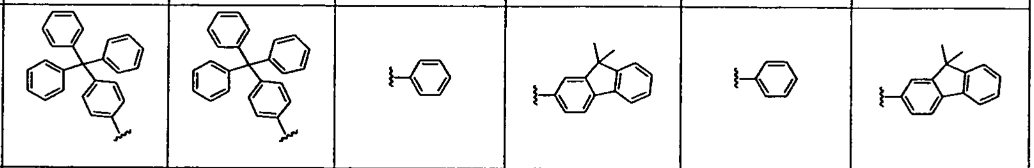
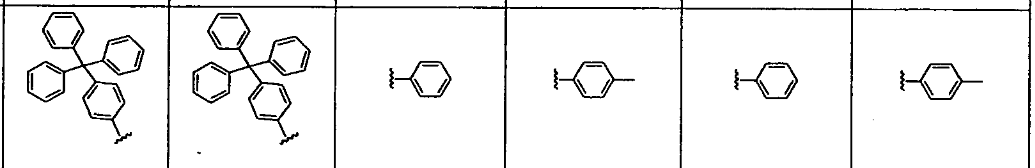
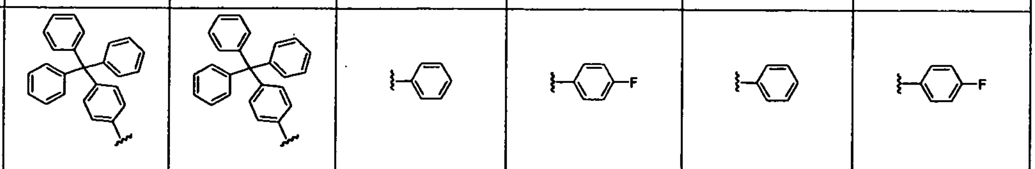
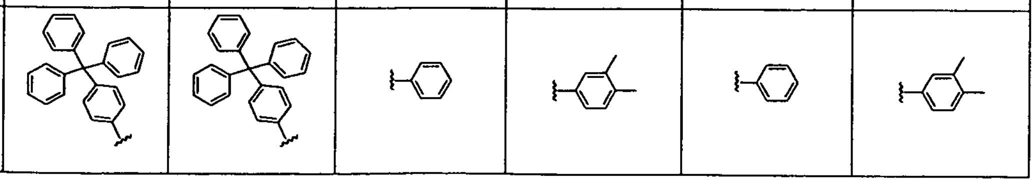
230	
231	
232	
233	
234	
235	
236	
237	
238	
239	
240	

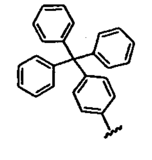
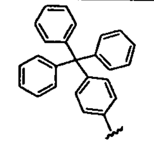
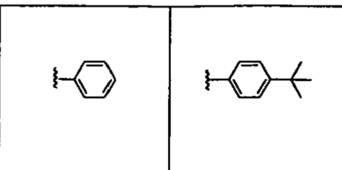
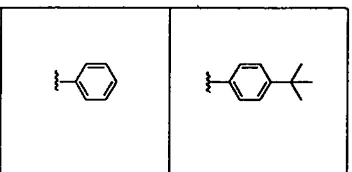
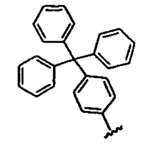
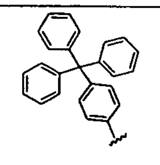
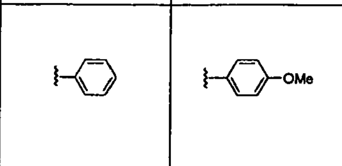
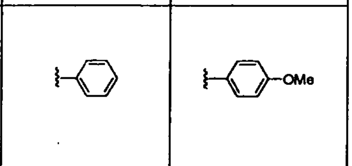
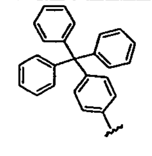
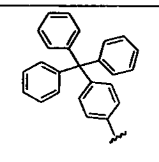
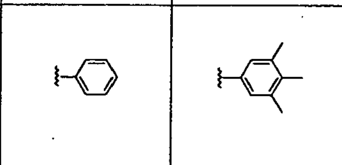
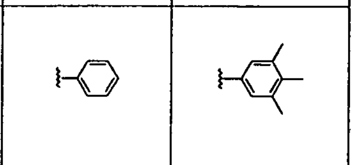
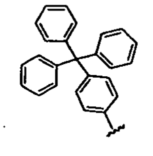
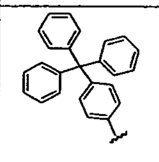
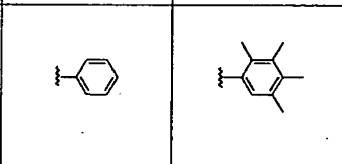
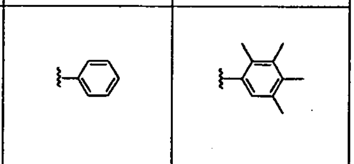
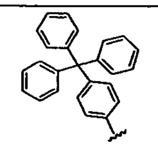
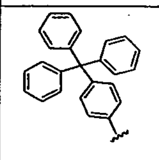
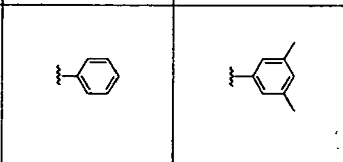
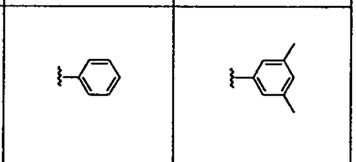
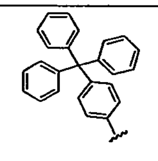
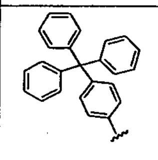
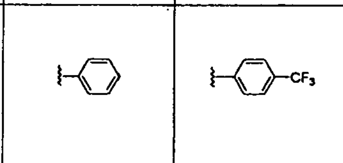
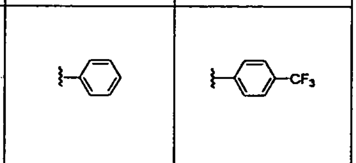
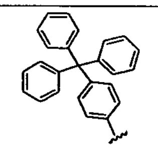
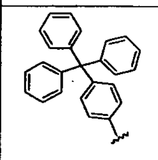
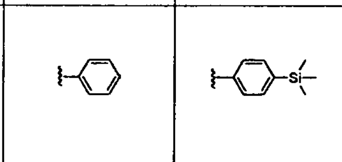
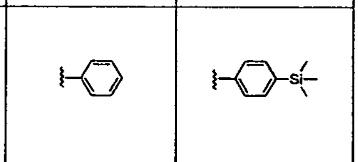
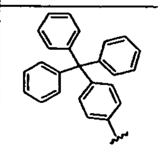
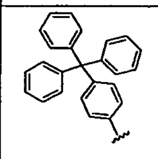
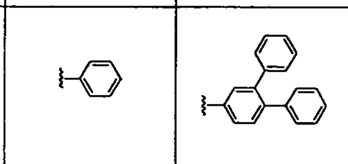
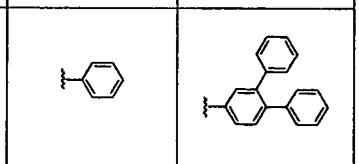
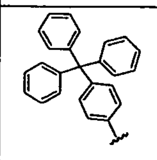
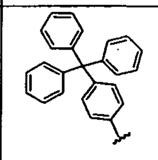
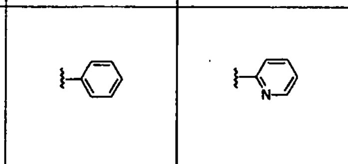
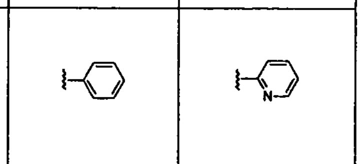
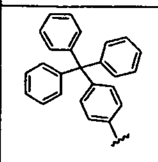
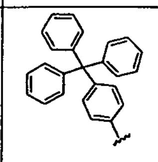
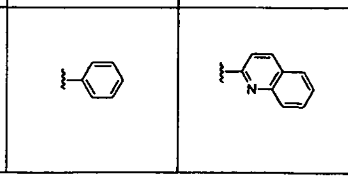
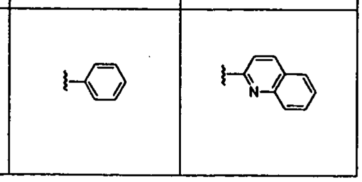
241	
242	
243	
244	
245	
246	
247	
248	
249	
250	
251	

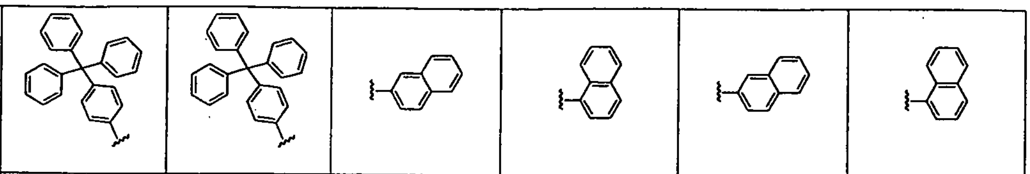
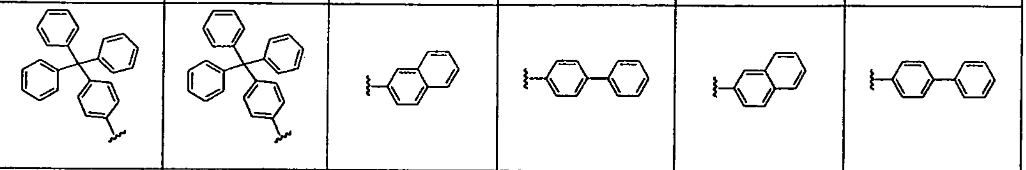
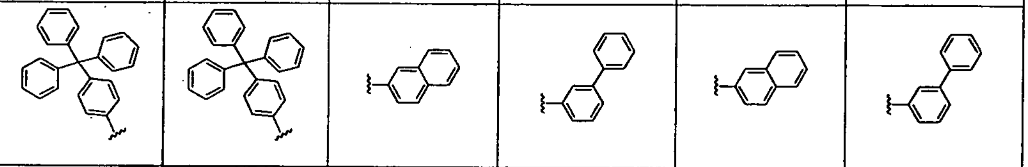
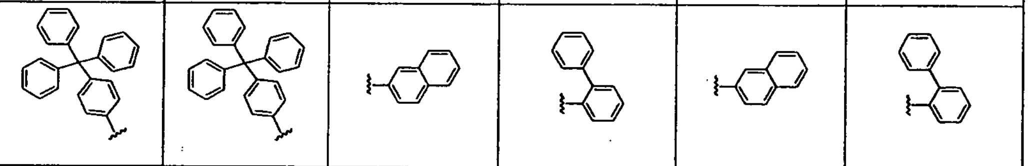
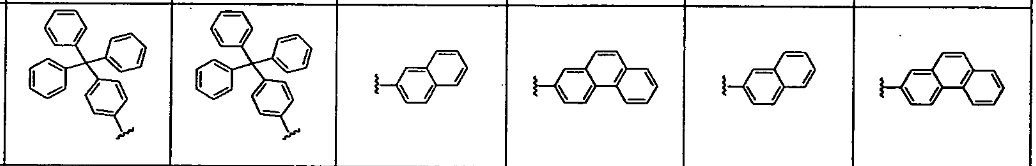
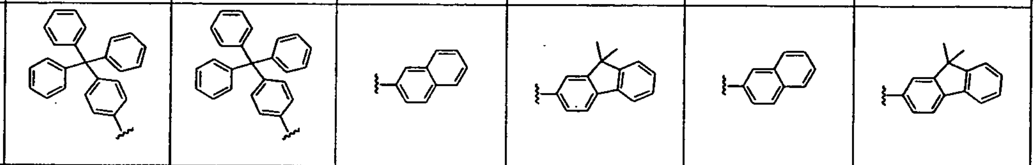
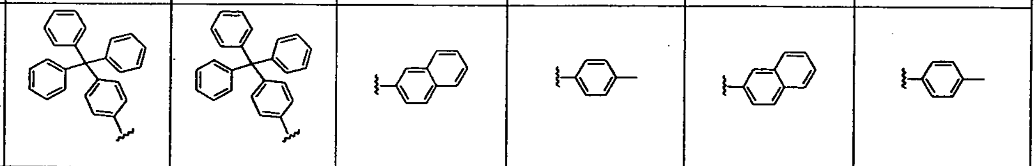
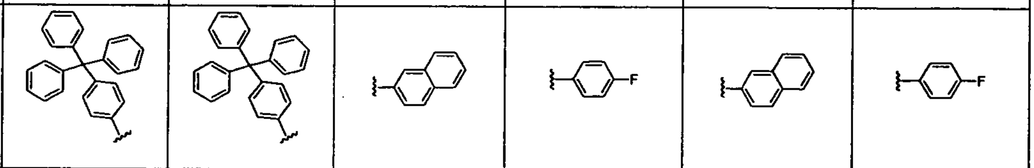
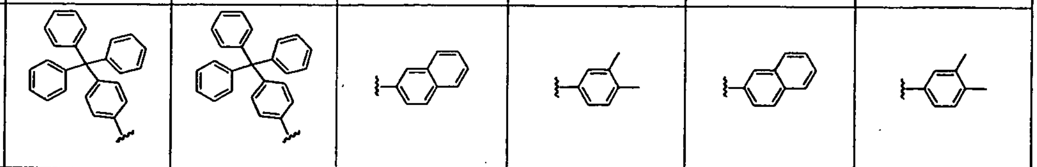
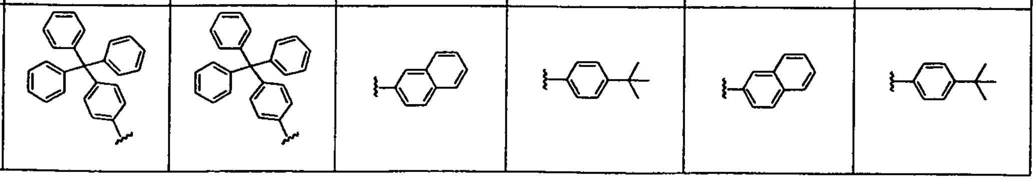
252	
253	
254	
255	
256	
257	
258	
259	
260	
261	
262	

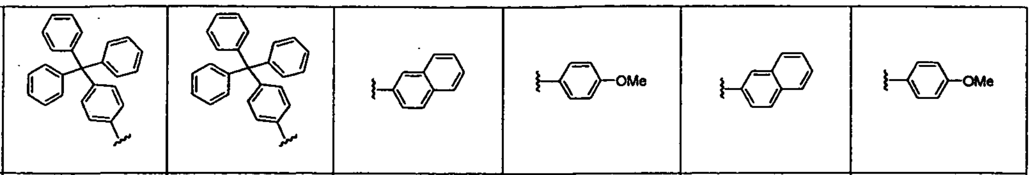
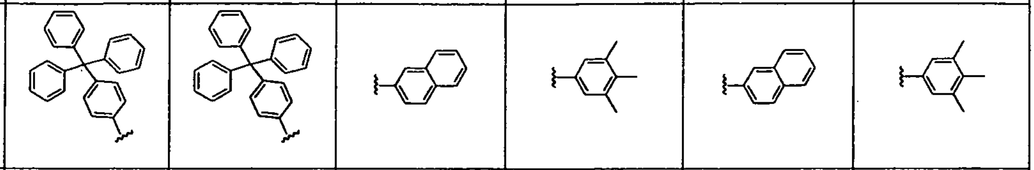
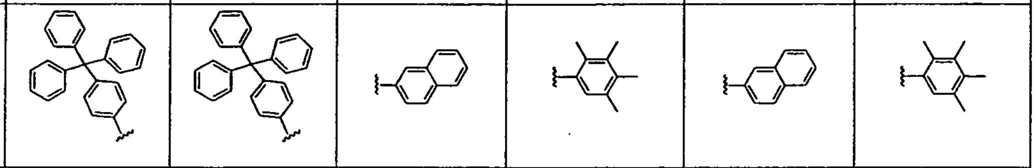
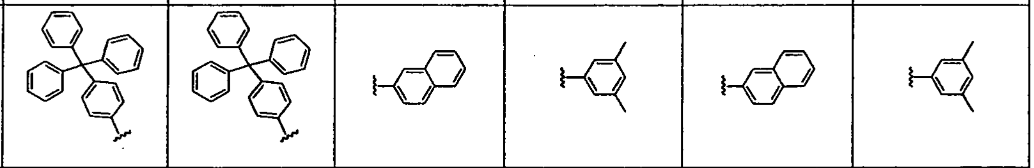
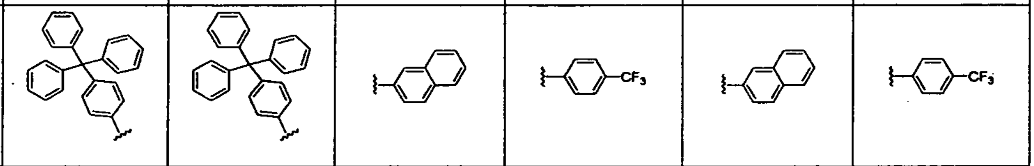
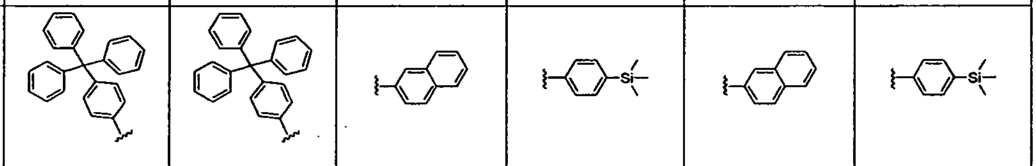
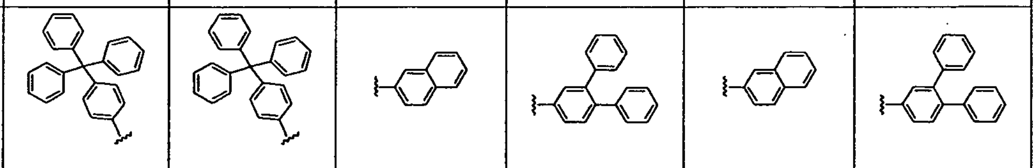
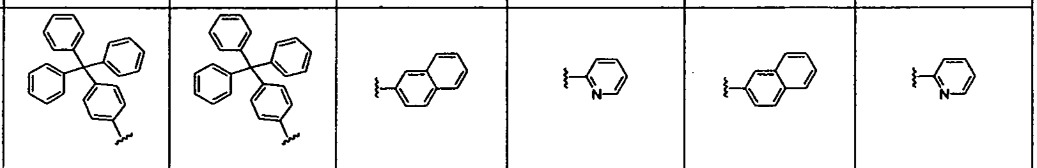
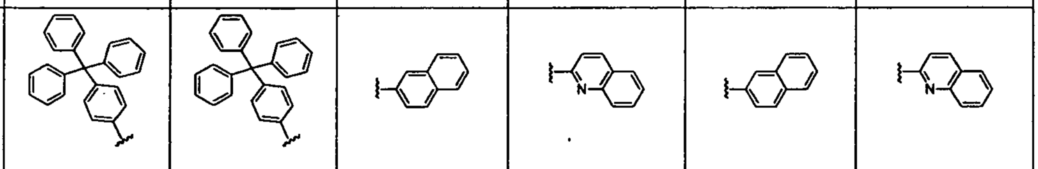
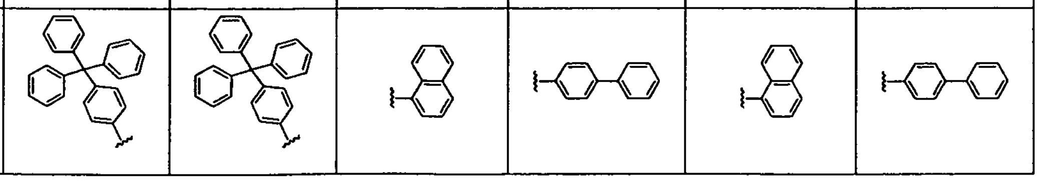
263	
264	
265	
266	
267	
268	
269	
270	
271	
272	

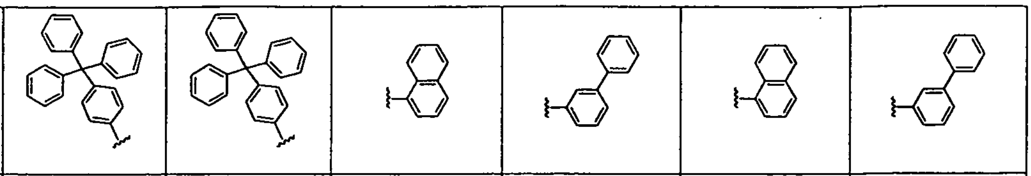
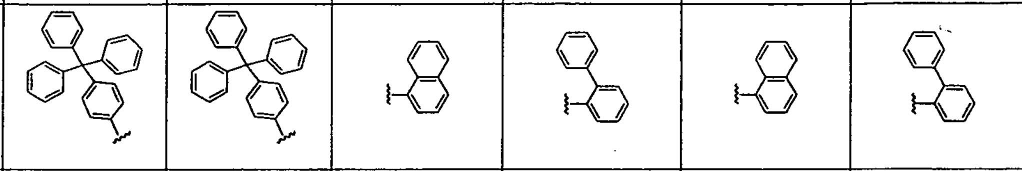
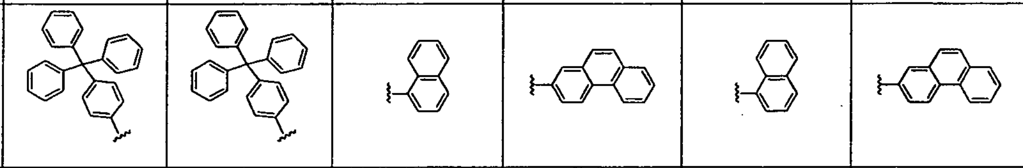
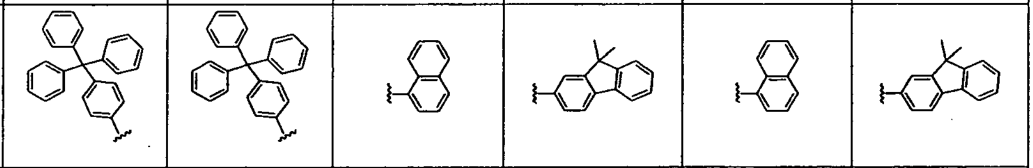
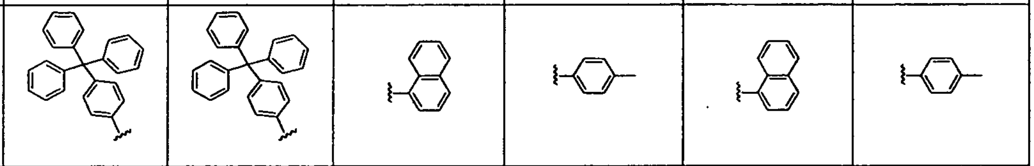
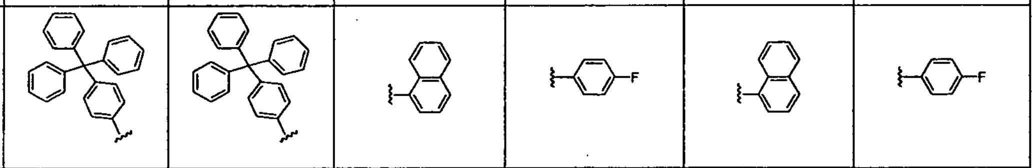
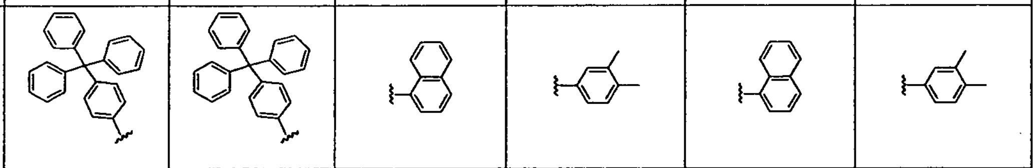
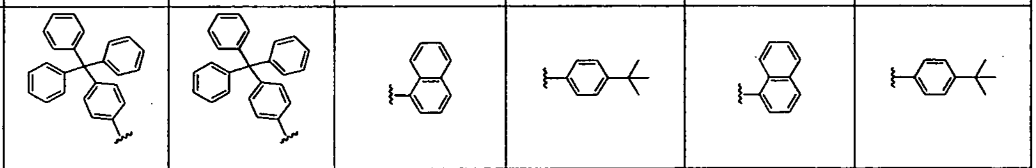
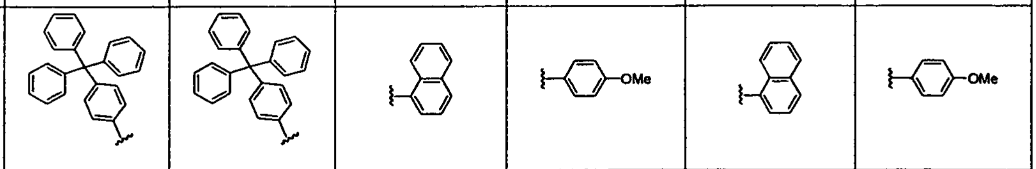
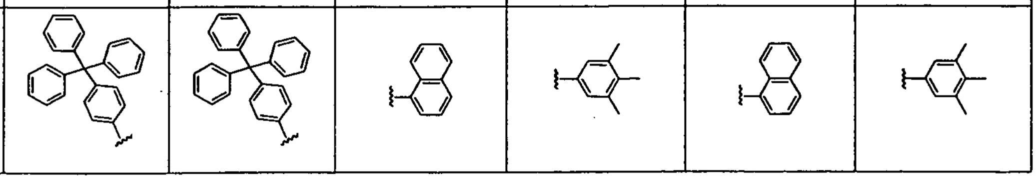
273		
274		
275		
276		
277		
278		
279		
280		
281		
282		

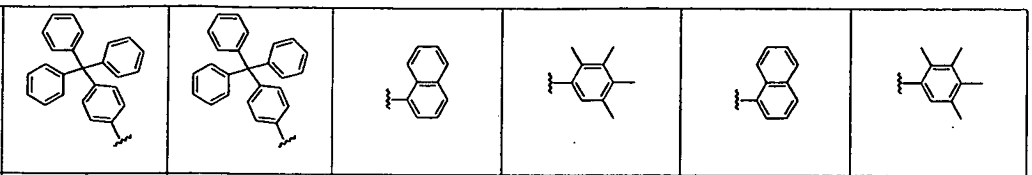
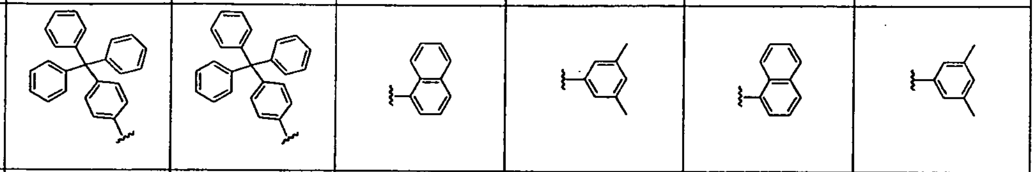
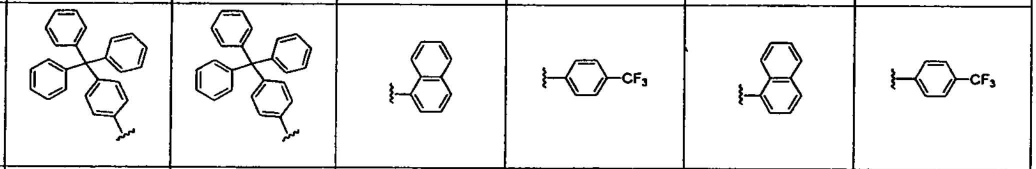
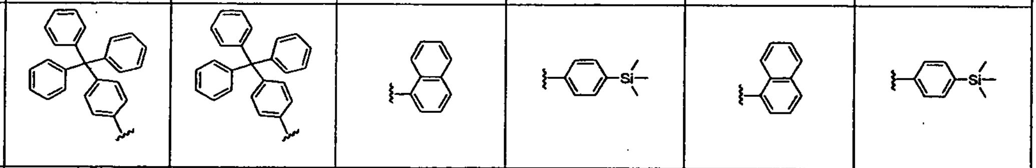
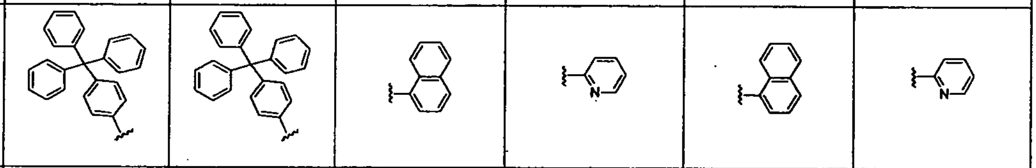
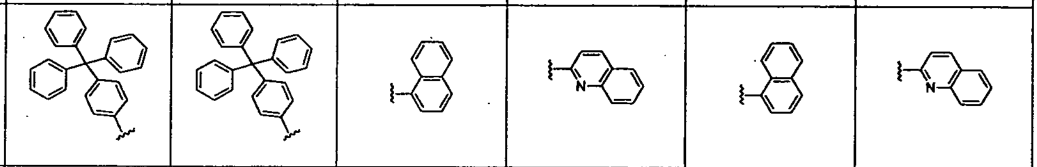
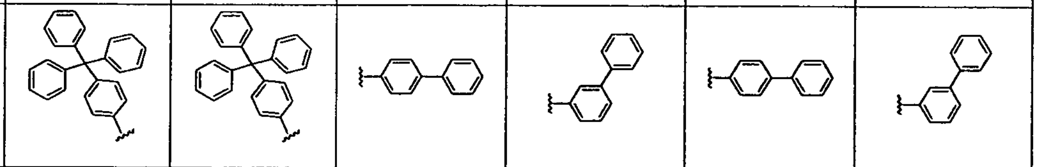
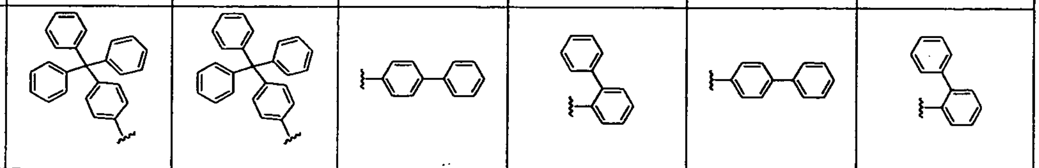
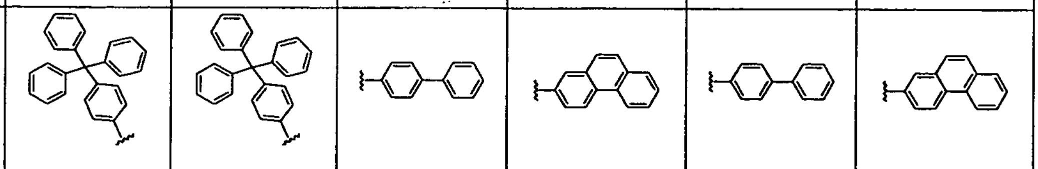
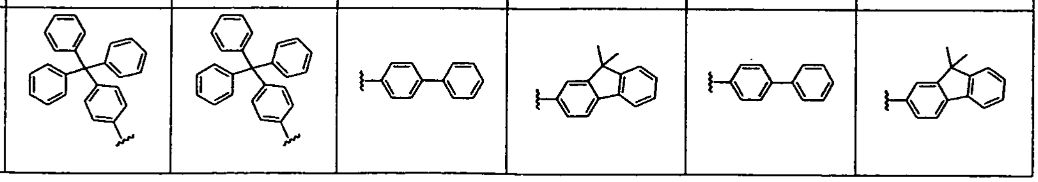
283	
284	
285	
286	
287	
288	
289	
290	
291	
292	

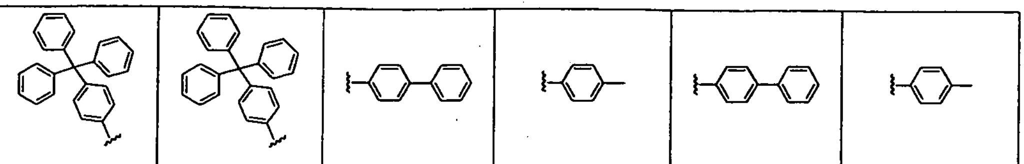
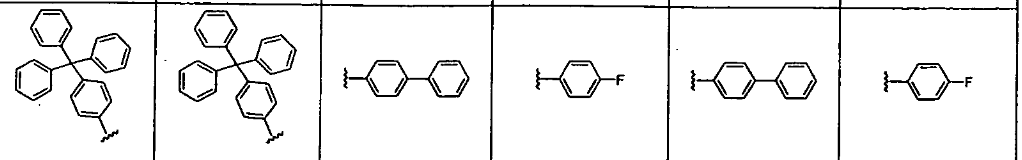
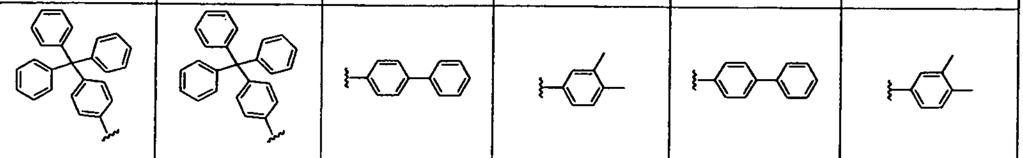
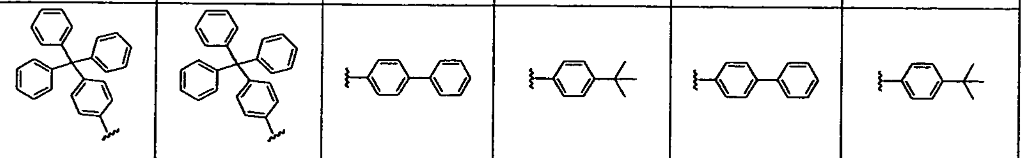
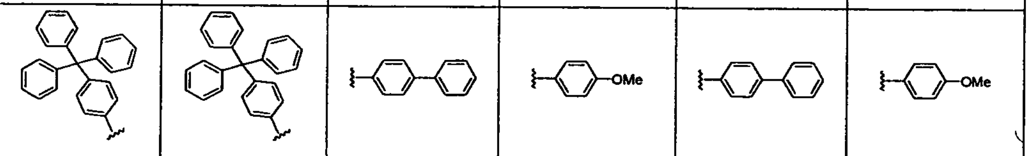
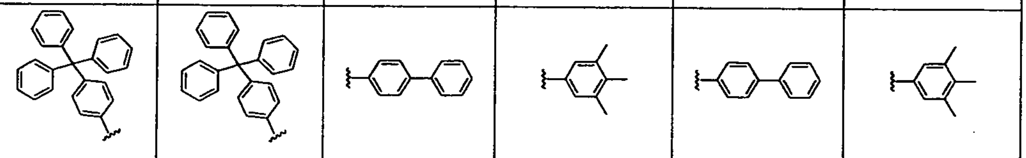
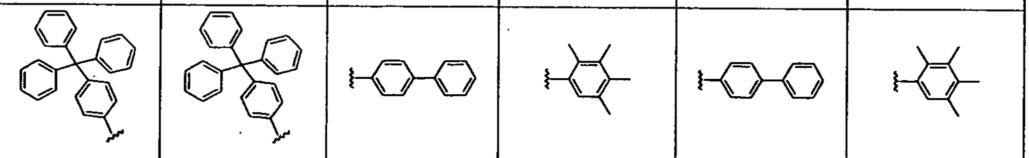
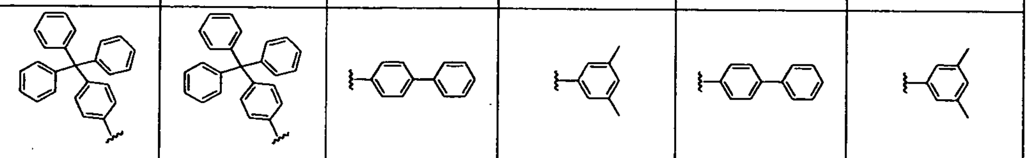
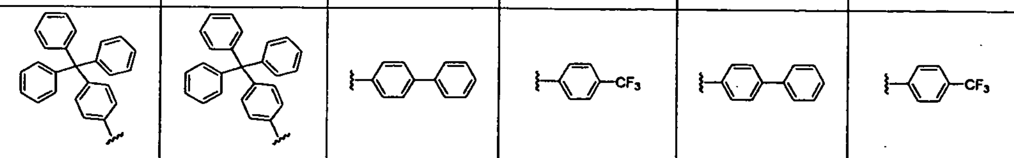
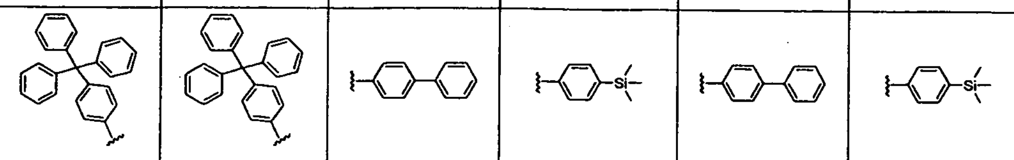
293						
294						
295						
296						
297						
298						
299						
300						
301						
302						

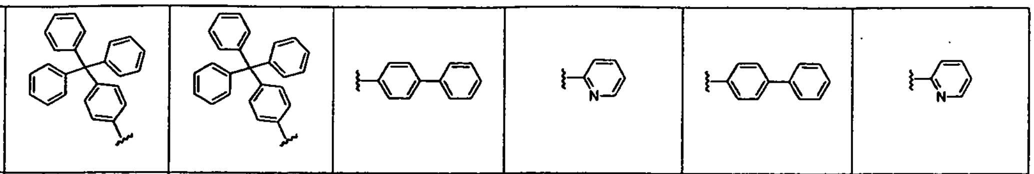
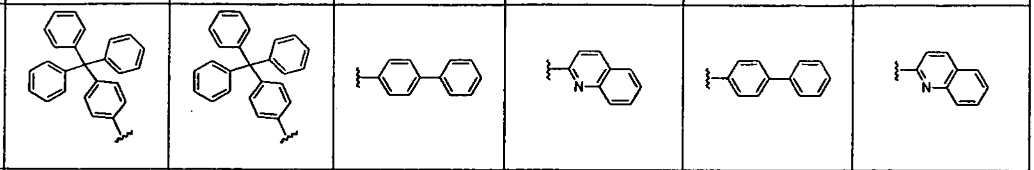
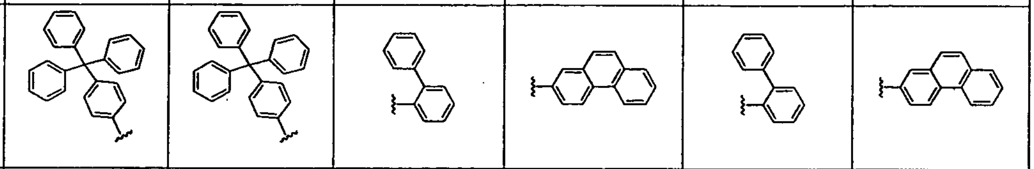
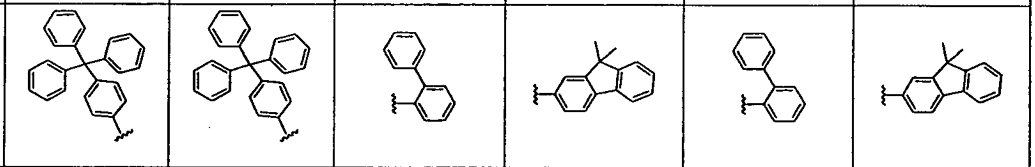
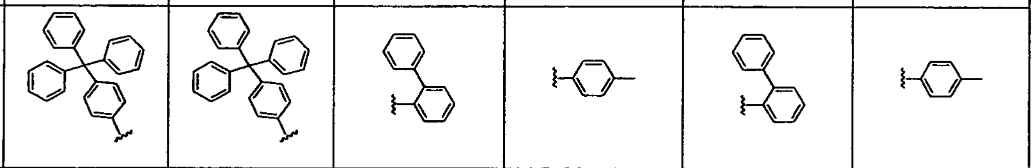
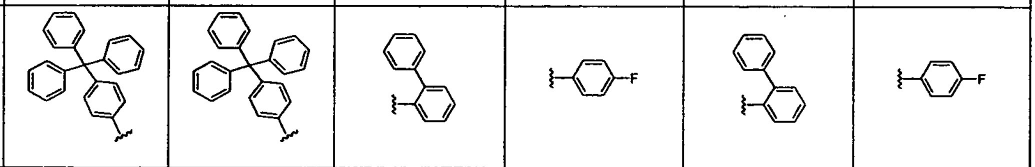
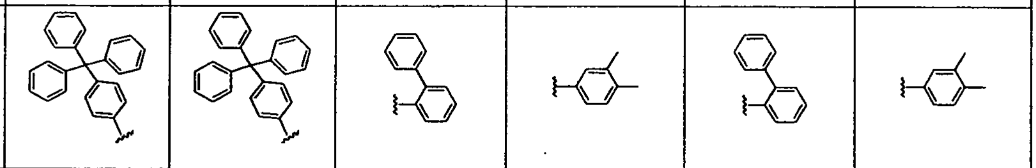
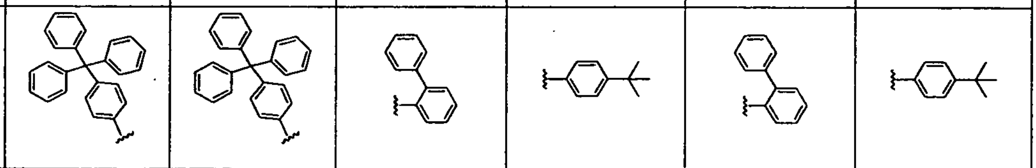
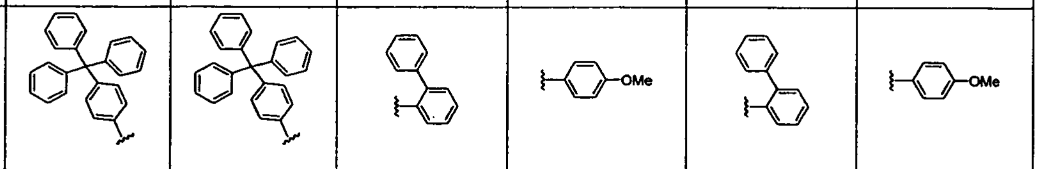
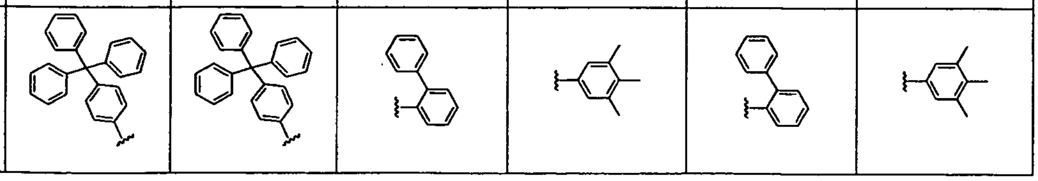
303	
304	
305	
306	
307	
308	
309	
310	
311	
312	

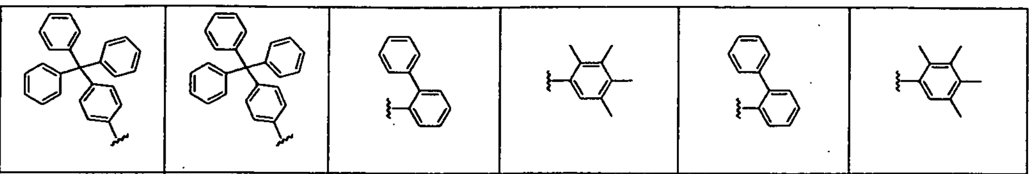
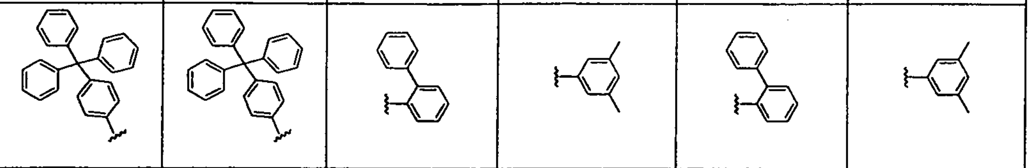
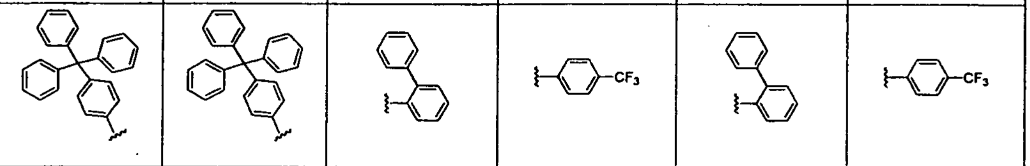
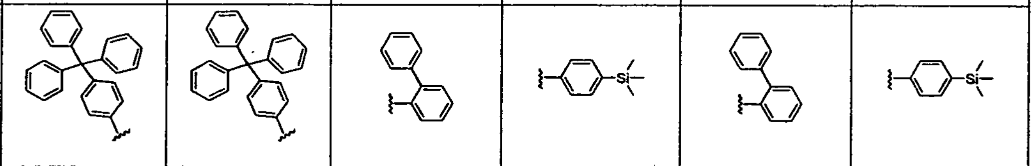
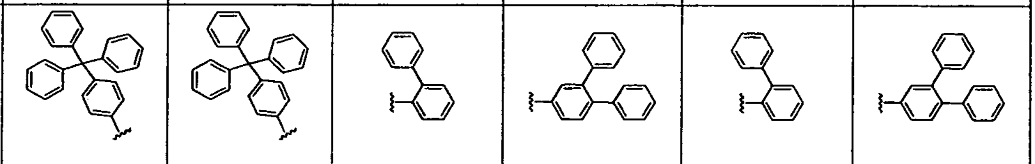
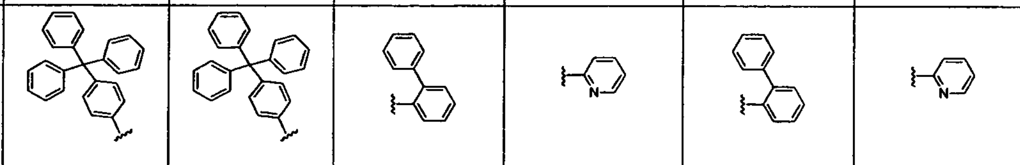
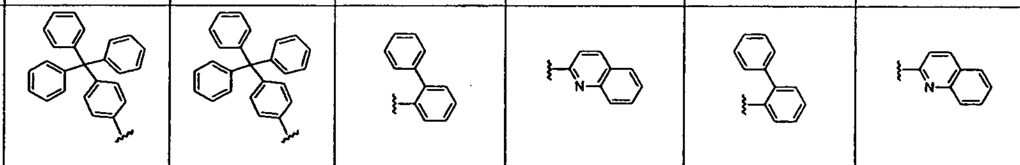
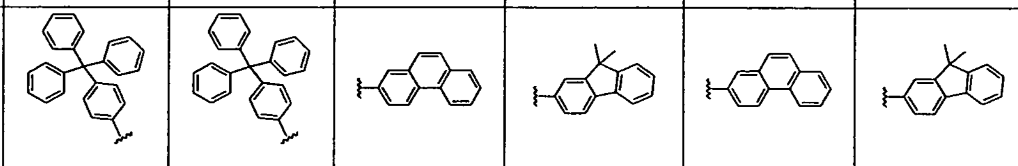
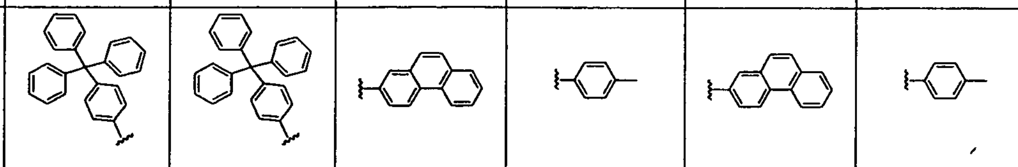
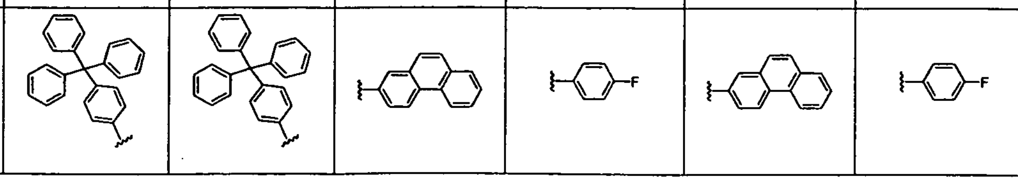
313						
314						
315						
316						
317						
318						
319						
320						
321						
322						

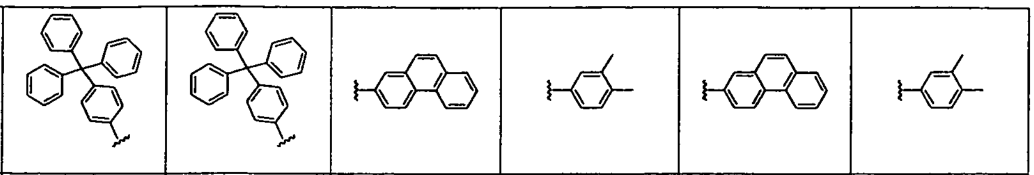
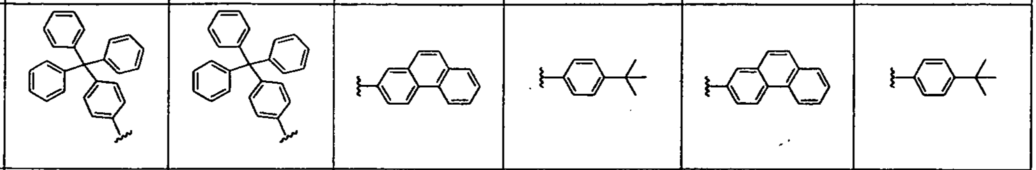
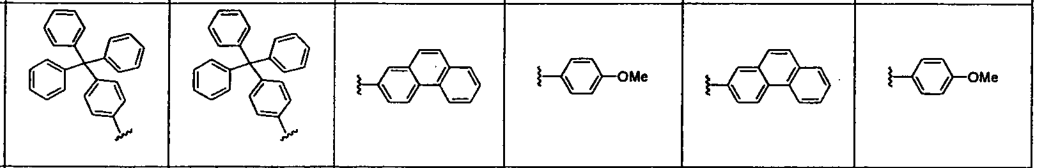
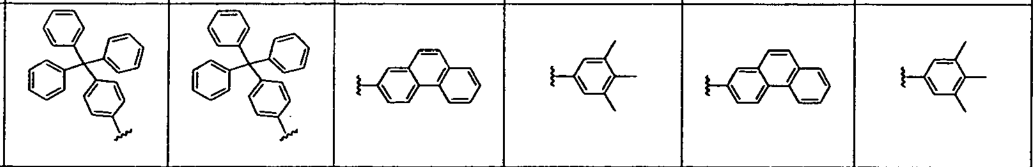
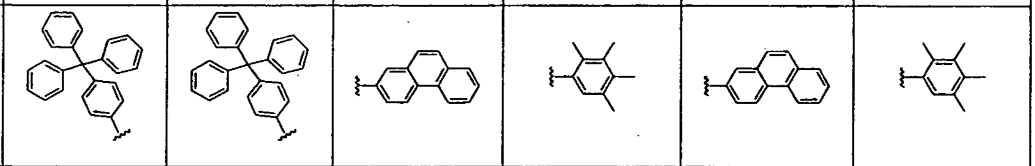
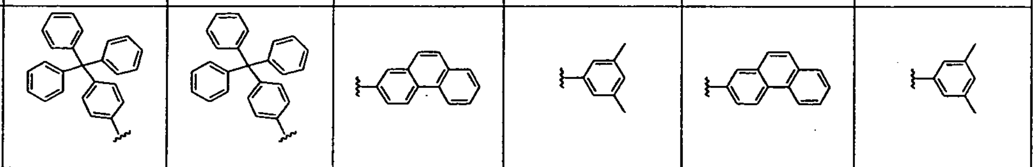
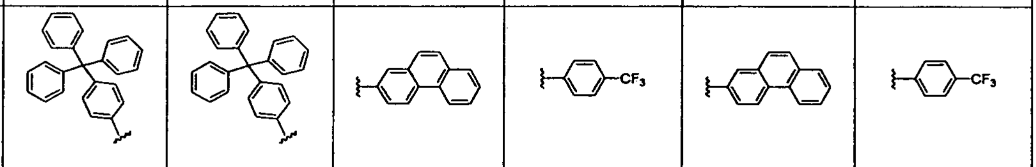
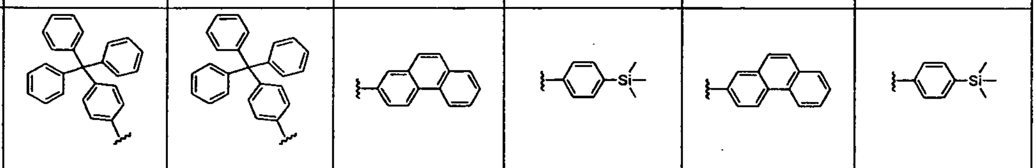
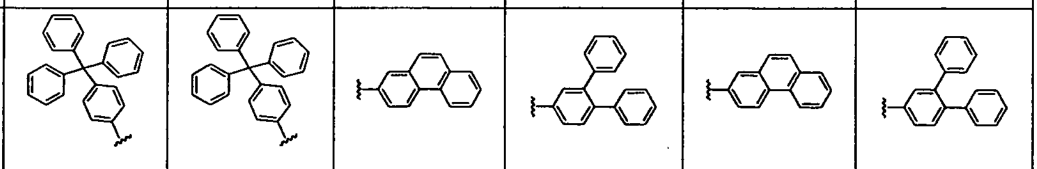
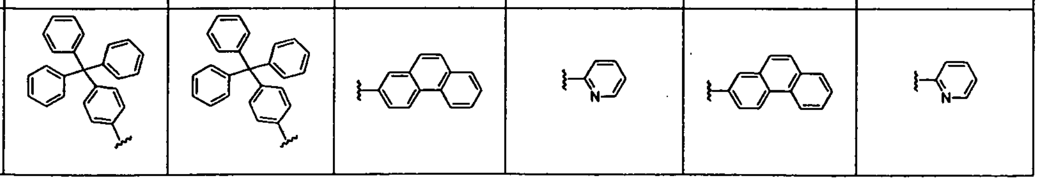
323	
324	
325	
326	
327	
328	
329	
330	
331	
332	

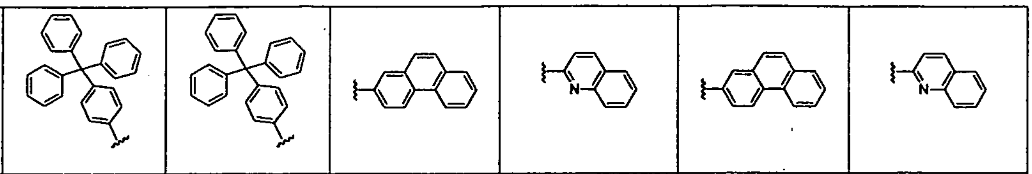
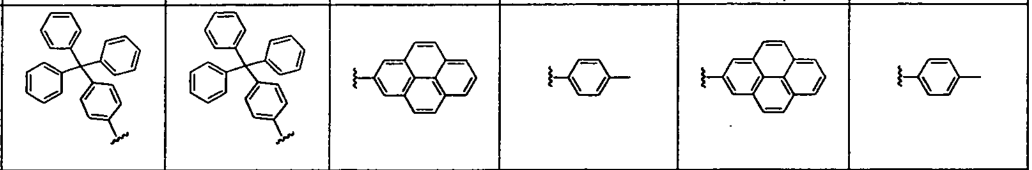
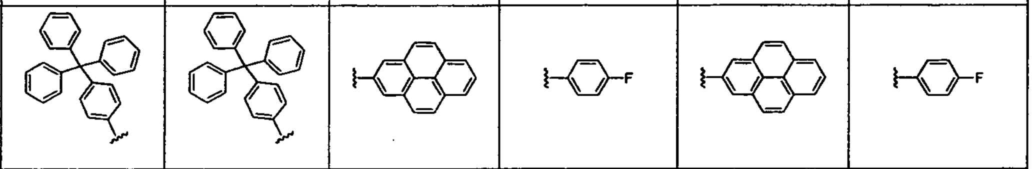
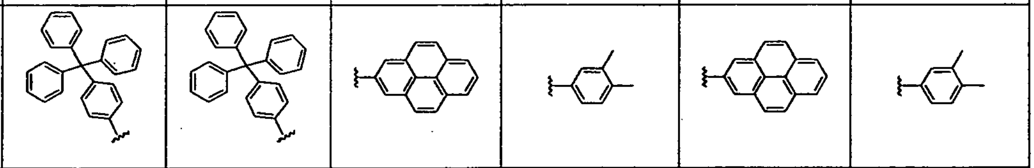
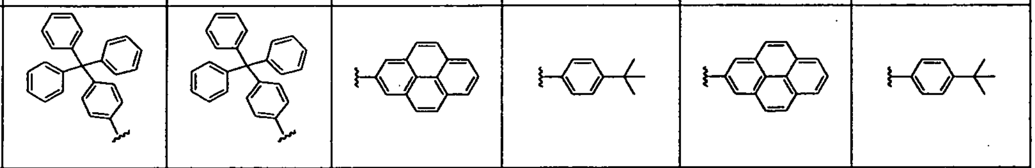
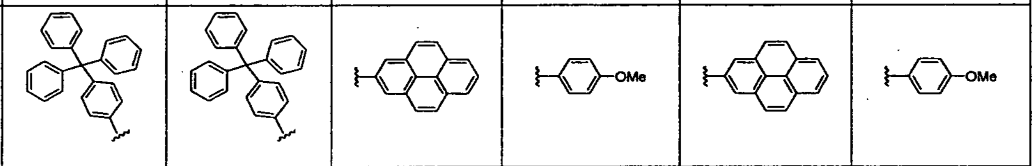
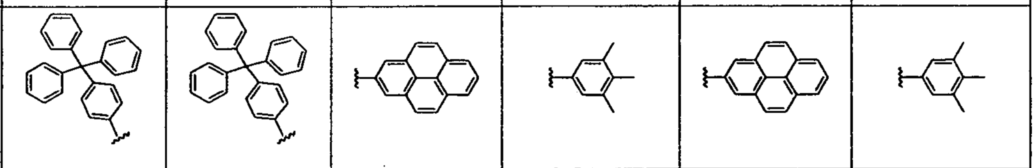
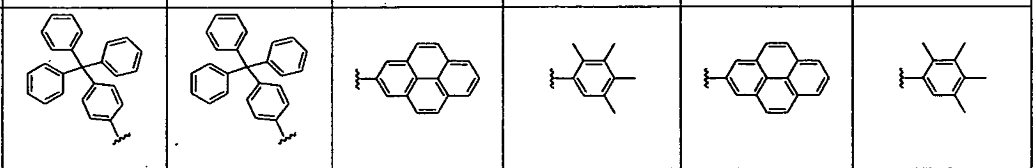
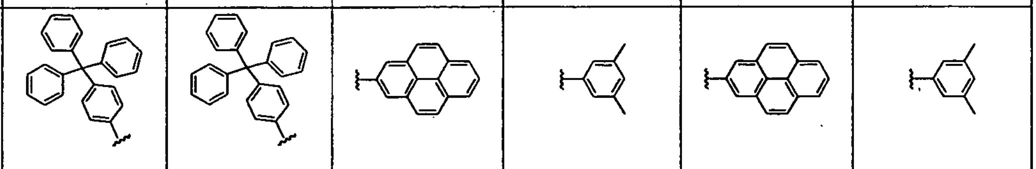
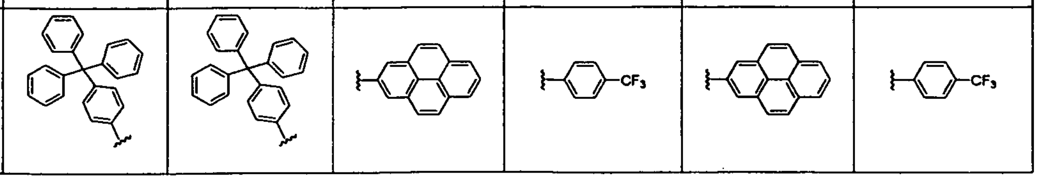
333	
334	
335	
336	
337	
338	
339	
340	
341	
342	

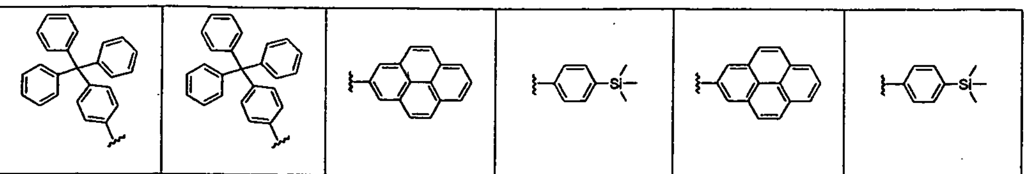
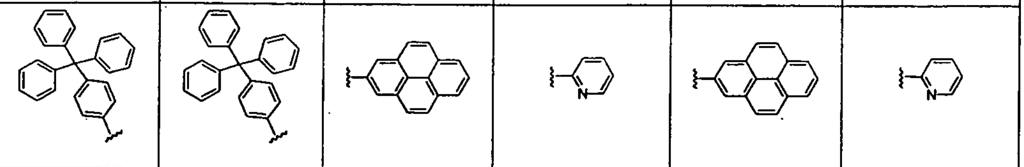
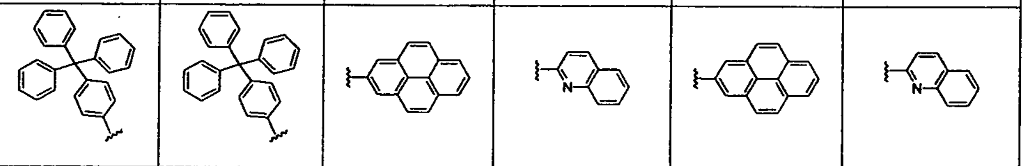
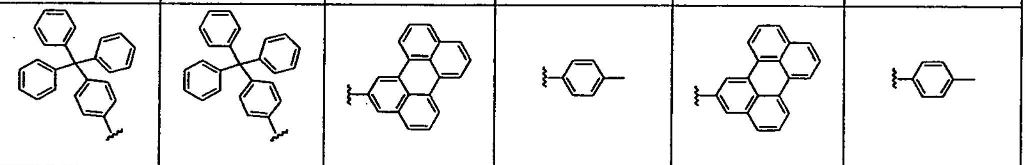
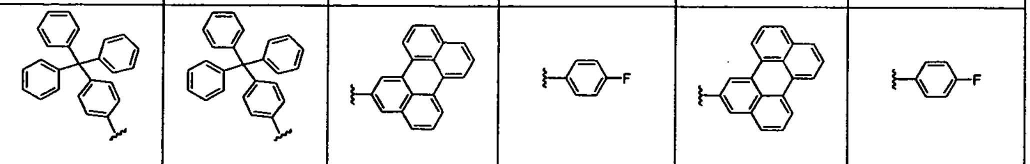
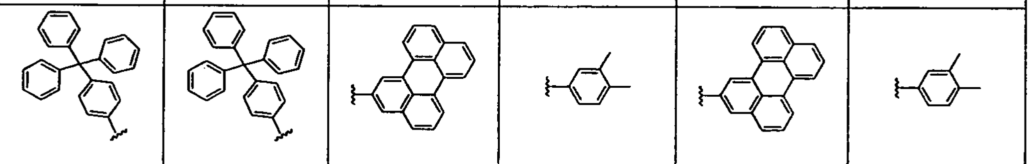
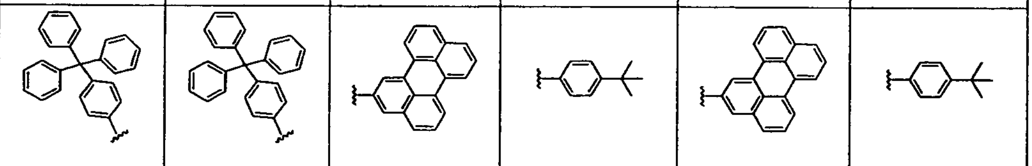
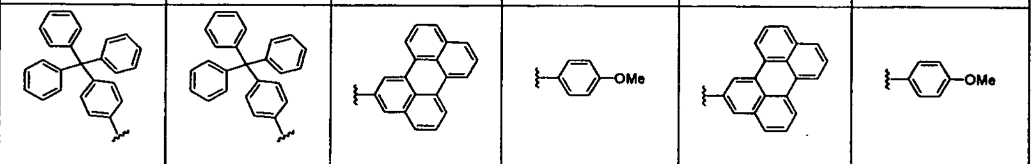
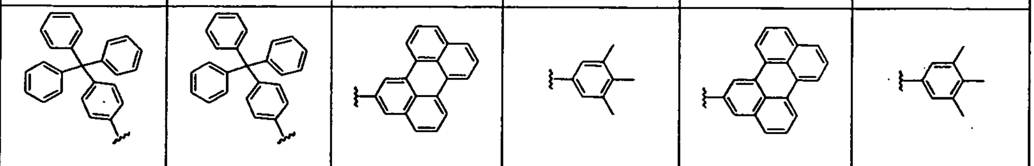
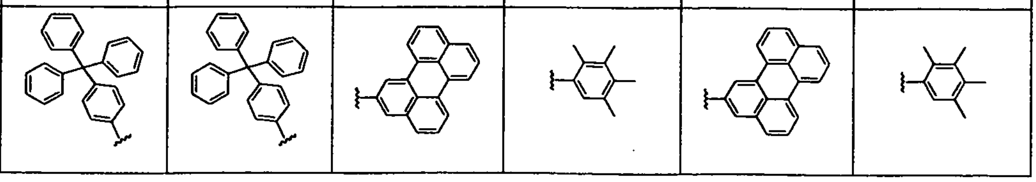
343	
344	
345	
346	
347	
348	
349	
350	
351	
352	

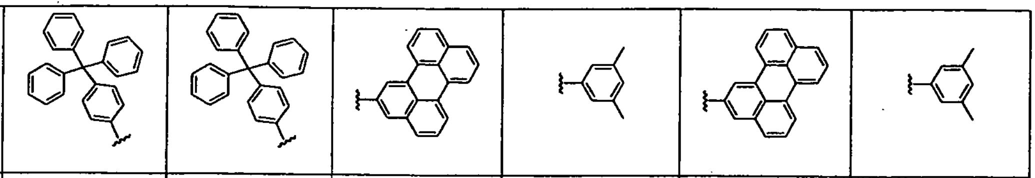
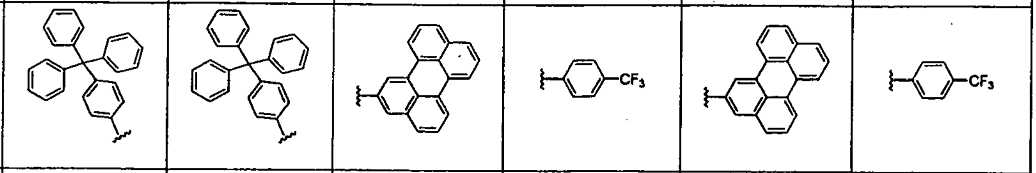
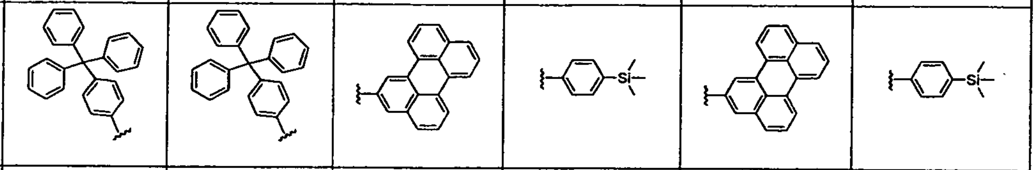
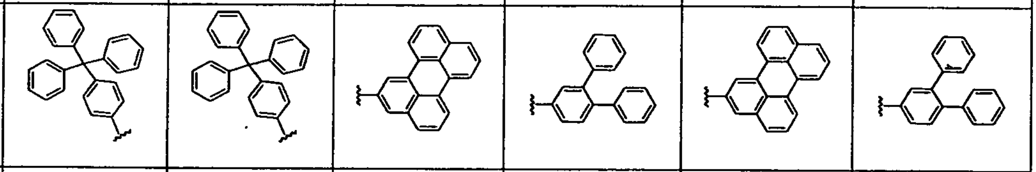
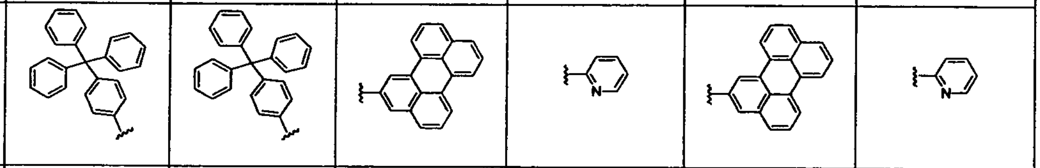
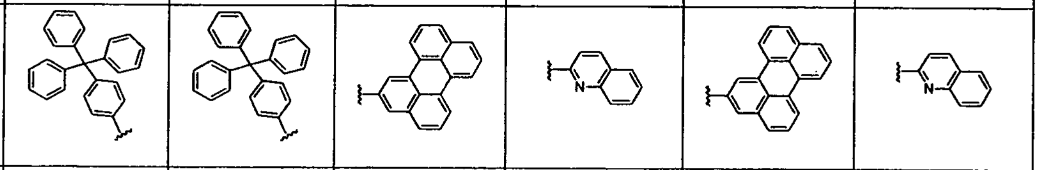
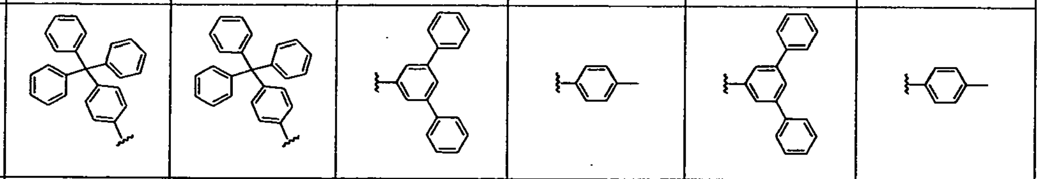
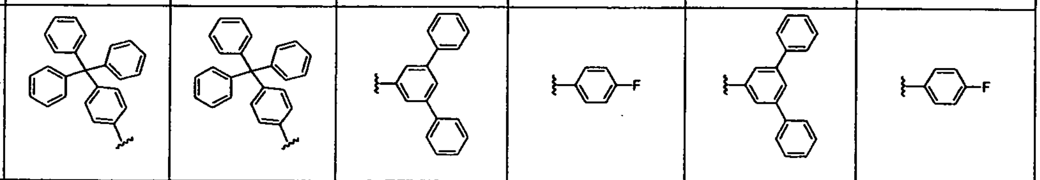
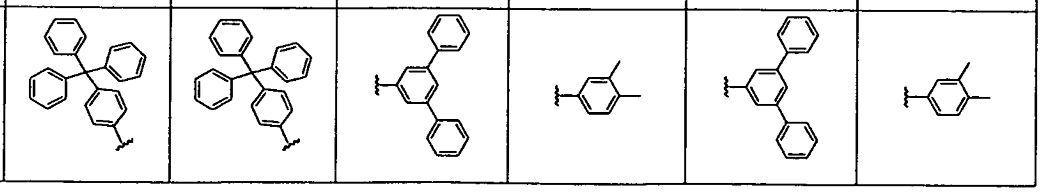
353	
354	
355	
356	
357	
358	
359	
360	
361	
362	

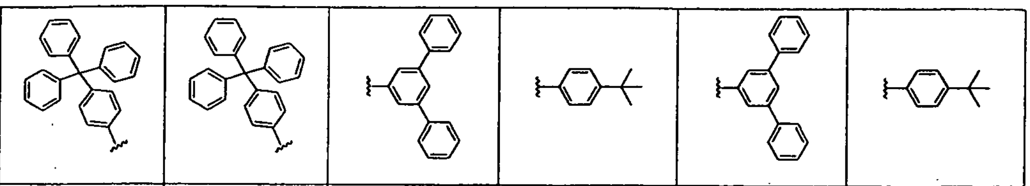
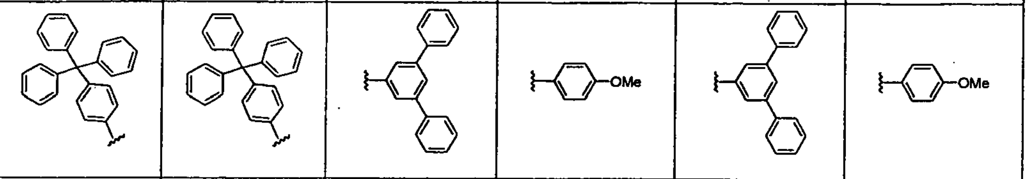
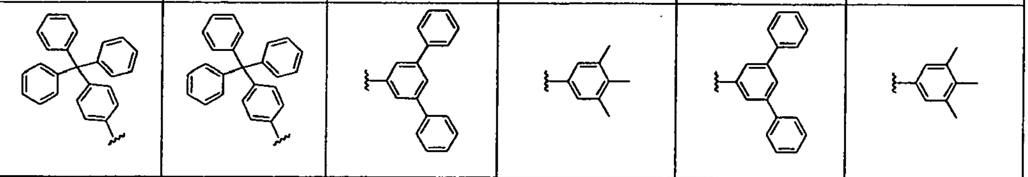
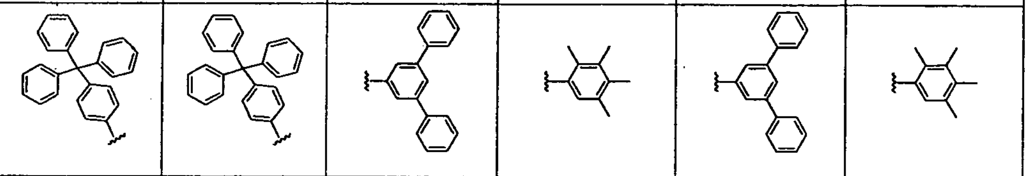
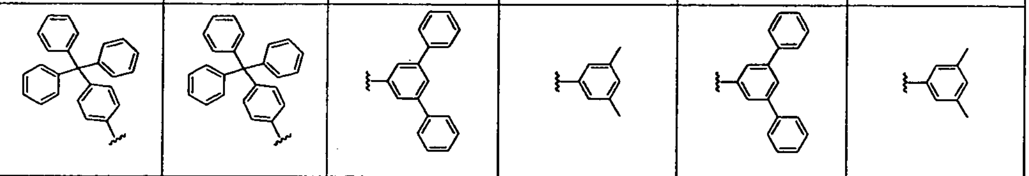
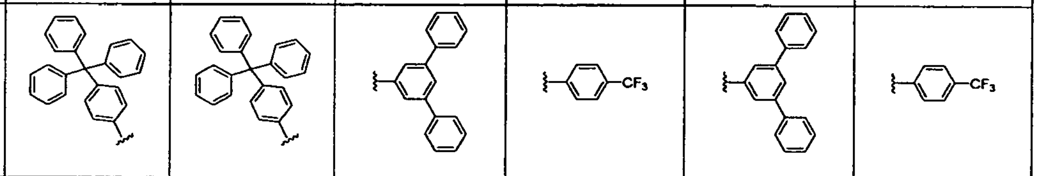
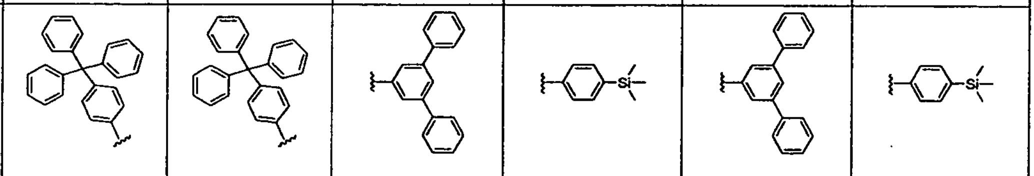
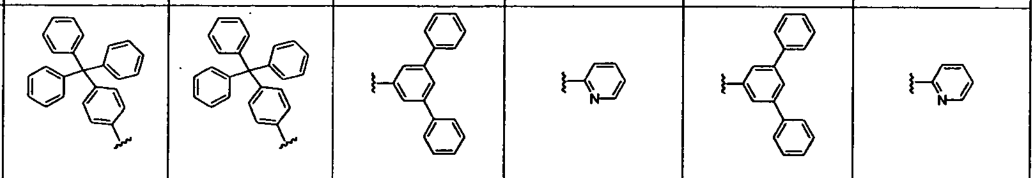
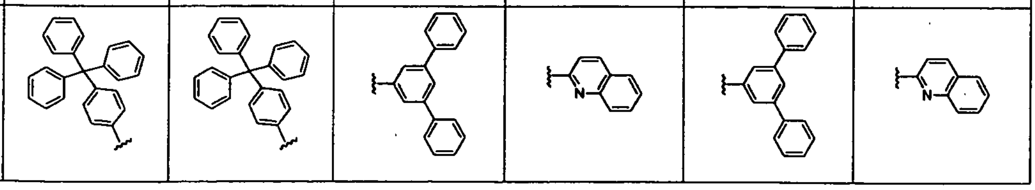
363	
364	
365	
366	
367	
368	
369	
370	
371	
372	

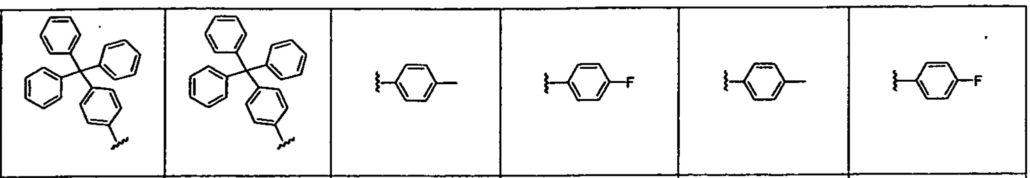
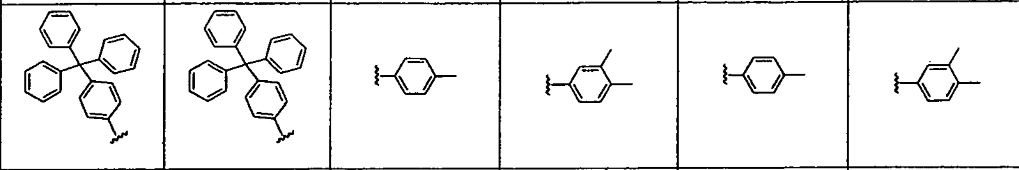
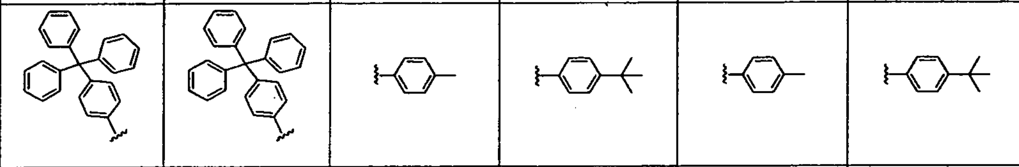
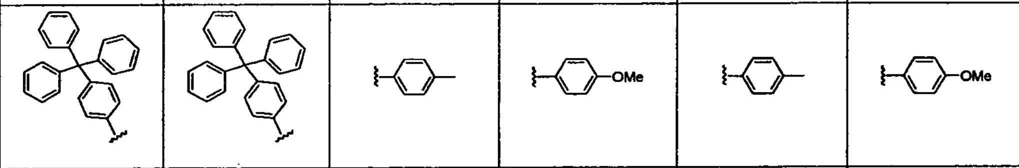
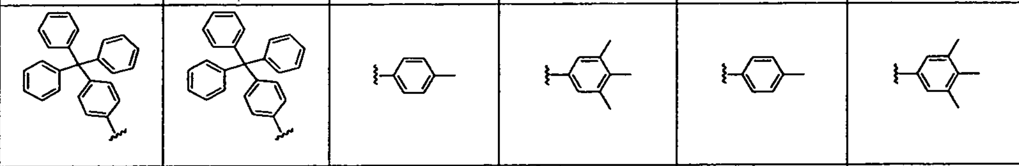
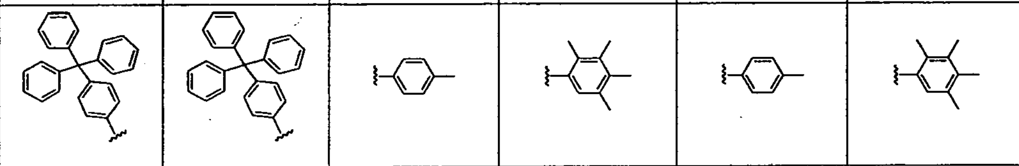
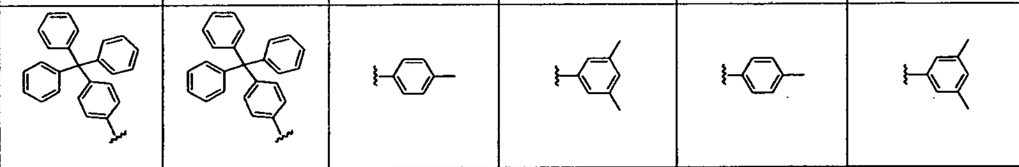
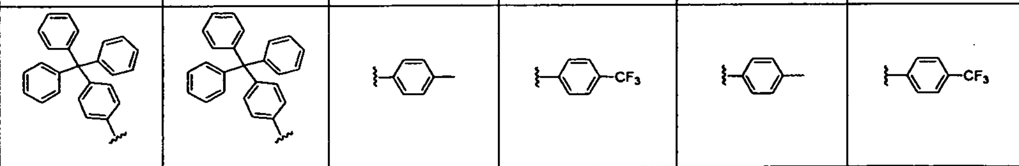
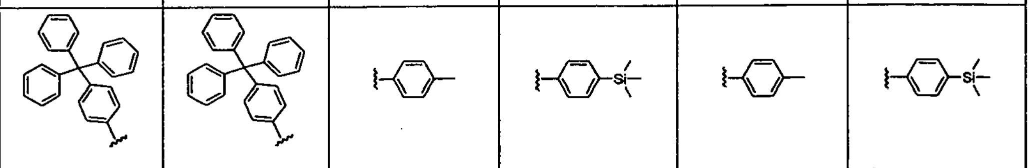
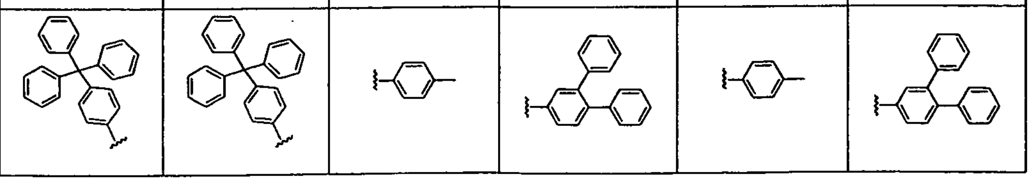
373	
374	
375	
376	
377	
378	
379	
380	
381	
382	

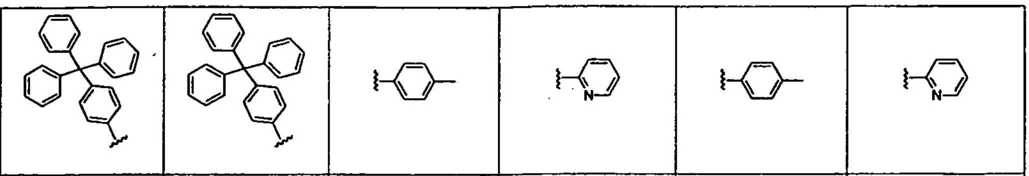
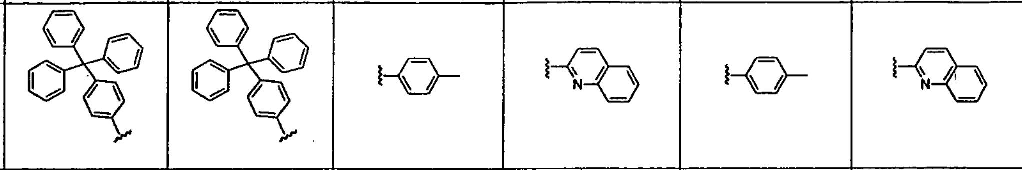
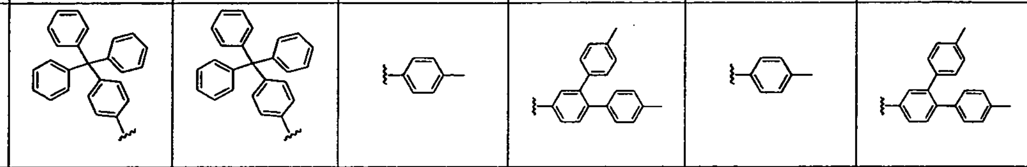
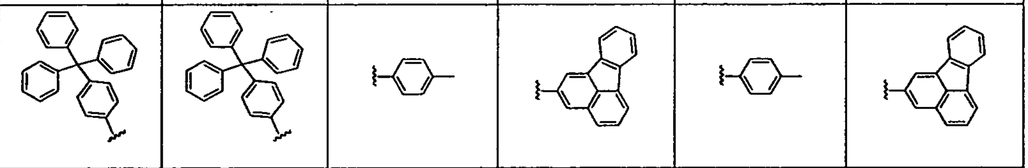
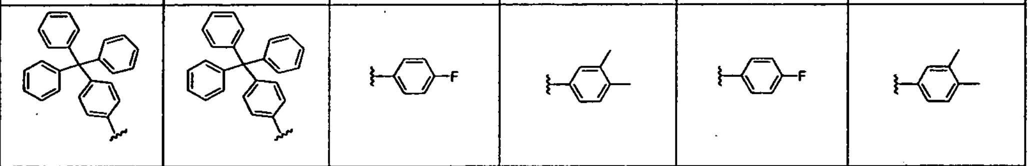
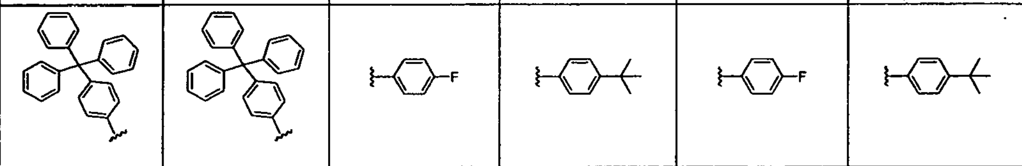
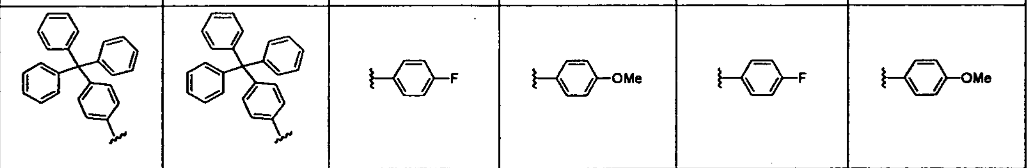
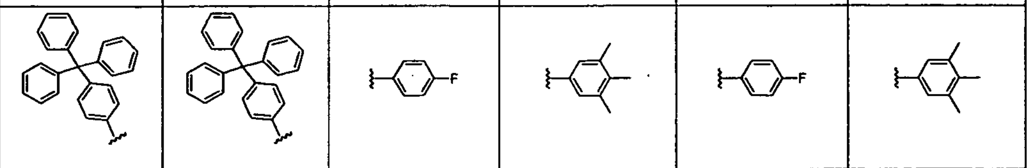
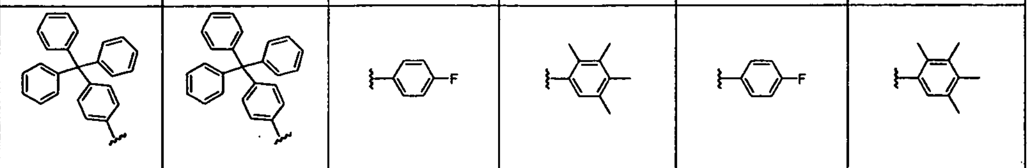
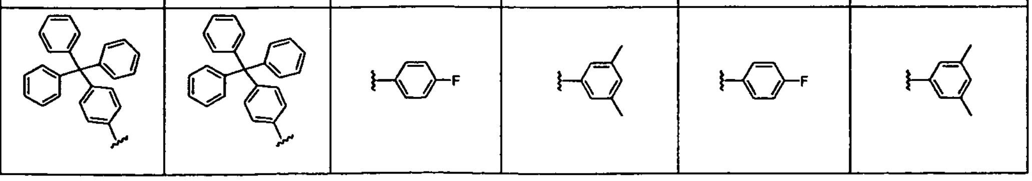
383	
384	
385	
386	
387	
388	
389	
390	
391	
392	

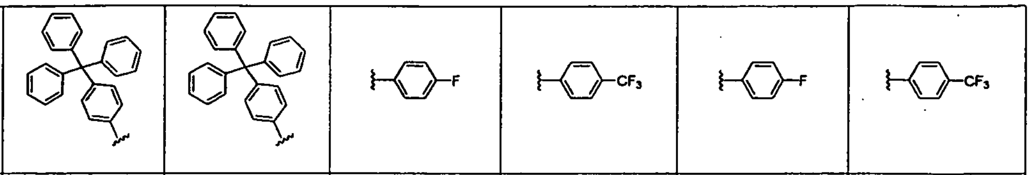
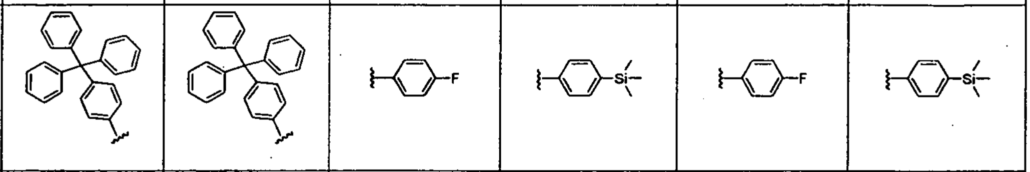
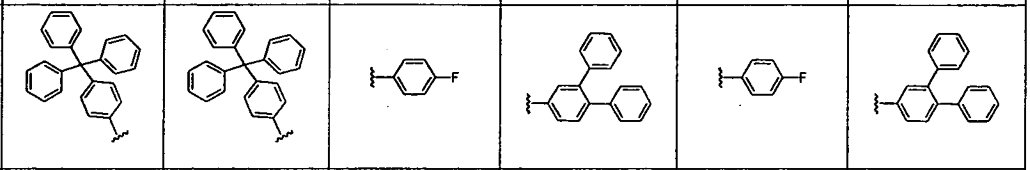
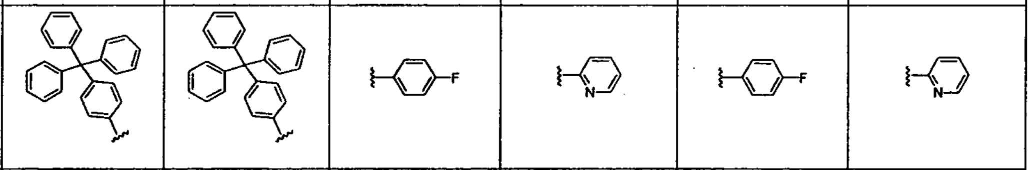
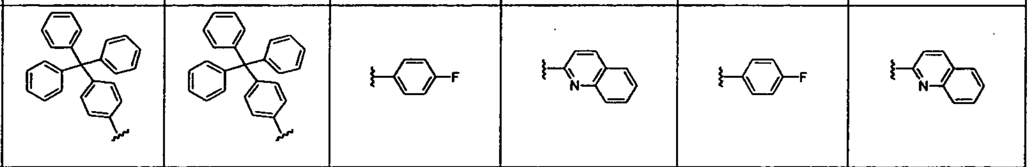
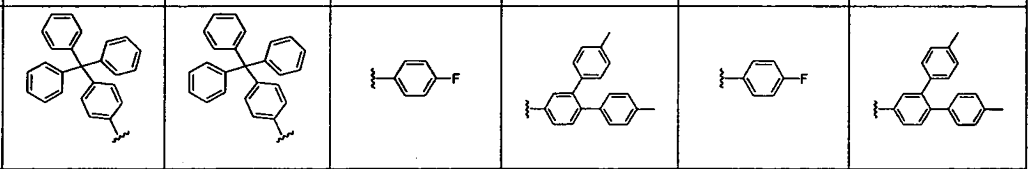
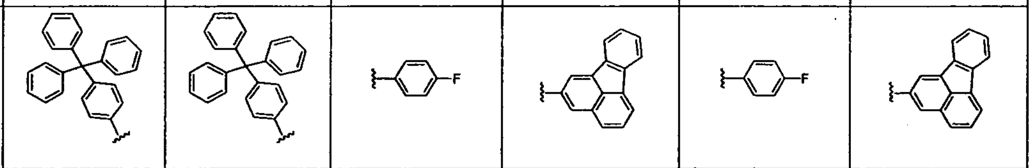
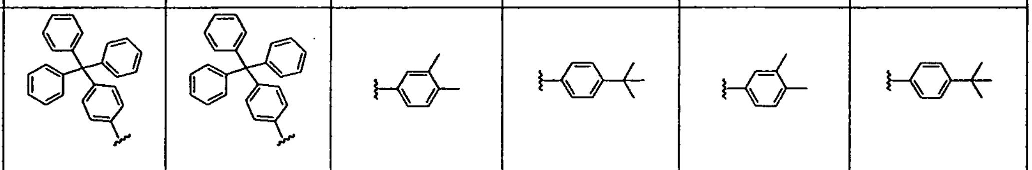
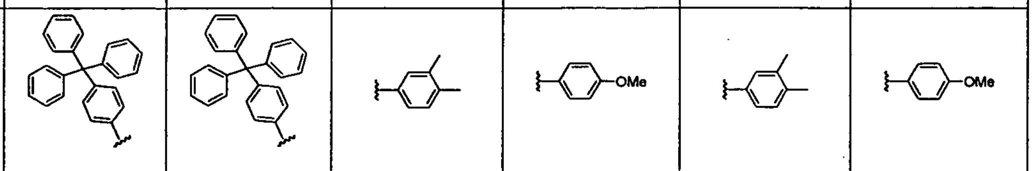
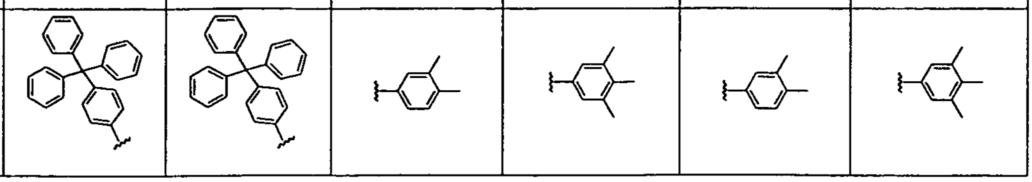
393	
394	
395	
396	
397	
398	
399	
400	
401	
402	

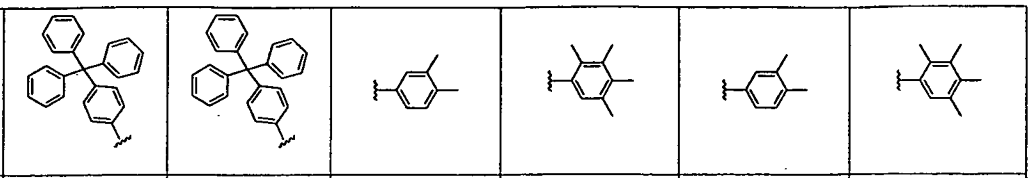
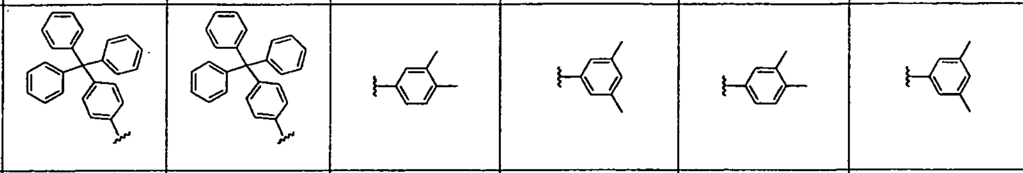
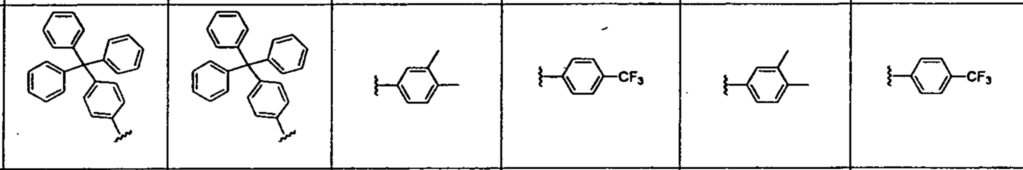
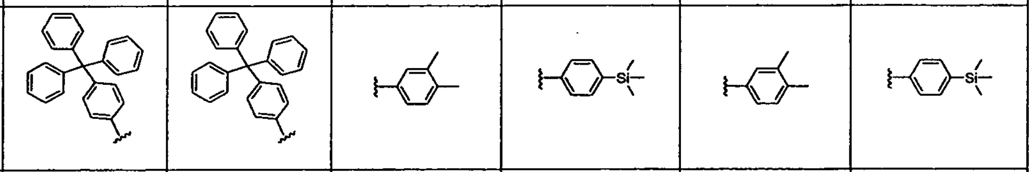
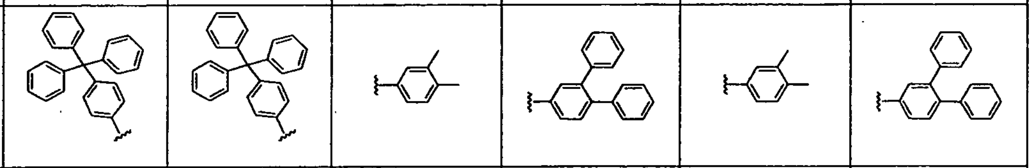
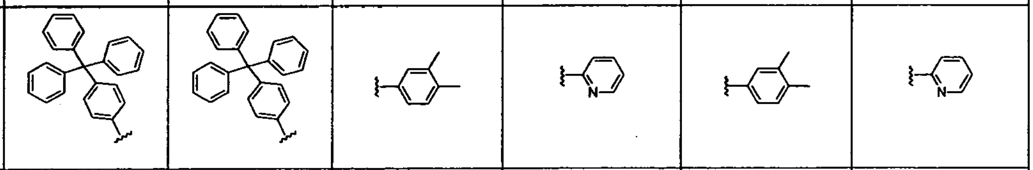
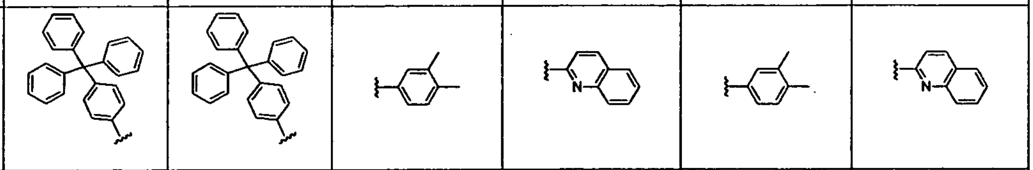
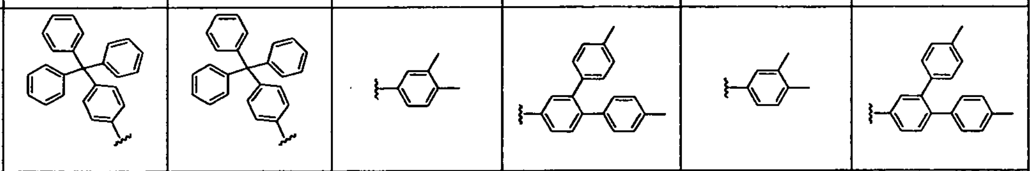
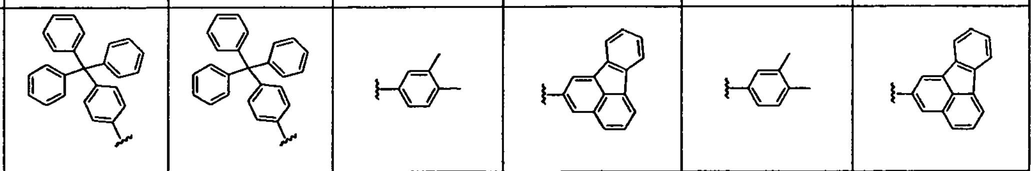
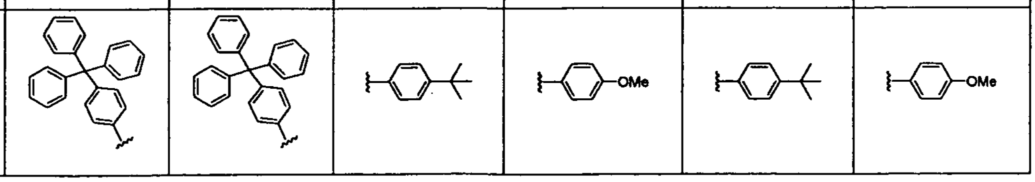
403	
404	
405	
406	
407	
408	
409	
410	
411	

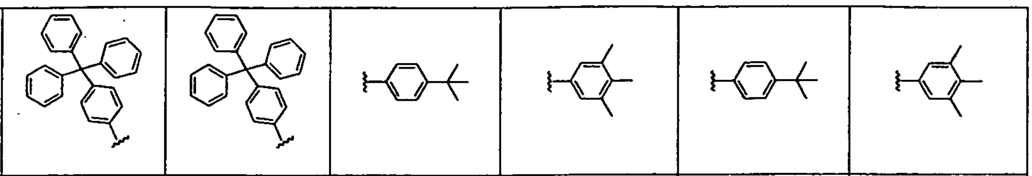
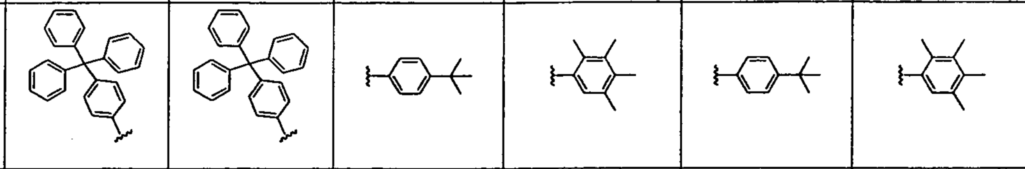
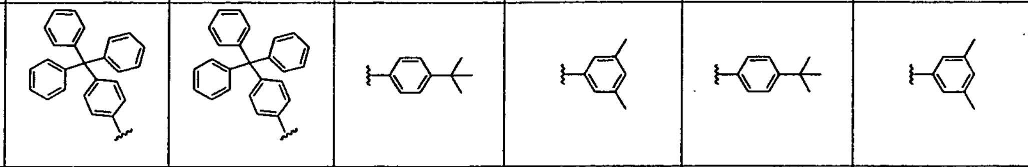
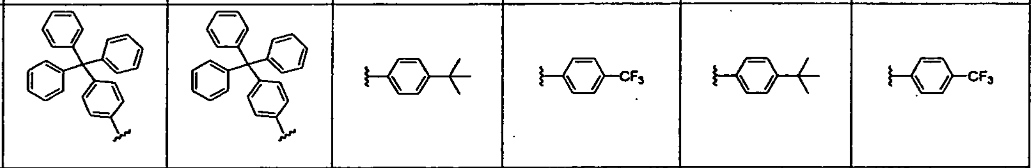
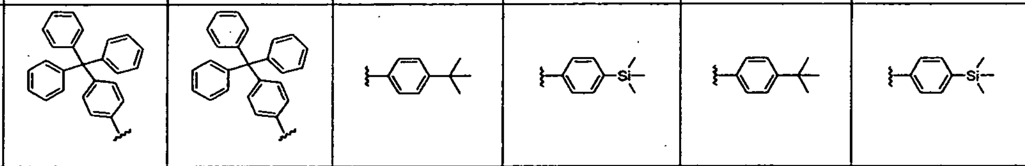
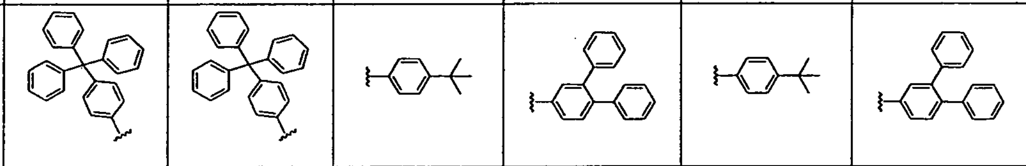
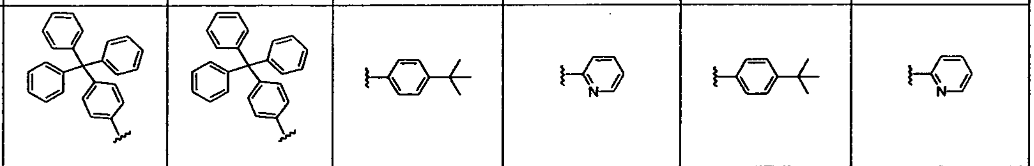
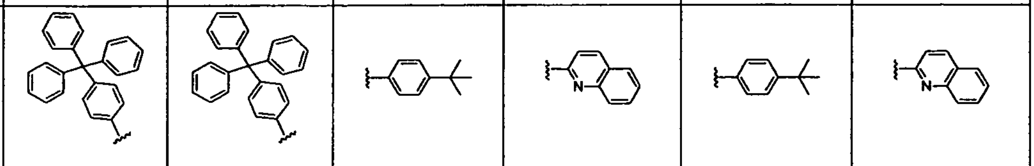
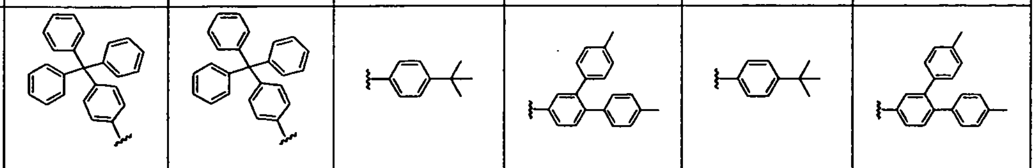
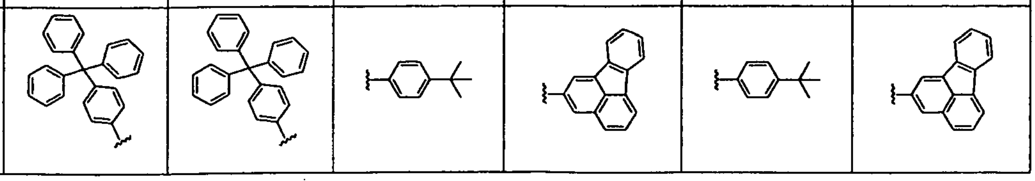
412	
413	
414	
415	
416	
417	
418	
419	
420	

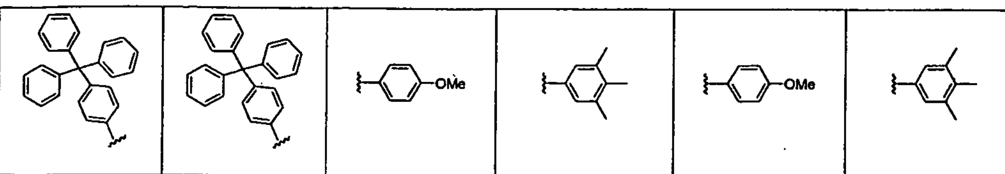
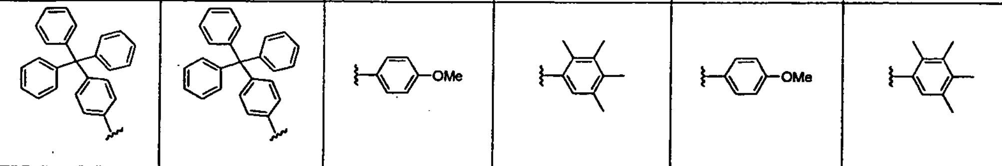
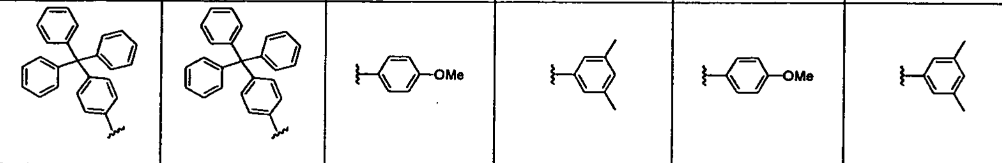
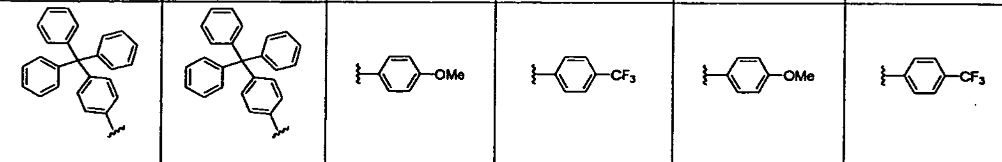
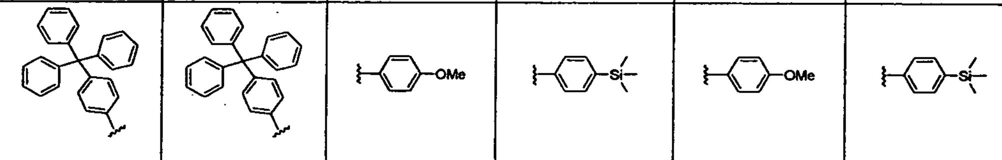
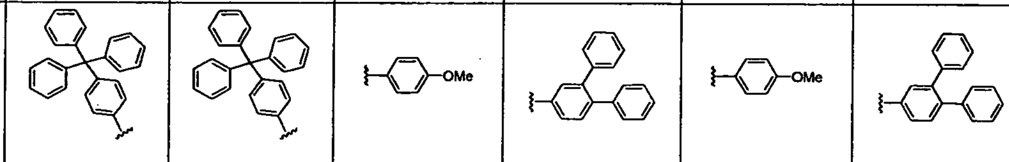
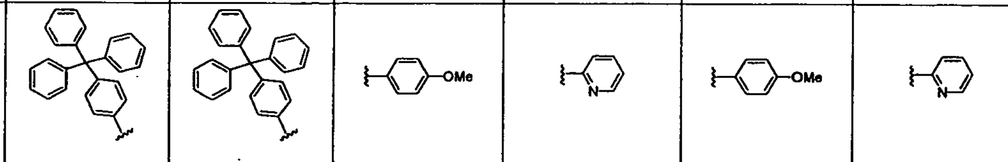
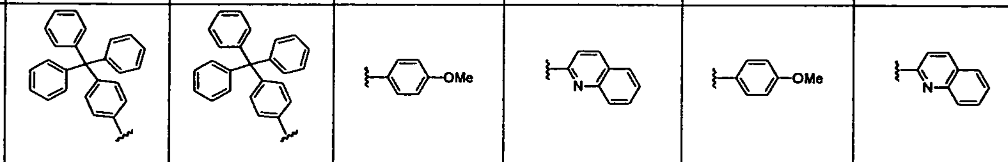
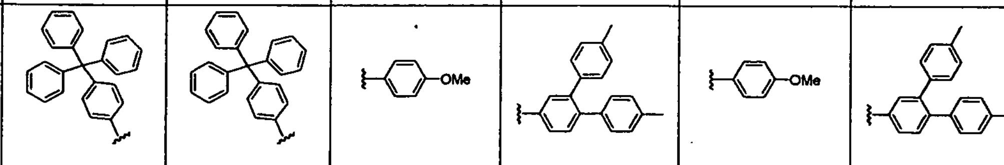
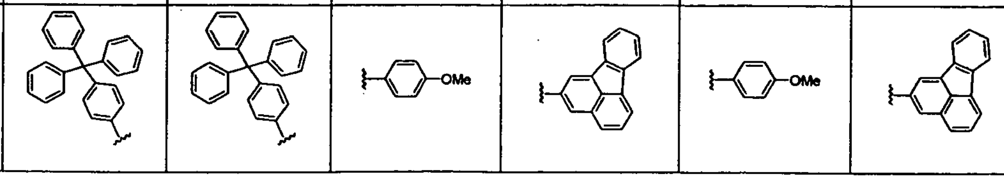
421	
422	
423	
424	
425	
426	
427	
428	
429	
430	

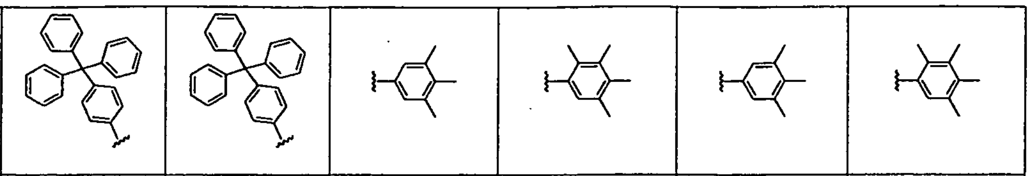
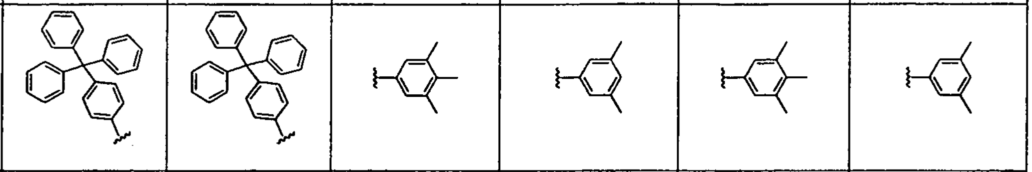
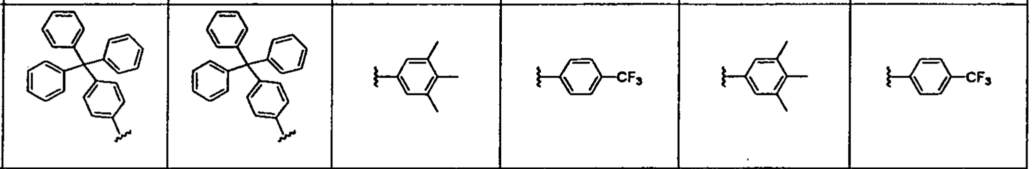
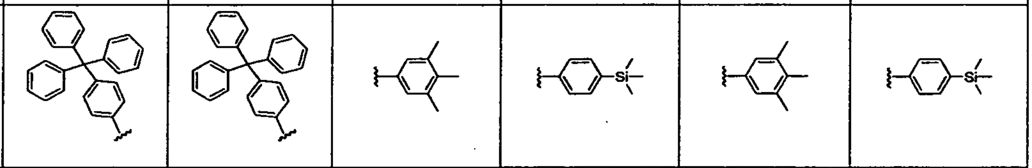
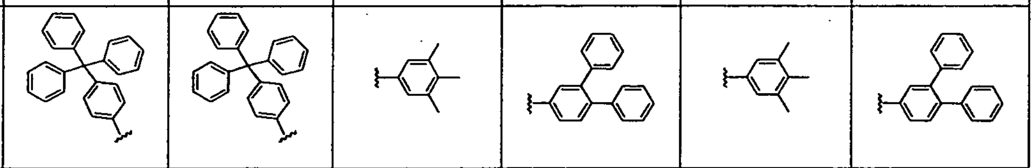
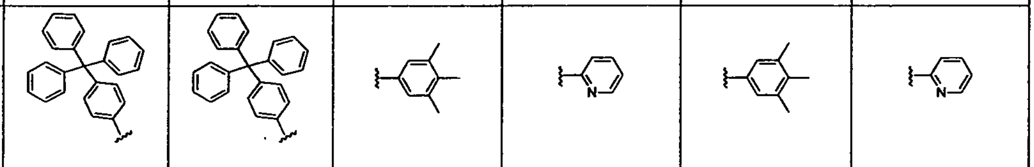
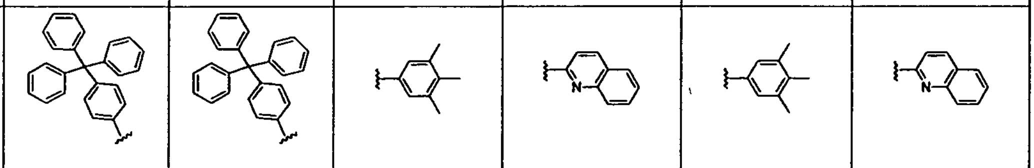
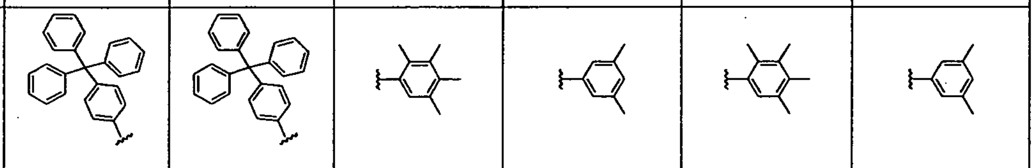
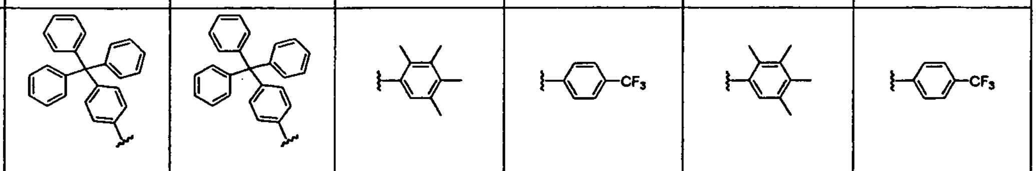
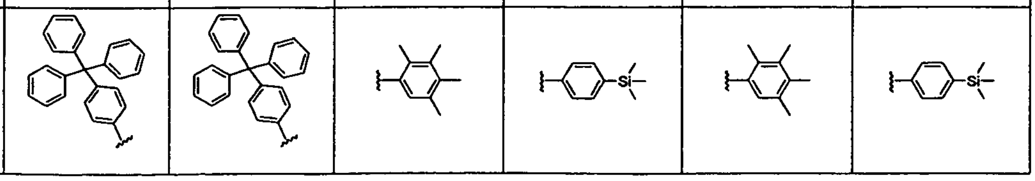
431	
432	
433	
434	
435	
436	
437	
438	
439	
440	

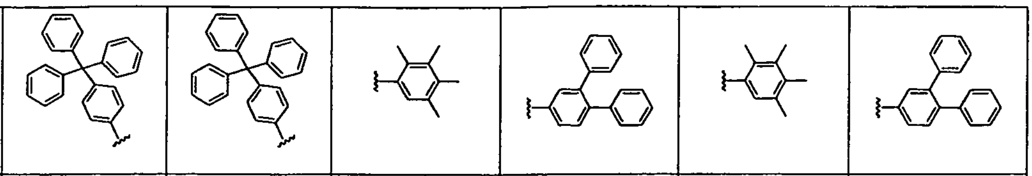
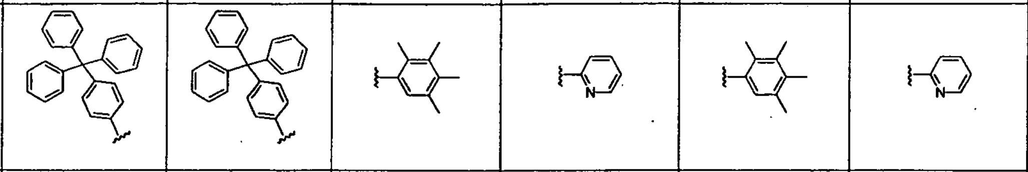
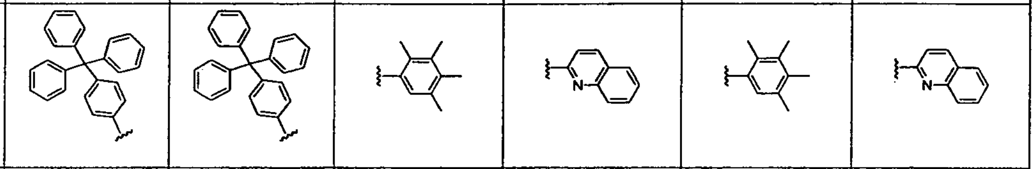
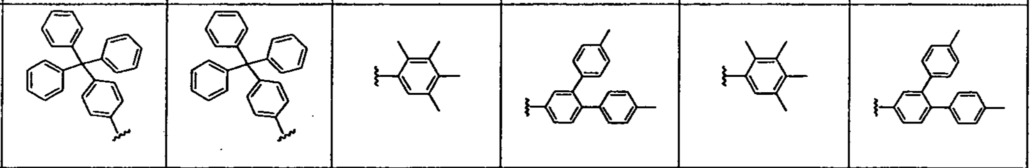
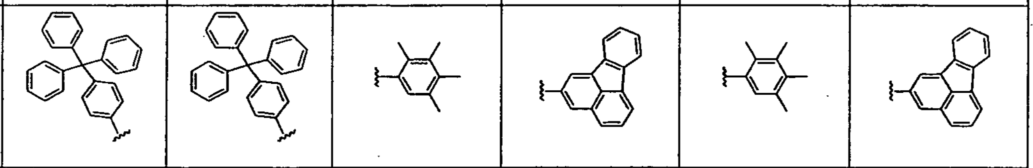
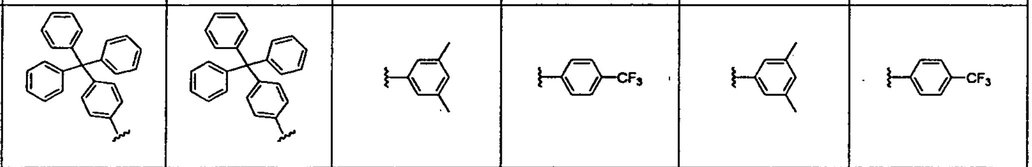
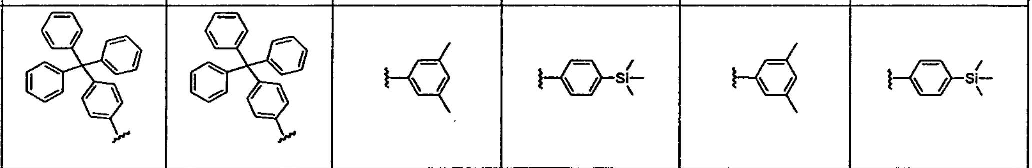
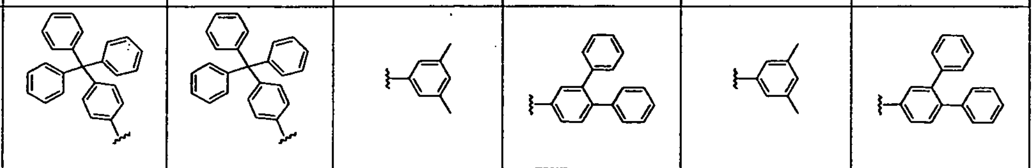
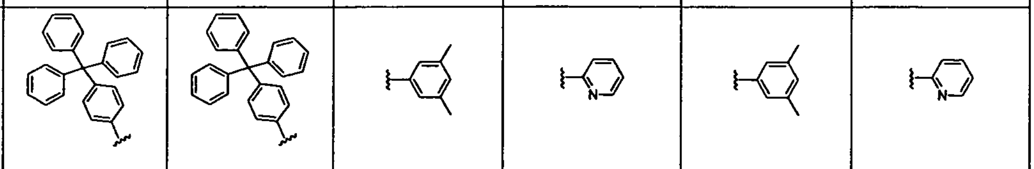
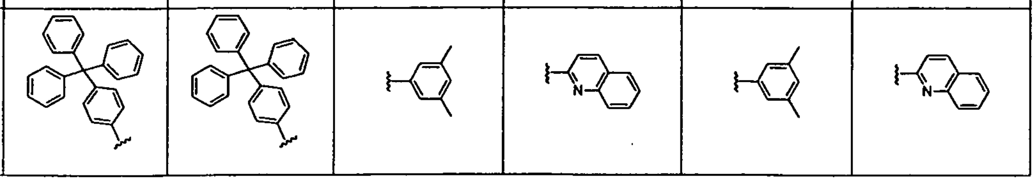
441	
442	
443	
444	
445	
446	
447	
448	
449	
450	

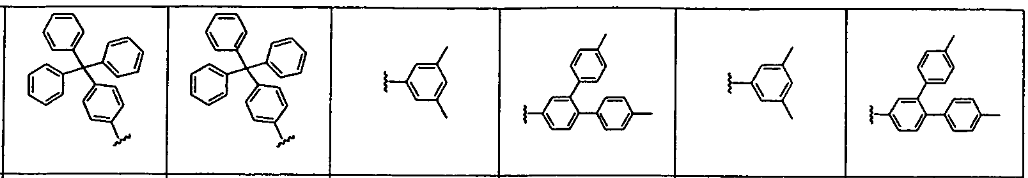
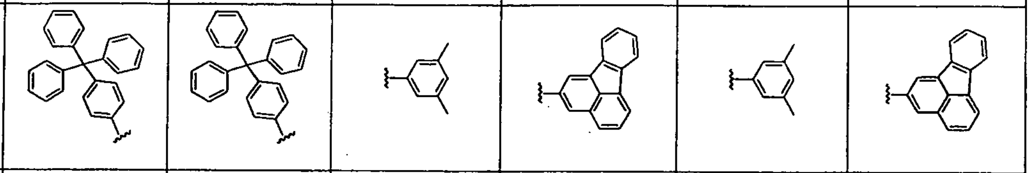
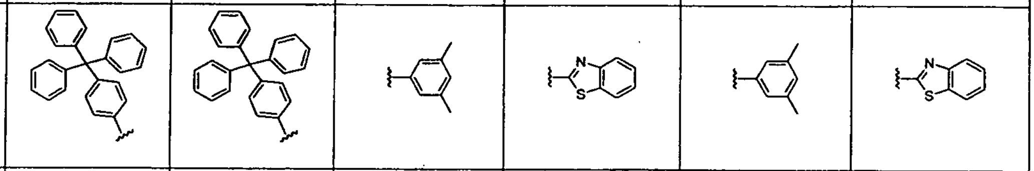
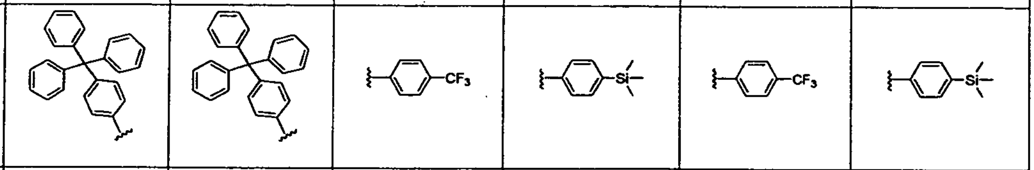
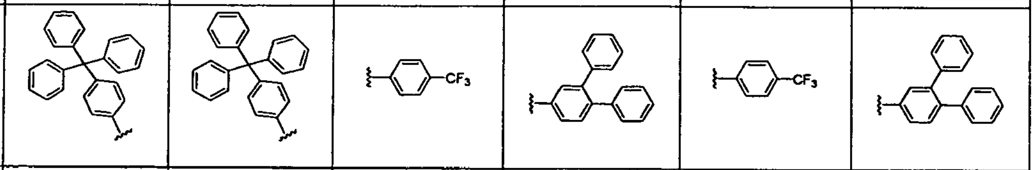
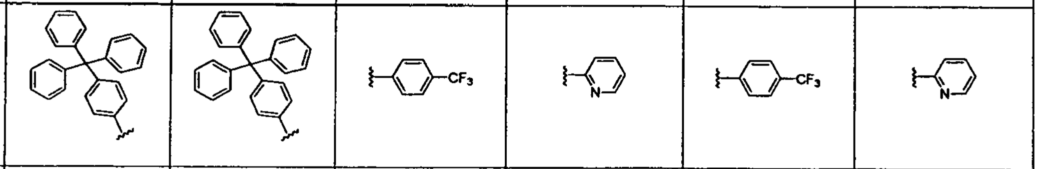
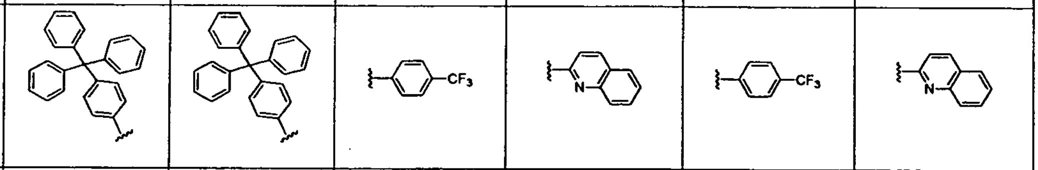
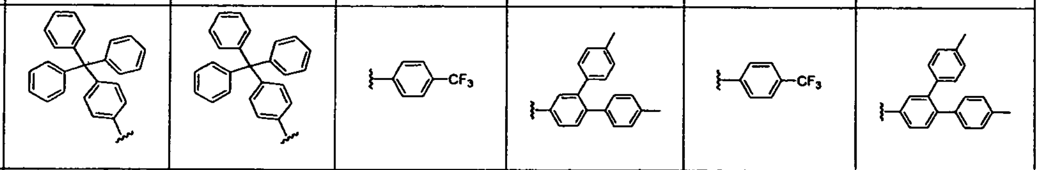
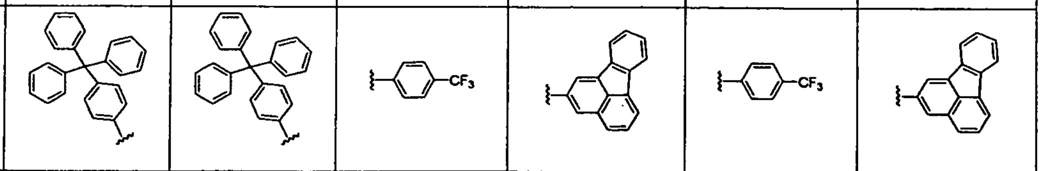
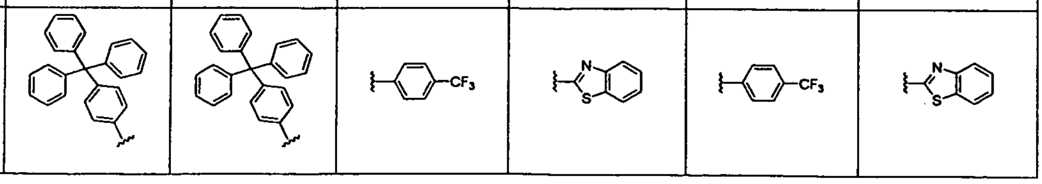
451	
452	
453	
454	
455	
456	
457	
458	
459	
460	

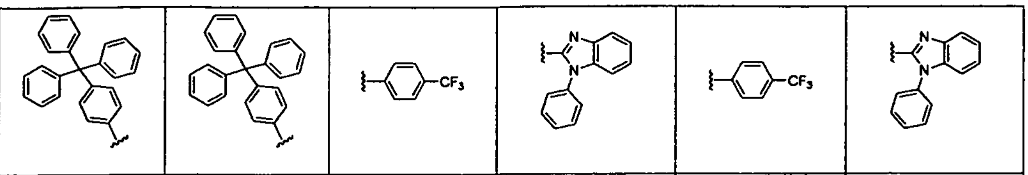
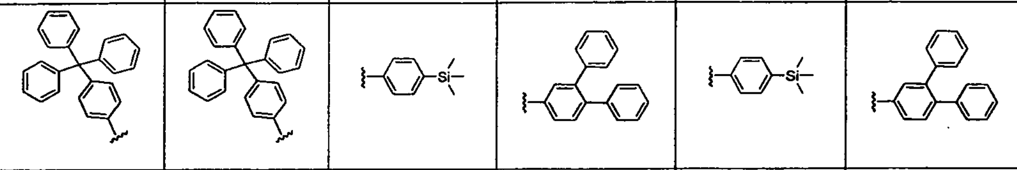
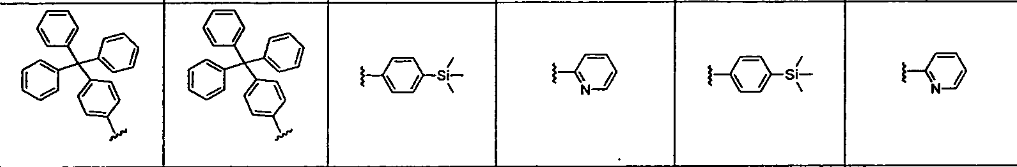
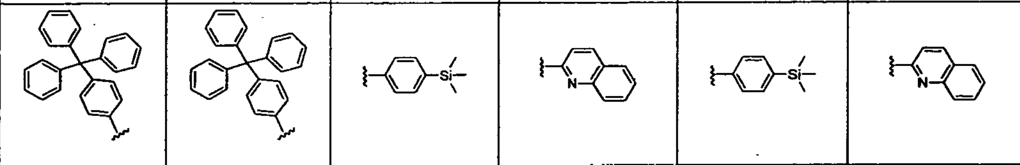
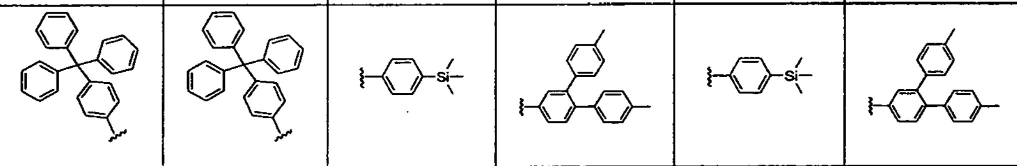
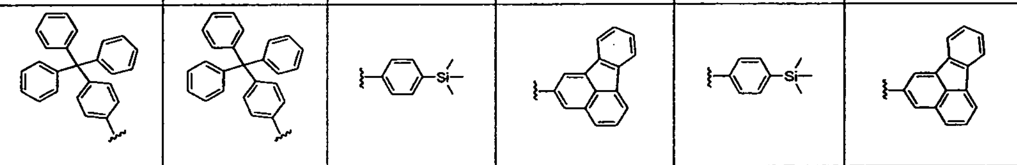
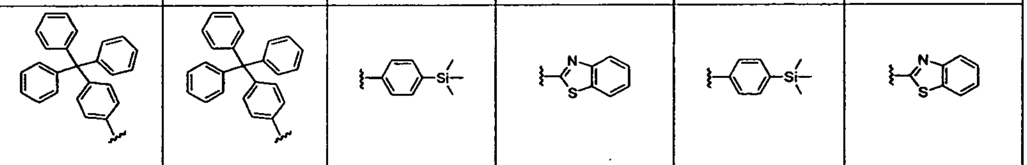
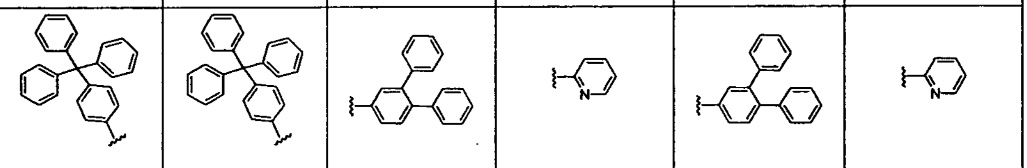
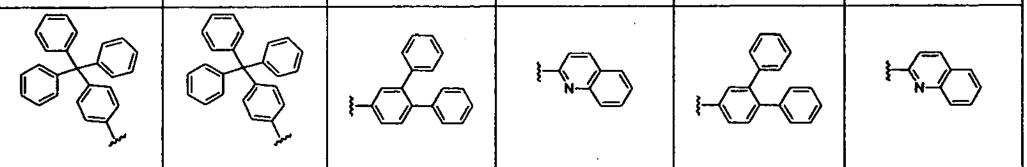
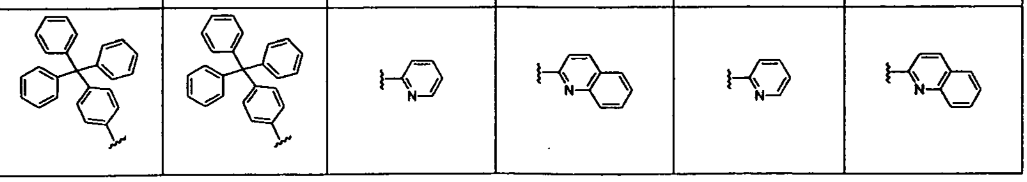
461	
462	
463	
464	
465	
466	
467	
468	
469	
470	

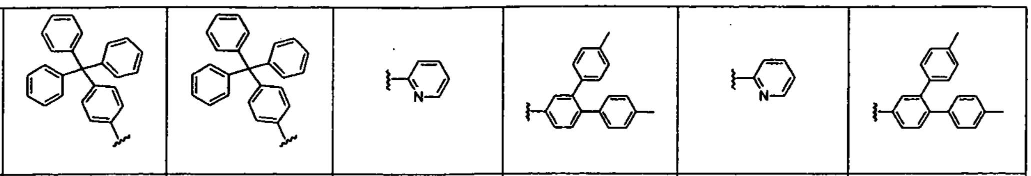
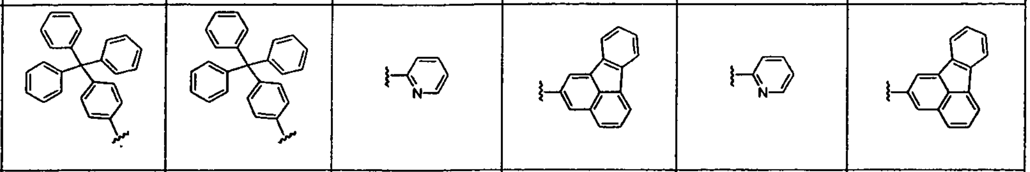
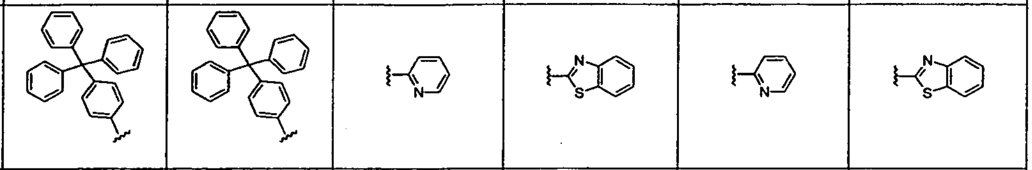
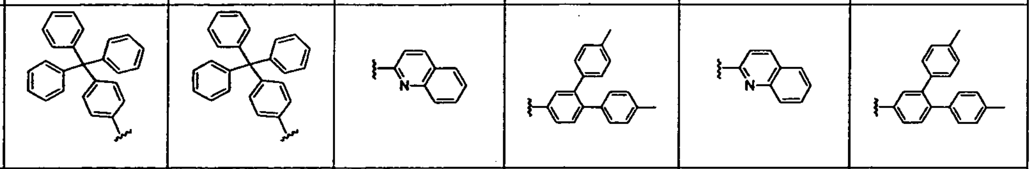
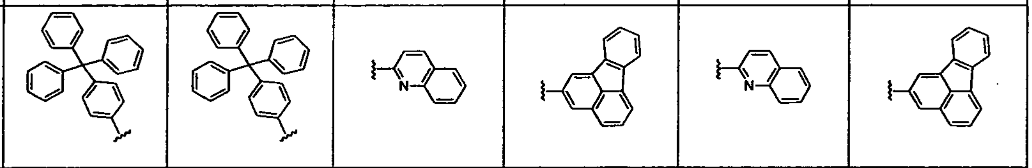
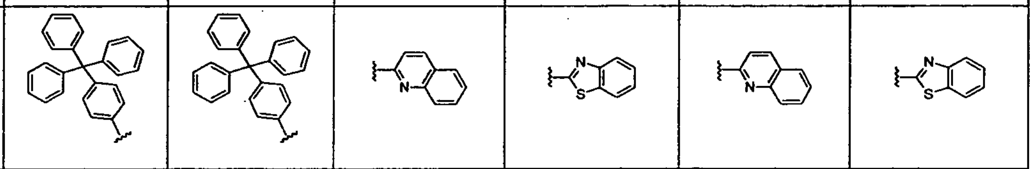
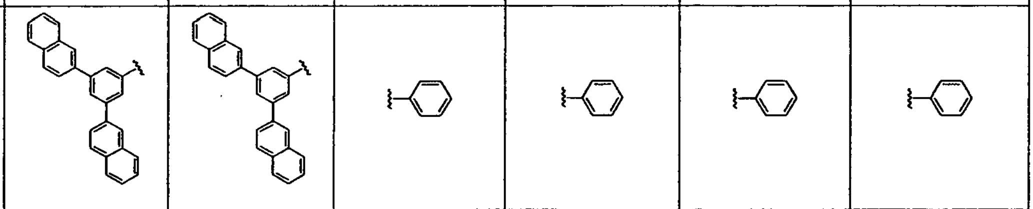
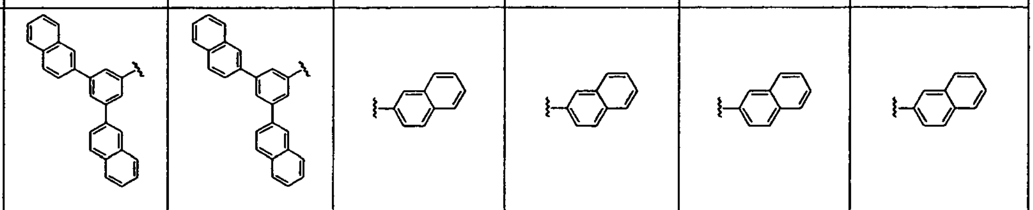
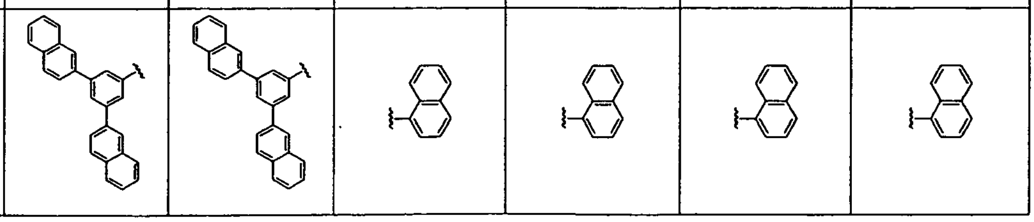
471	
472	
473	
474	
475	
476	
477	
478	
479	
480	

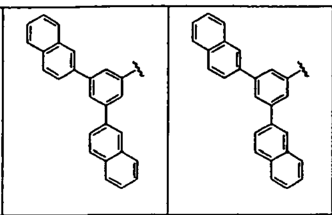
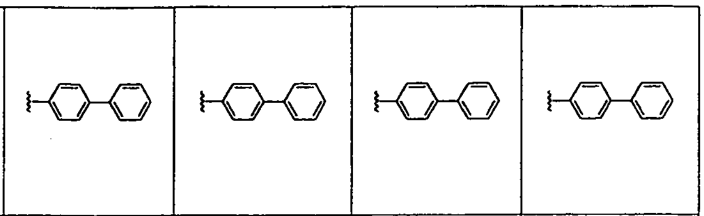
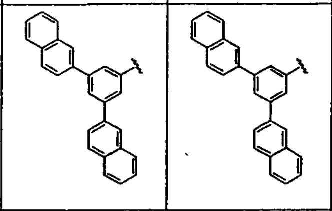
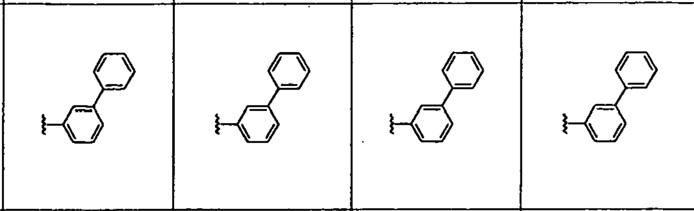
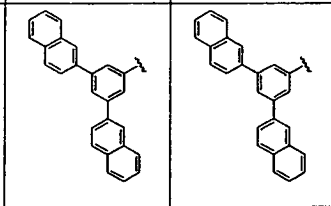
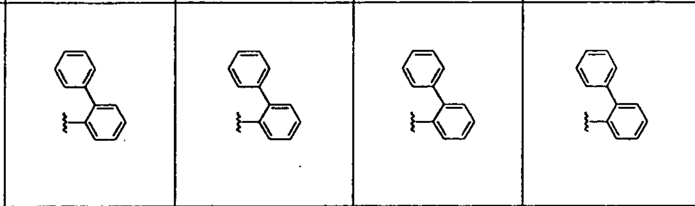
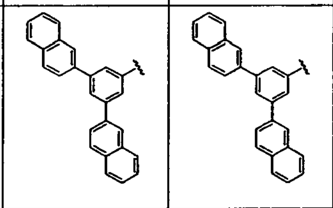
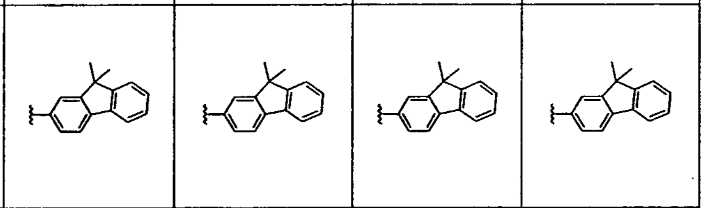
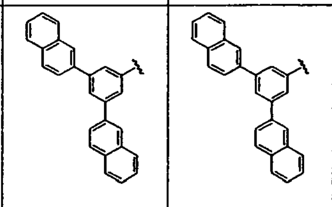
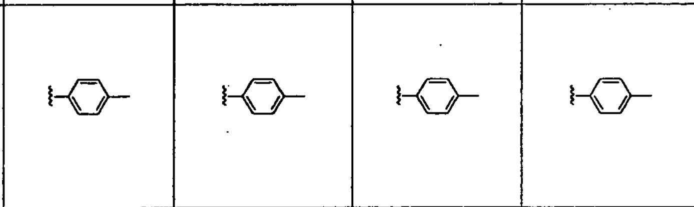
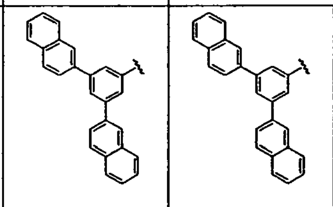
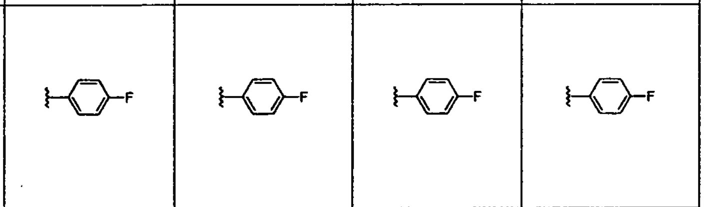
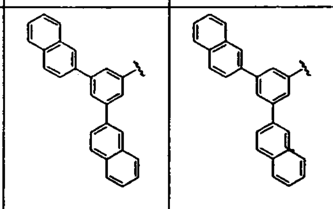
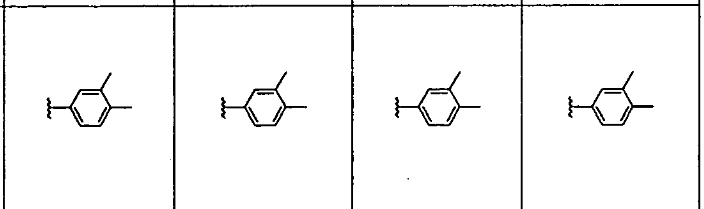
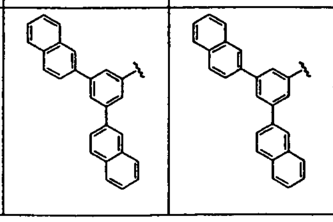
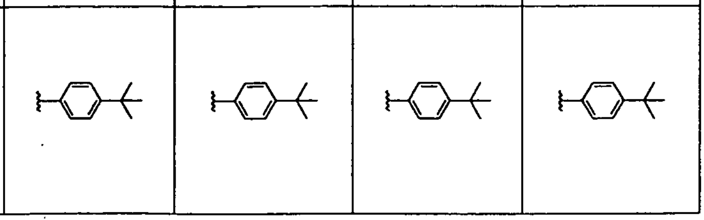
481	
482	
483	
484	
485	
486	
487	
488	
489	
490	

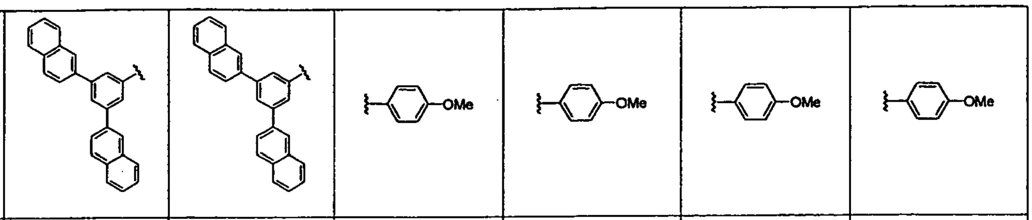
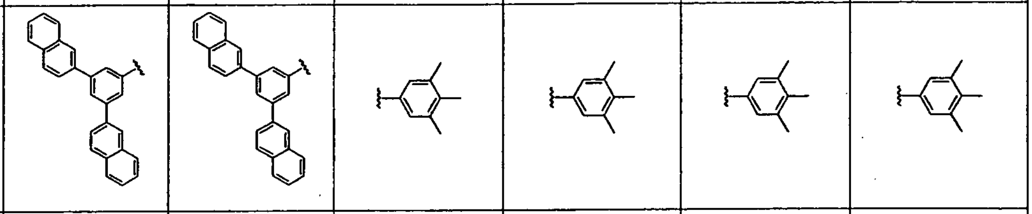
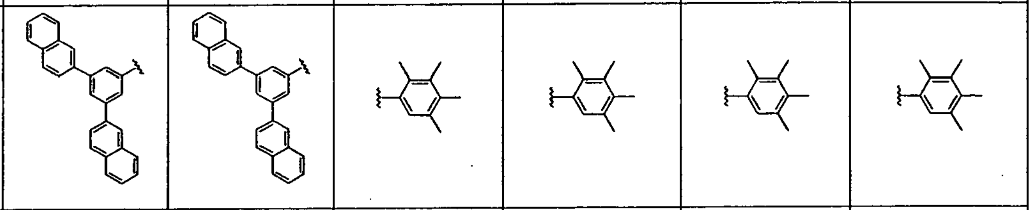
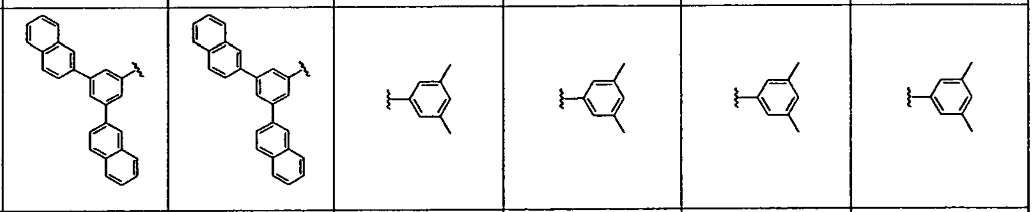
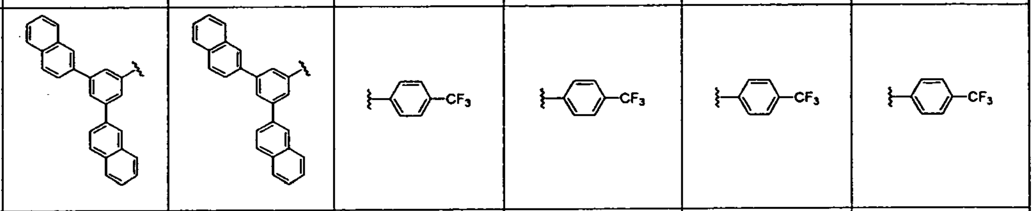
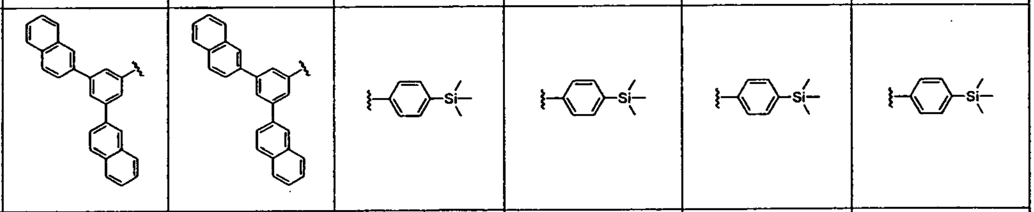
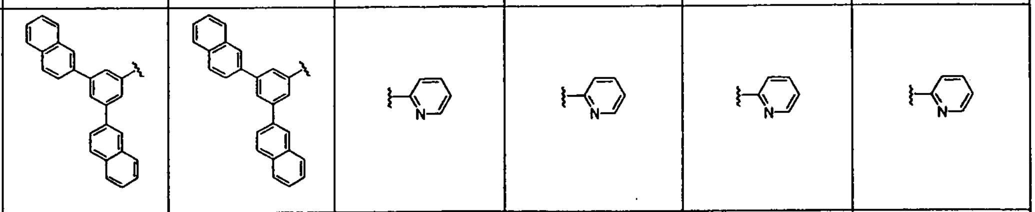
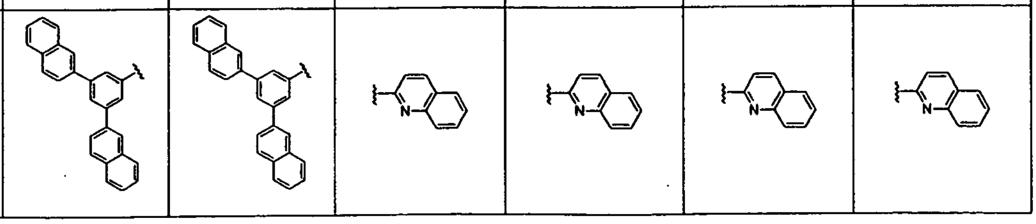
491	
492	
493	
494	
495	
496	
497	
498	
499	
500	

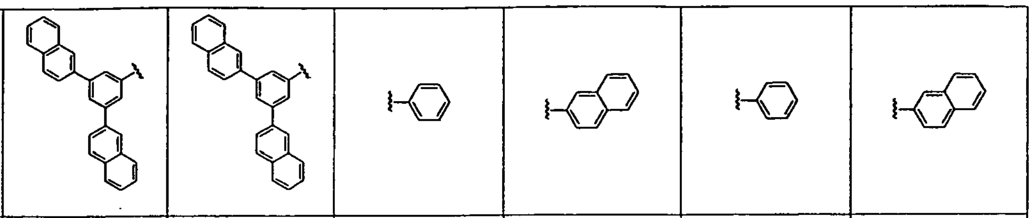
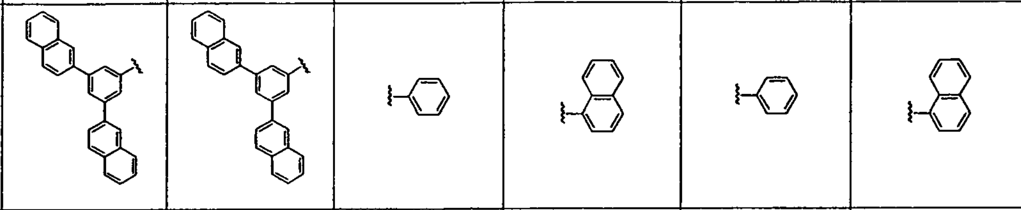
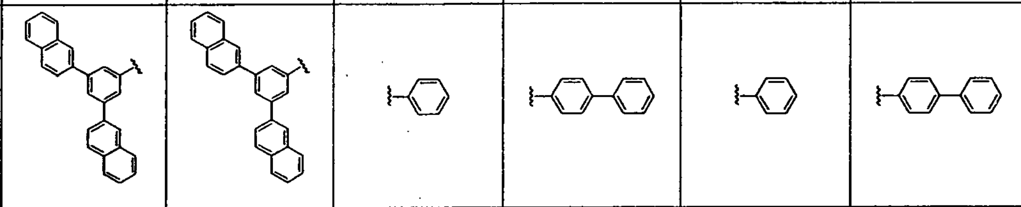
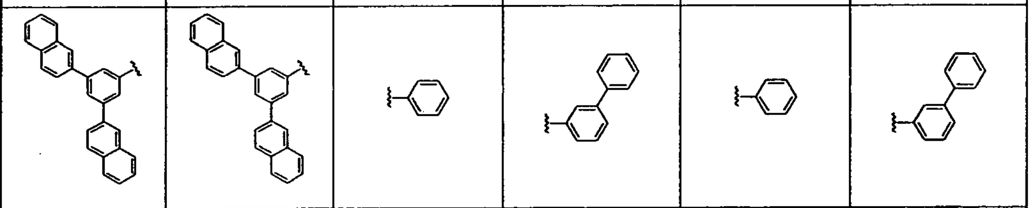
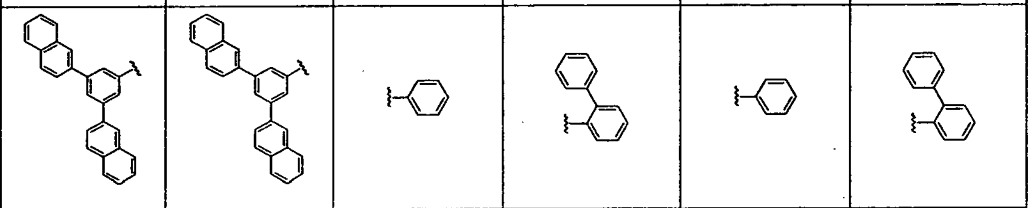
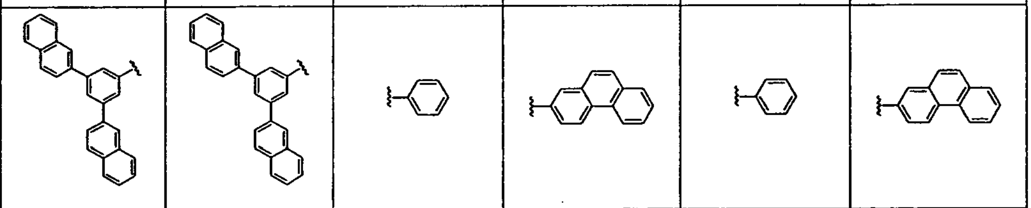
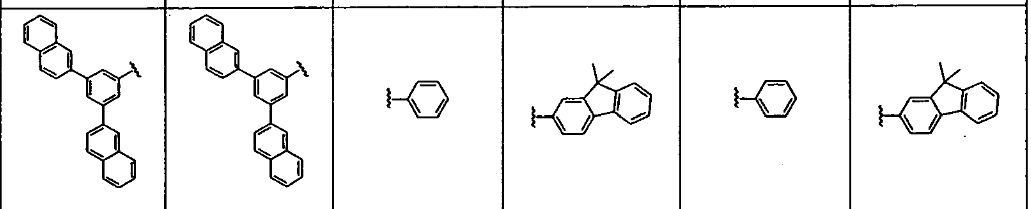
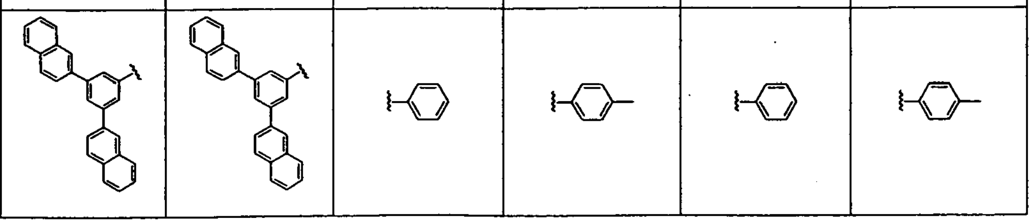
501						
502						
503						
504						
505						
506						
507						
508						
509						
510						

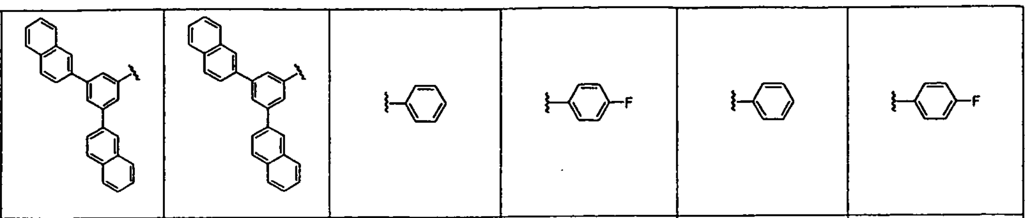
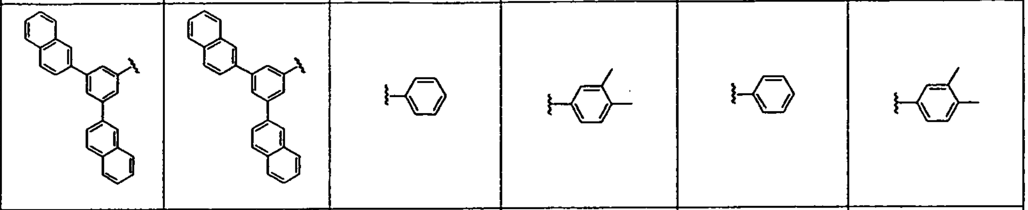
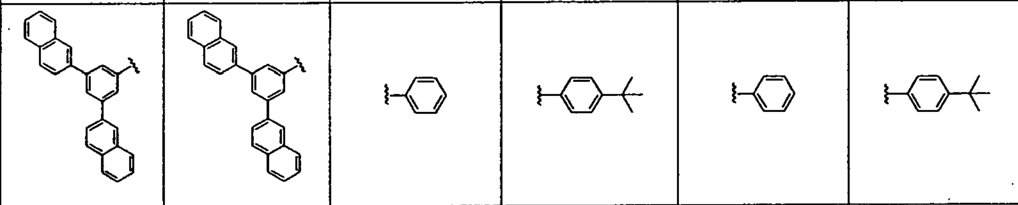
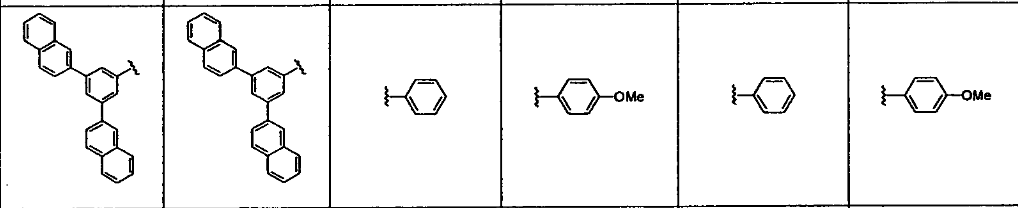
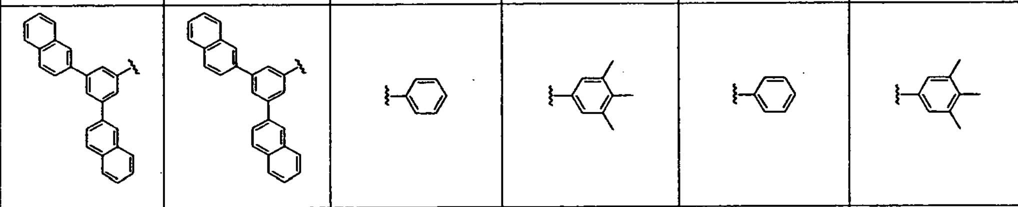
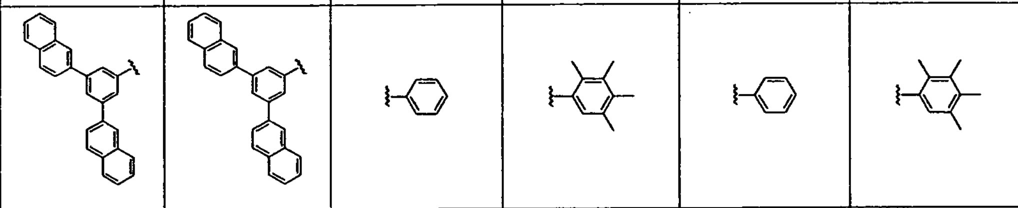
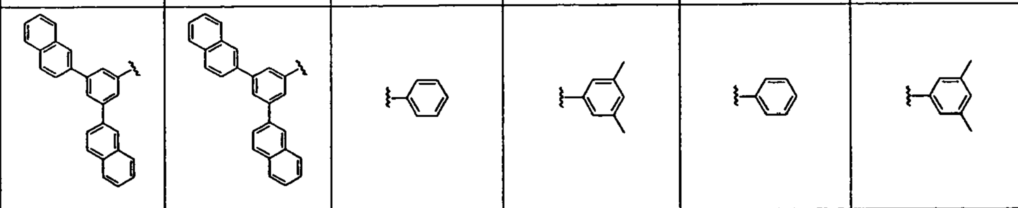
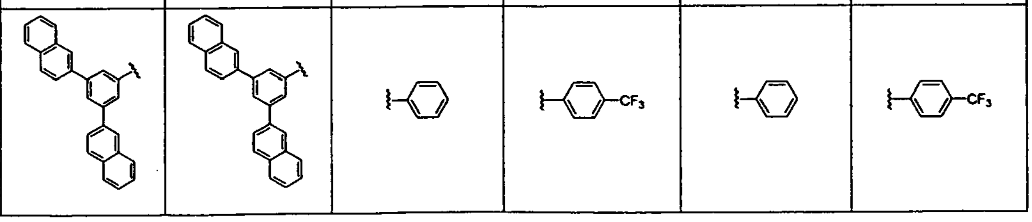
511						
512						
513						
514						
515						
516						
517						
518						
519						
520						

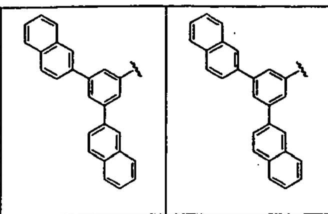
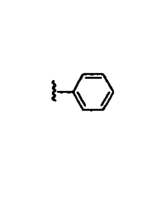
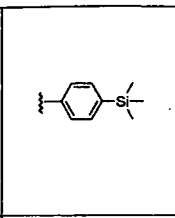
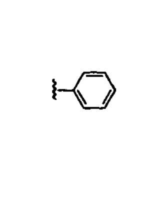
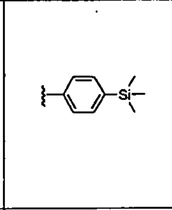
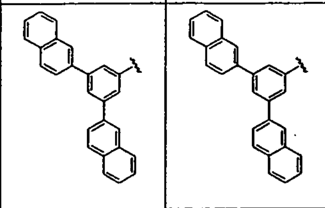
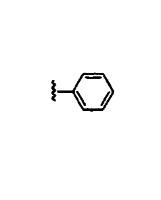
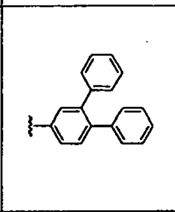
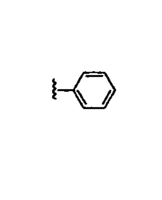
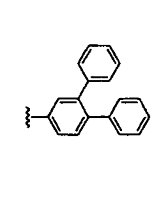
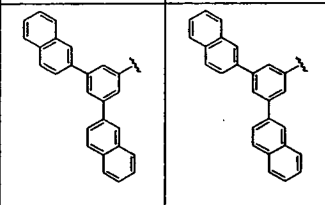
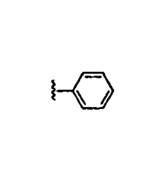
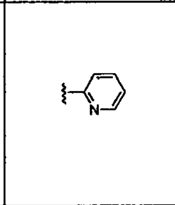
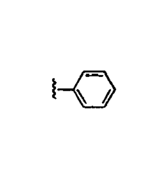
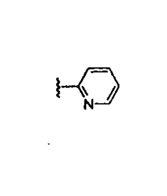
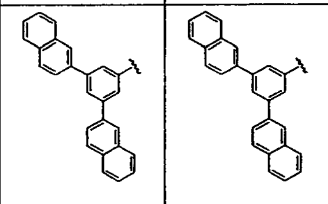
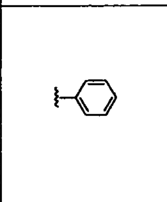
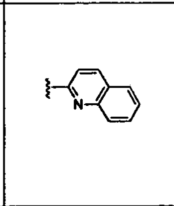
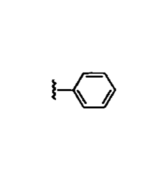
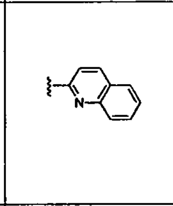
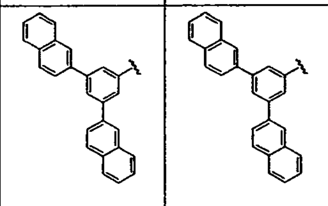
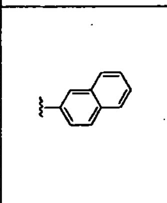
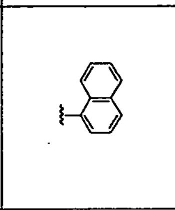
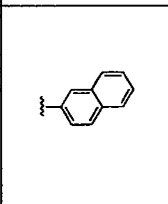
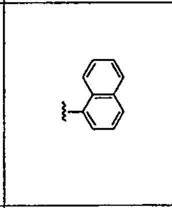
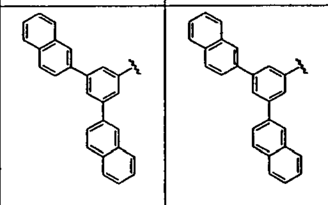
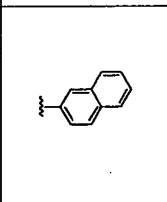
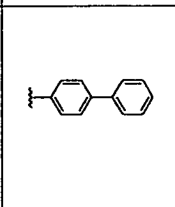
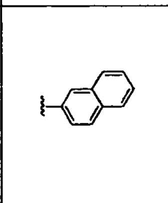
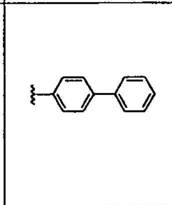
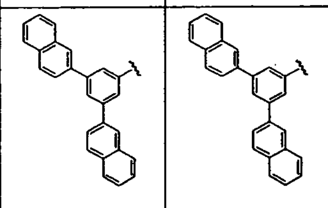
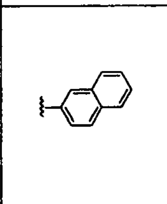
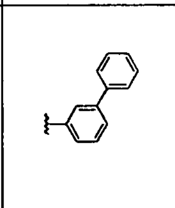
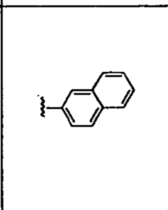
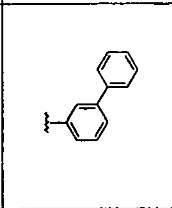
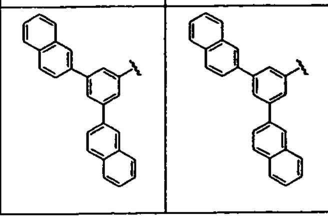
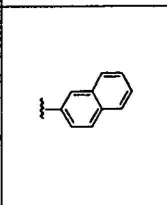
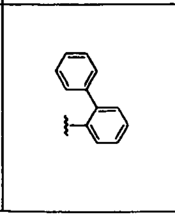
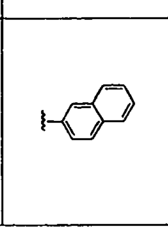
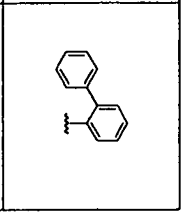
521	
522	
523	
524	
525	
526	
527	
528	
529	

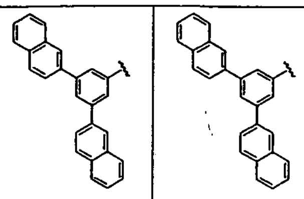
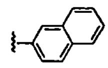
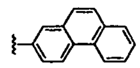
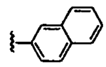
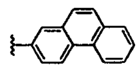
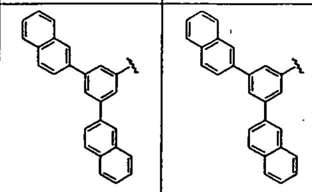
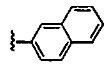
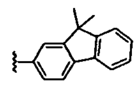
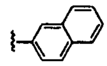
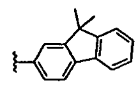
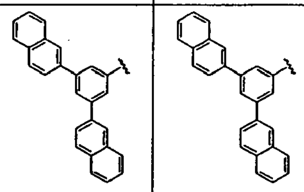
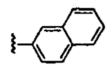
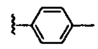
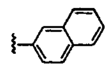
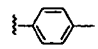
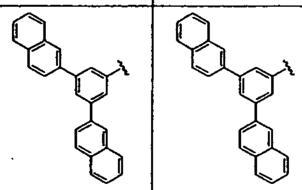
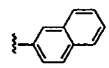
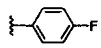
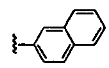
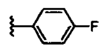
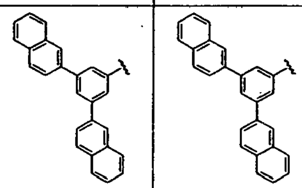
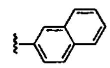
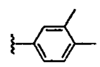
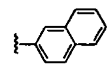
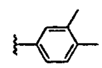
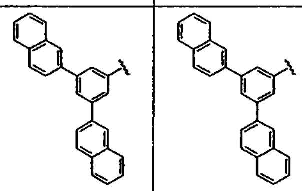
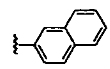
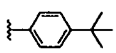
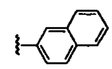
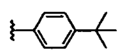
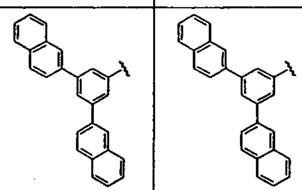
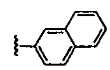
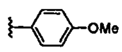
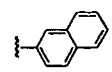
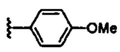
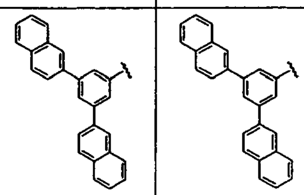
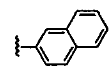
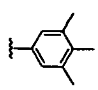
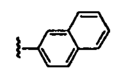
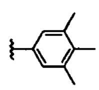
530		
531		
532		
533		
534		
535		
536		
537		

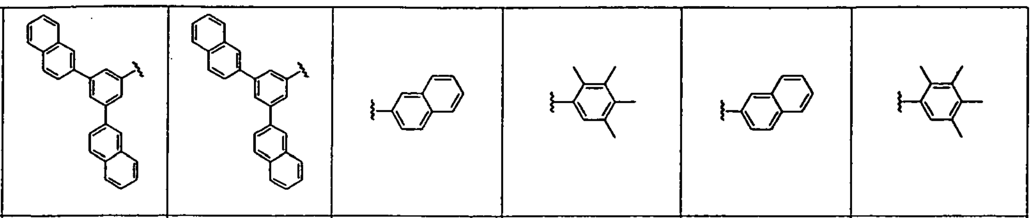
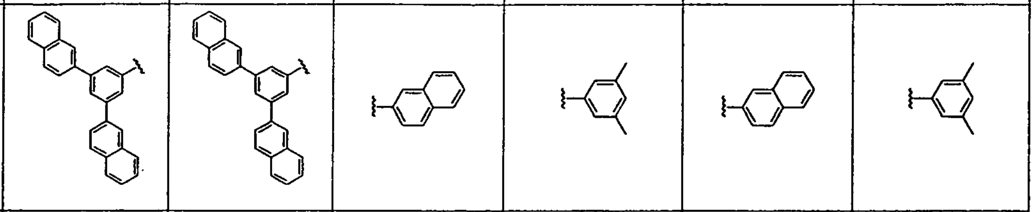
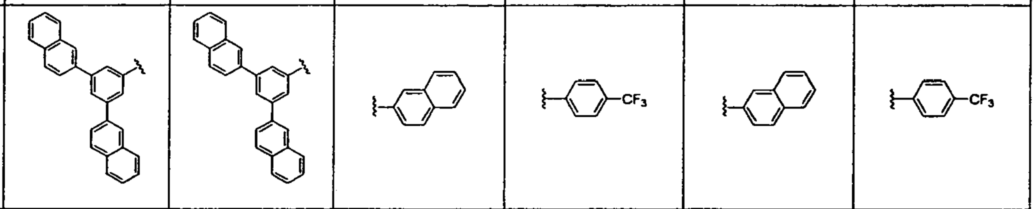
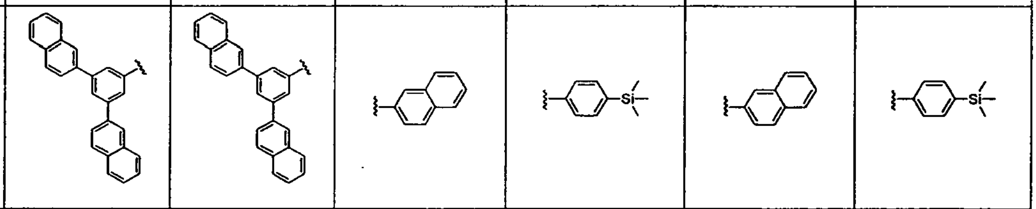
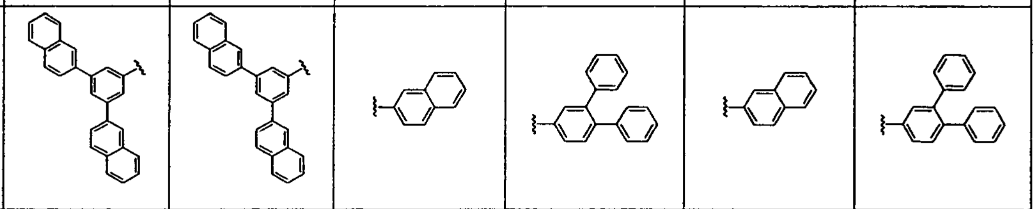
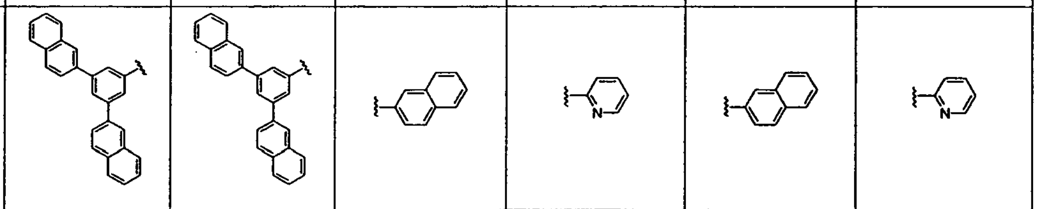
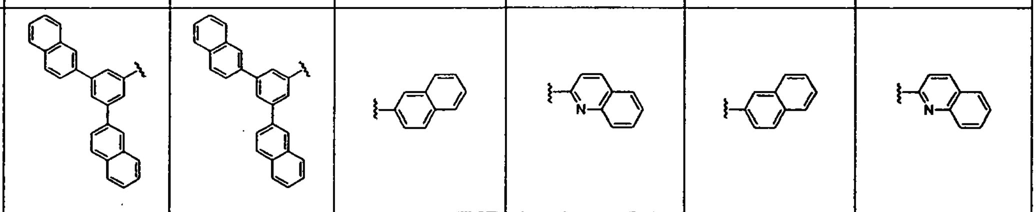
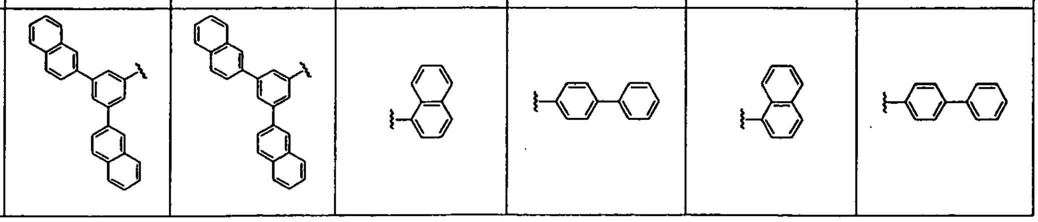
538	
539	
540	
541	
542	
543	
544	
545	

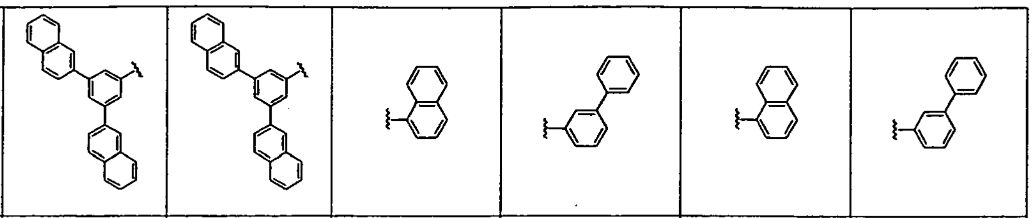
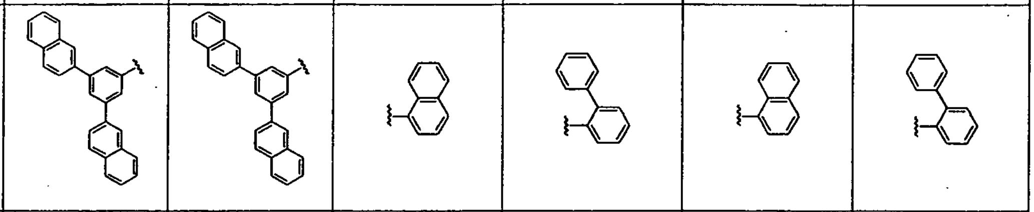
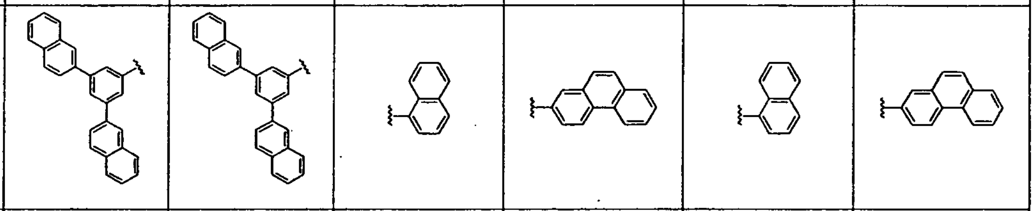
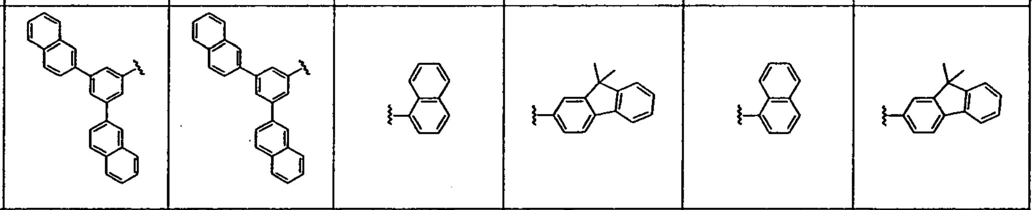
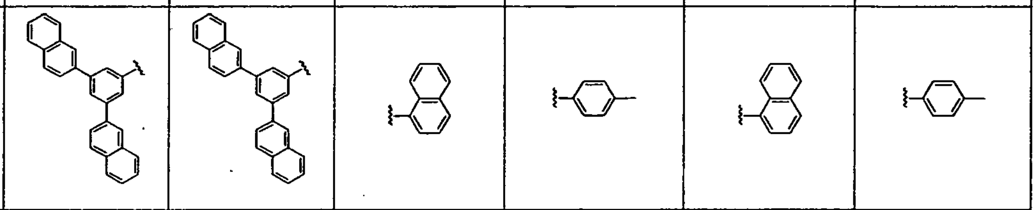
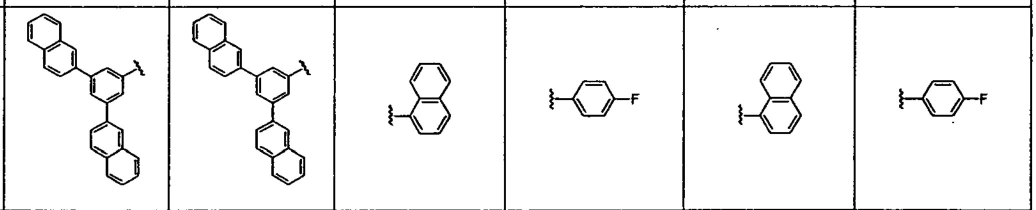
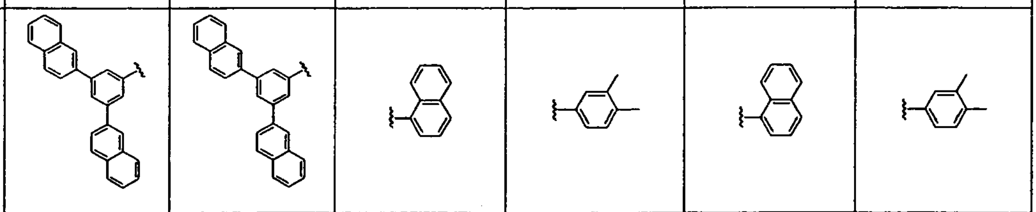
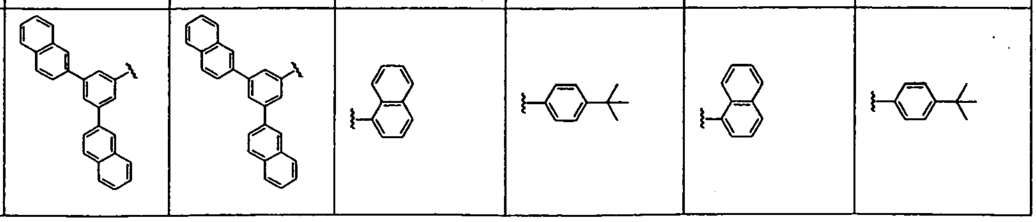
546						
547						
548						
549						
550						
551						
552						
553						

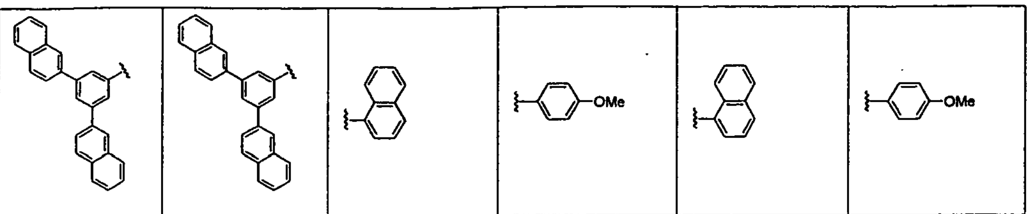
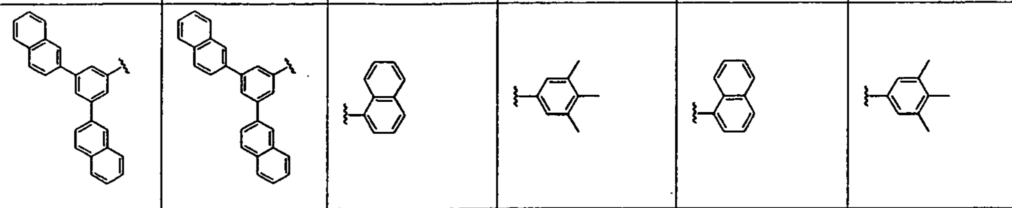
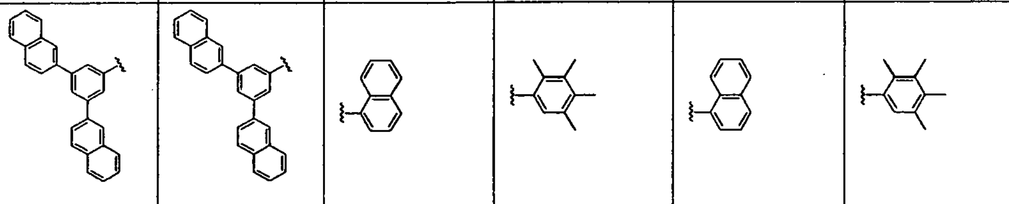
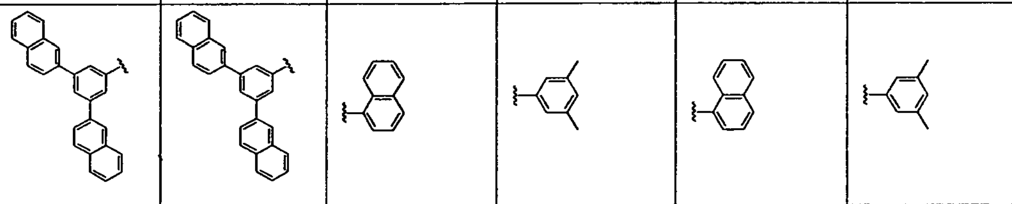
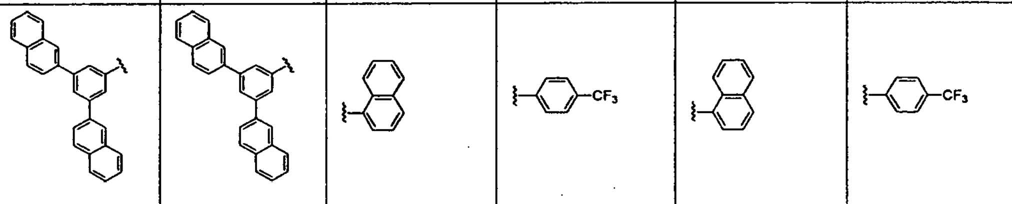
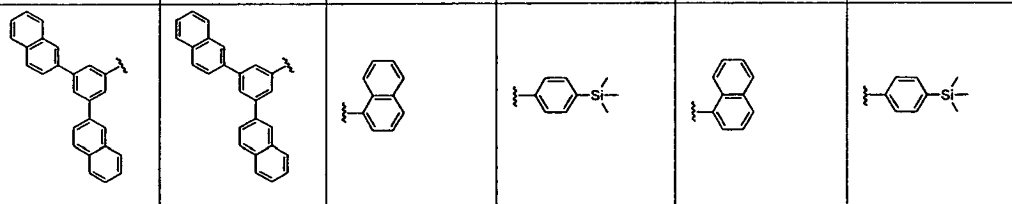
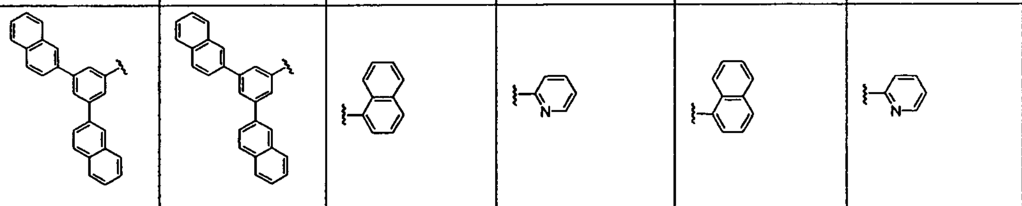
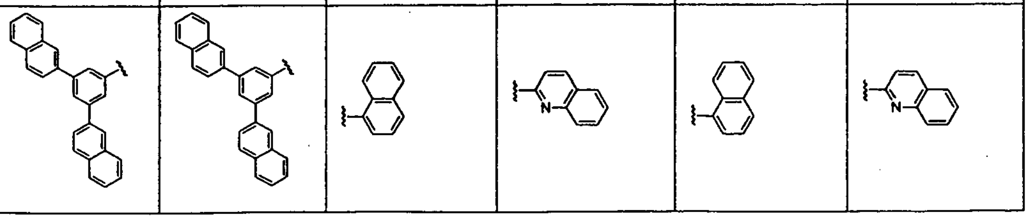
554	
555	
556	
557	
558	
559	
560	
561	

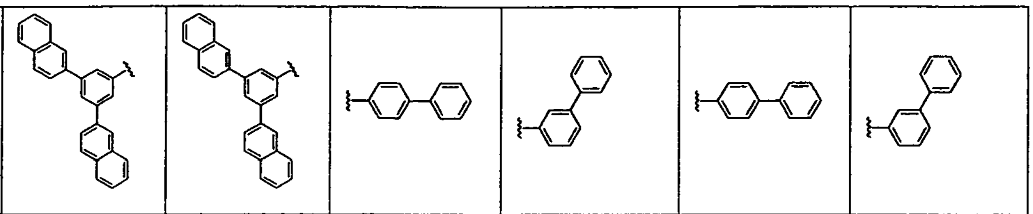
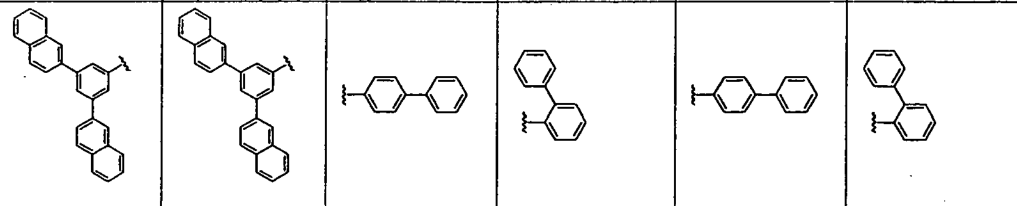
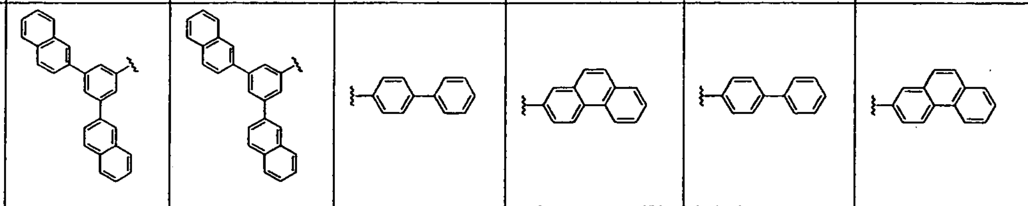
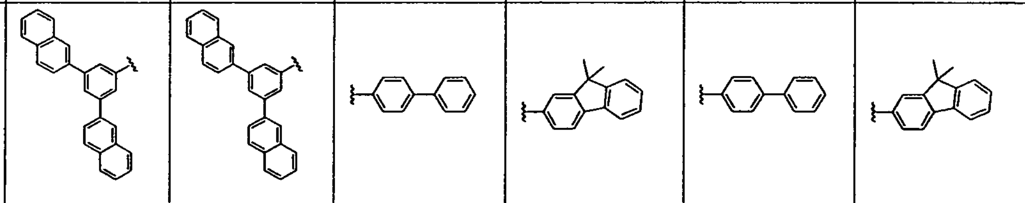
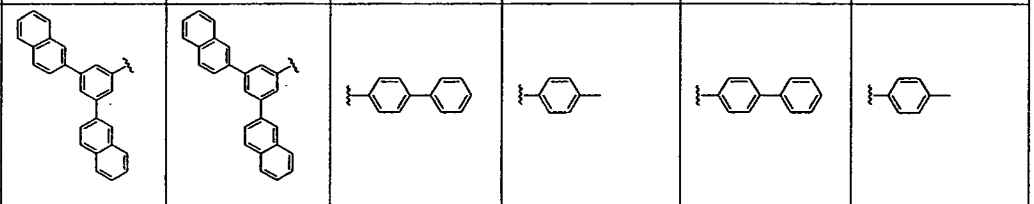
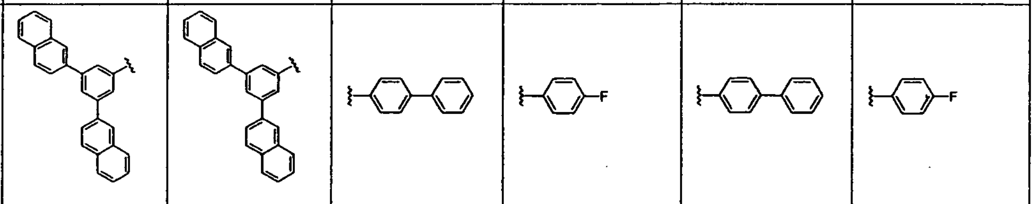
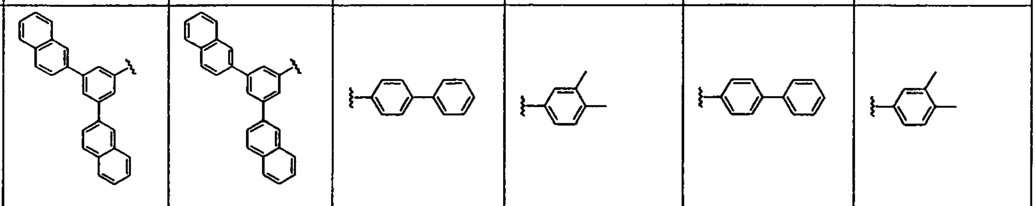
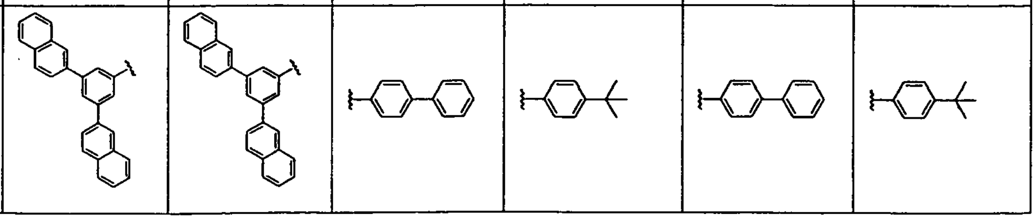
562						
563						
564						
565						
566						
567						
568						
569						

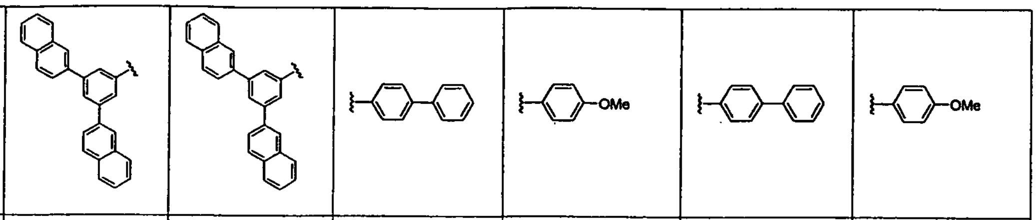
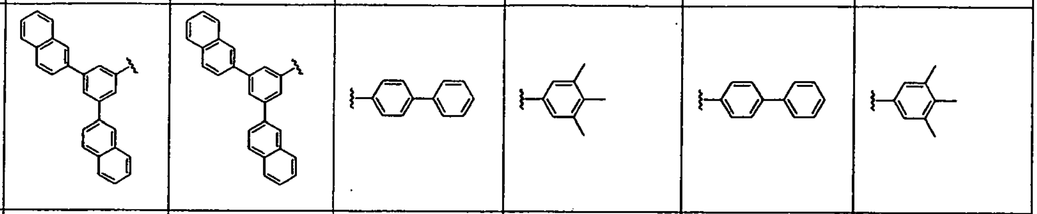
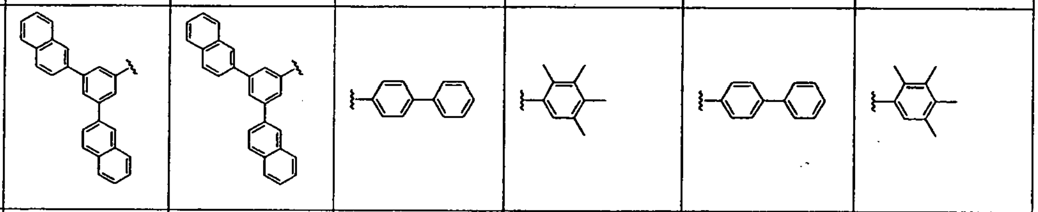
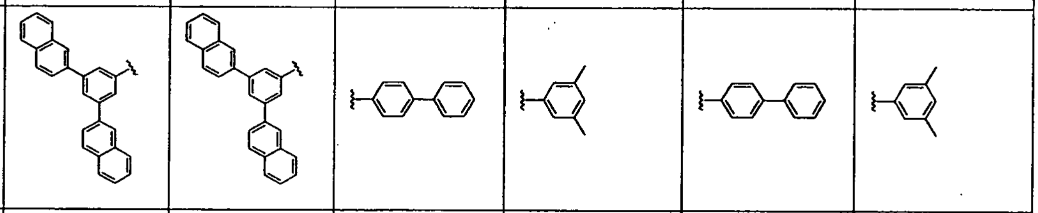
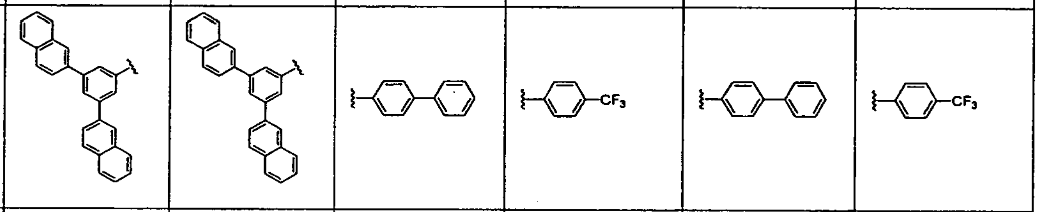
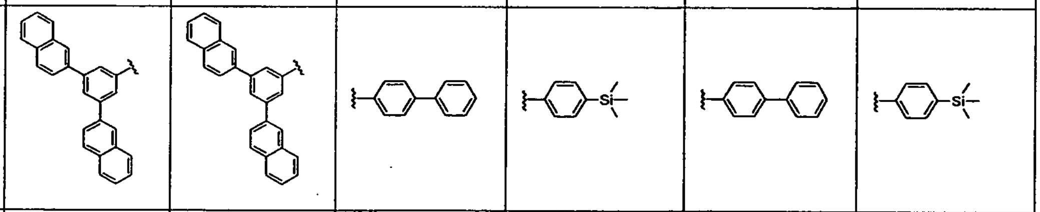
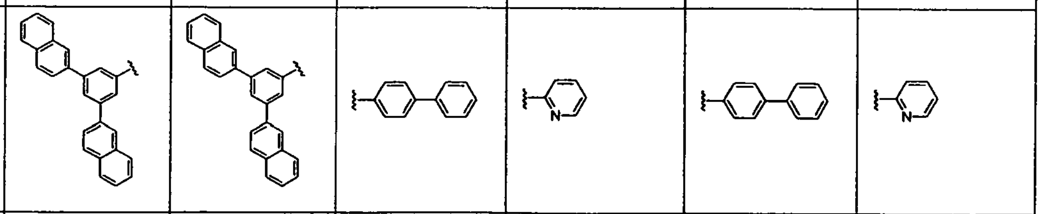
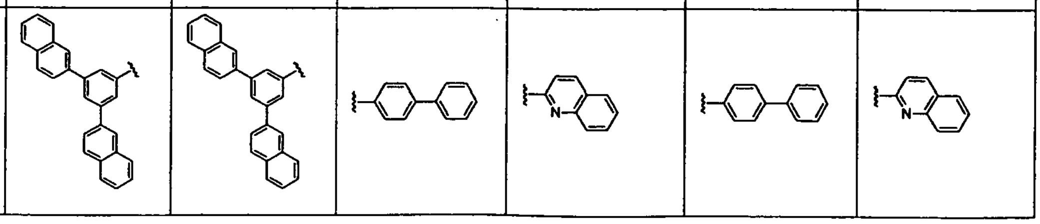
570					
571					
572					
573					
574					
575					
576					
577					

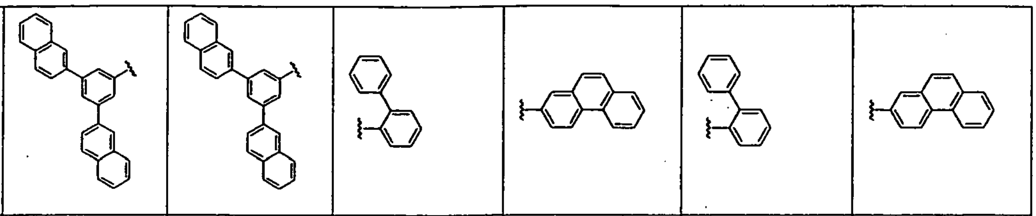
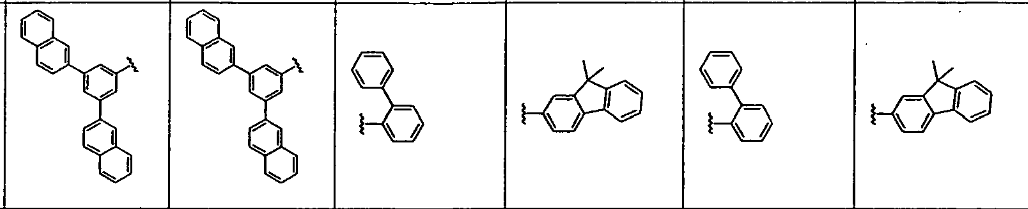
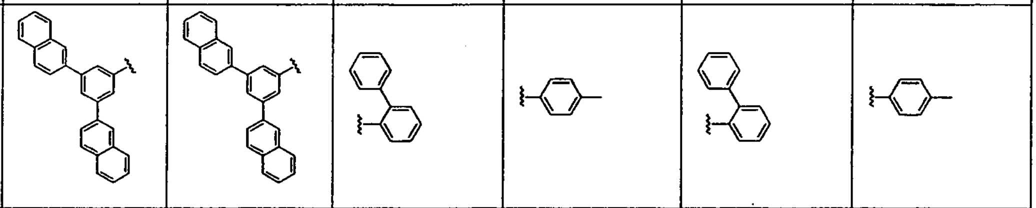
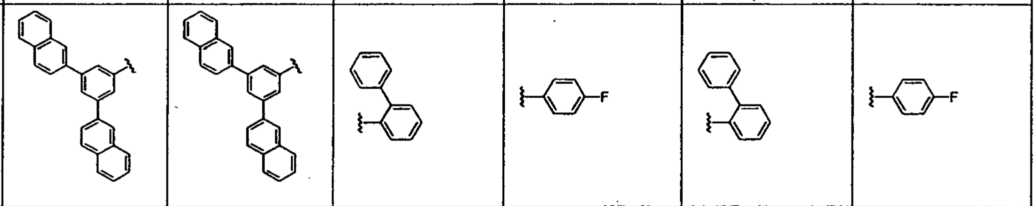
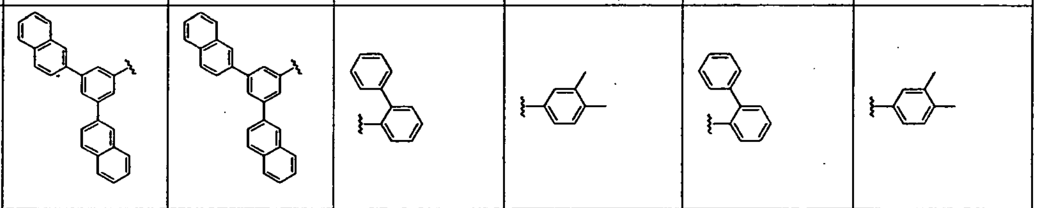
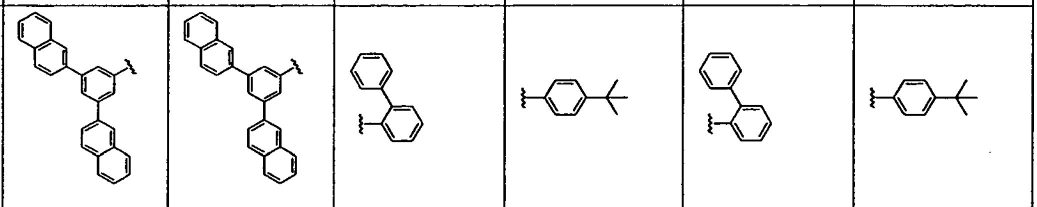
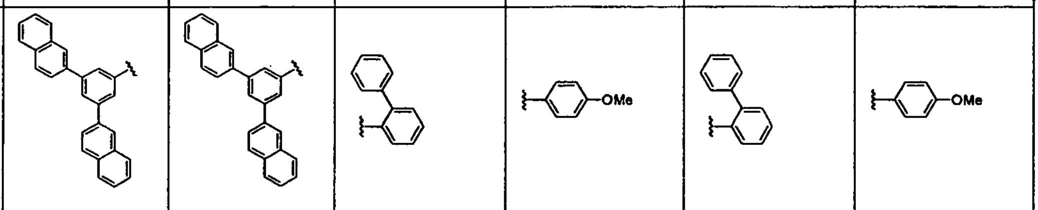
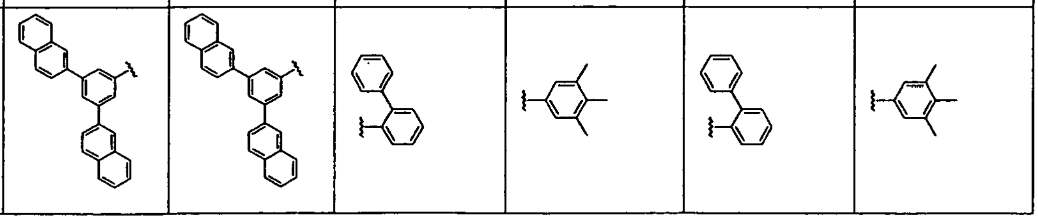
578	
579	
580	
581	
582	
583	
584	
585	

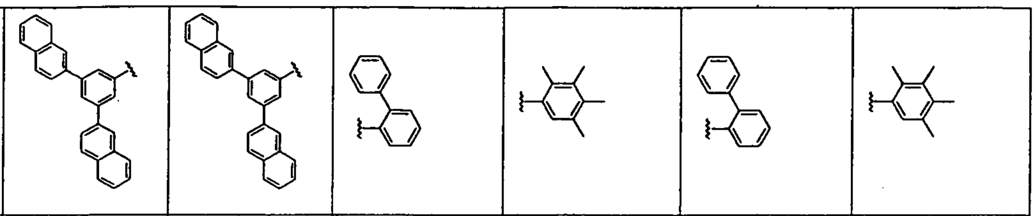
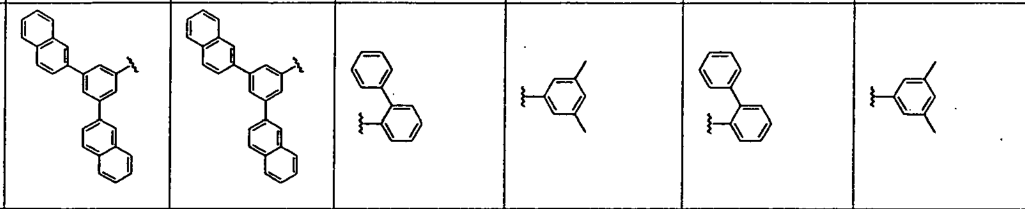
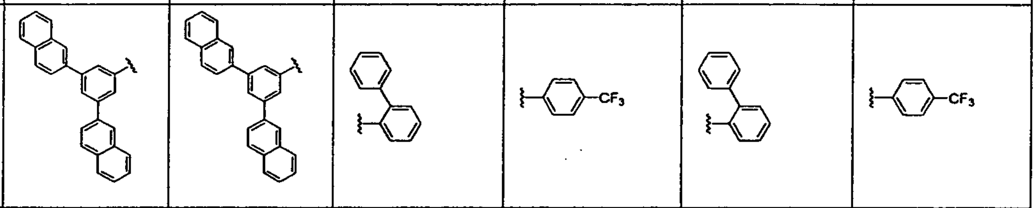
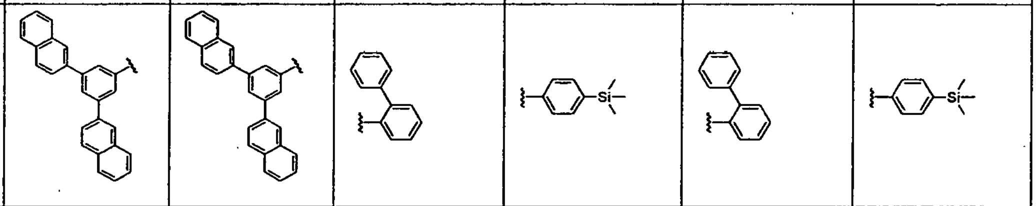
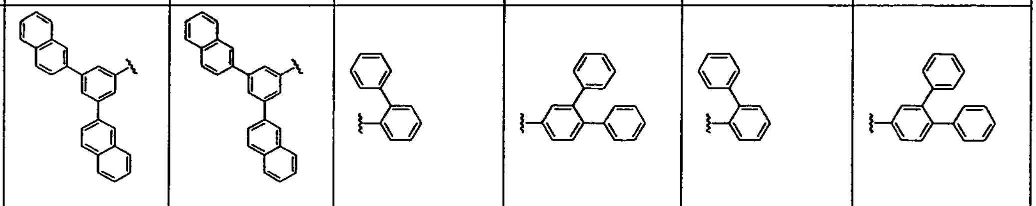
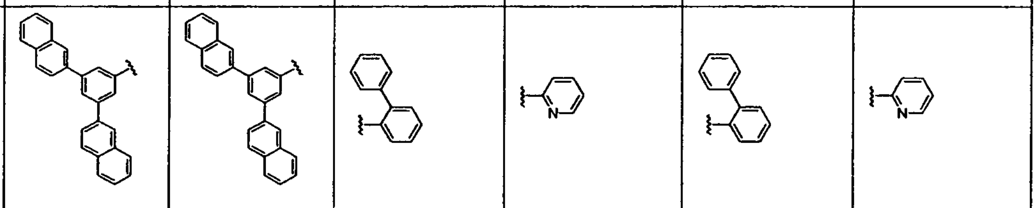
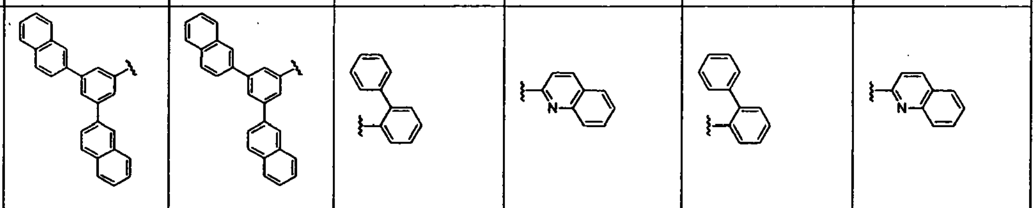
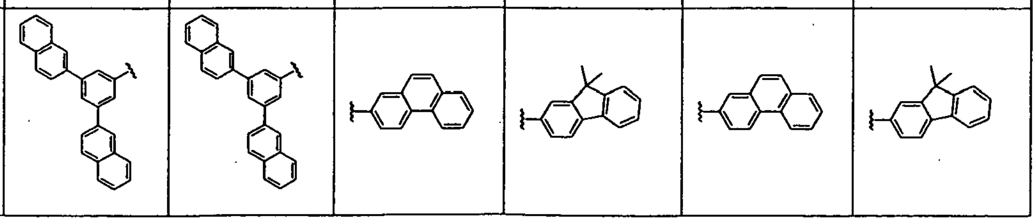
586	
587	
588	
589	
590	
591	
592	
593	

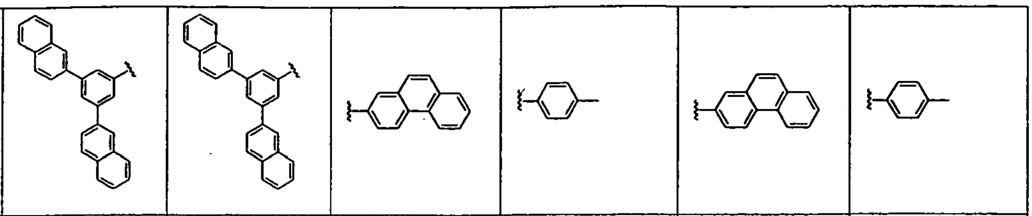
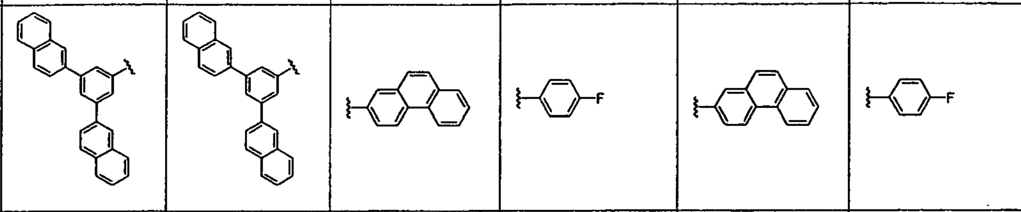
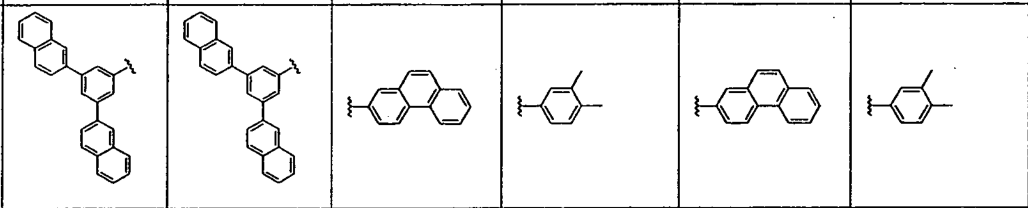
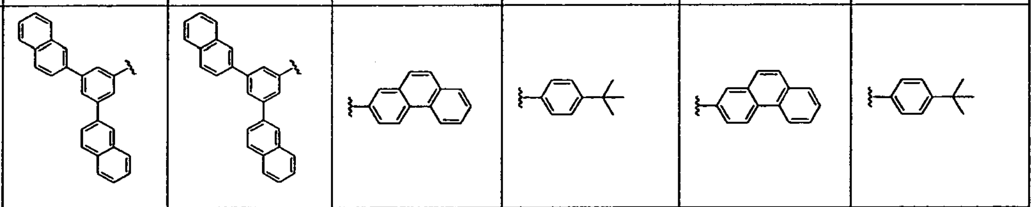
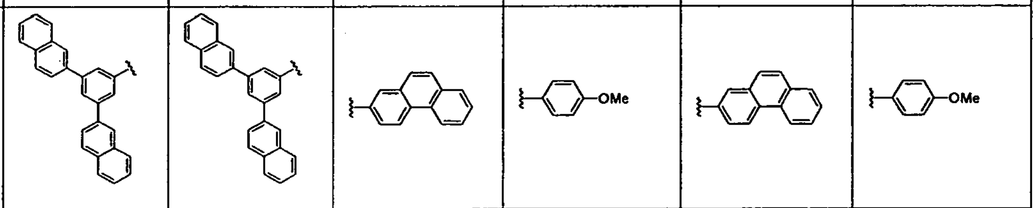
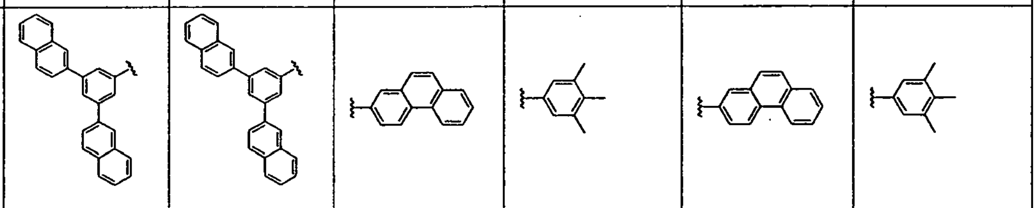
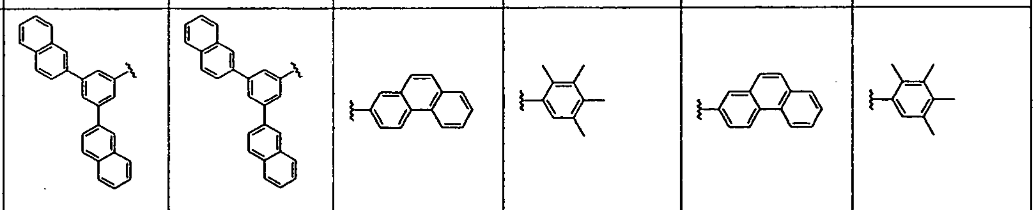
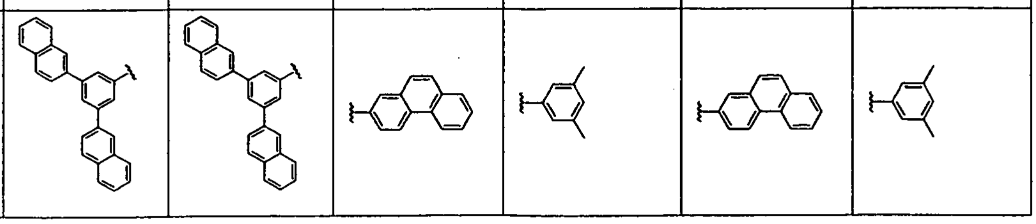
594	
595	
596	
597	
598	
599	
600	
601	

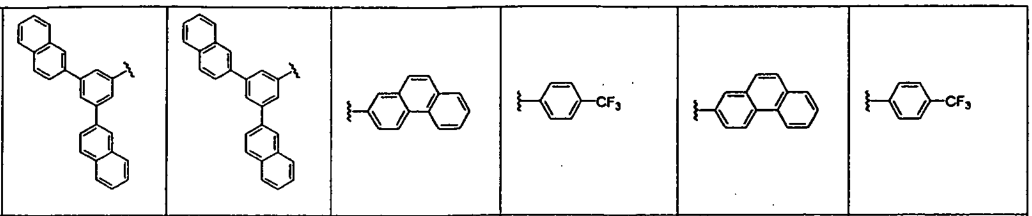
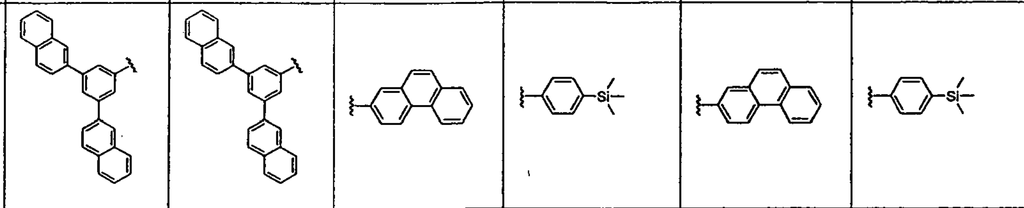
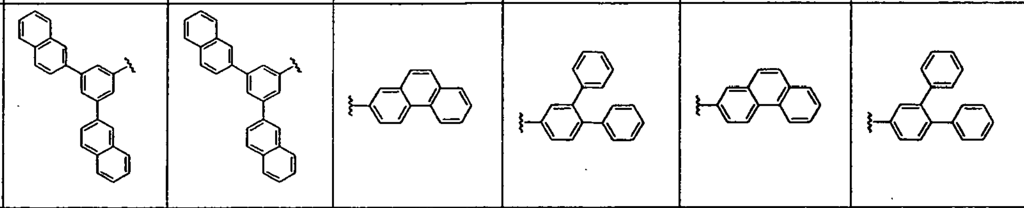
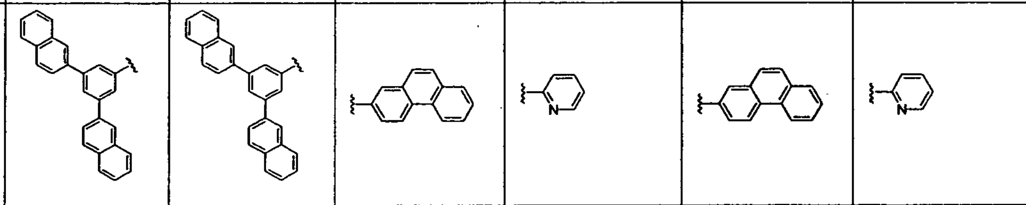
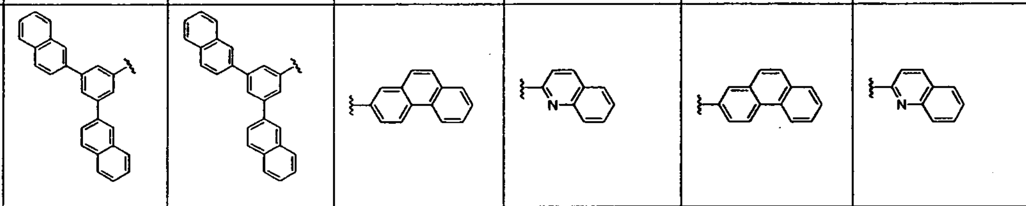
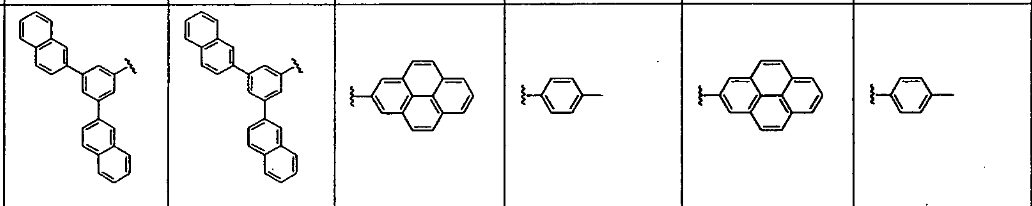
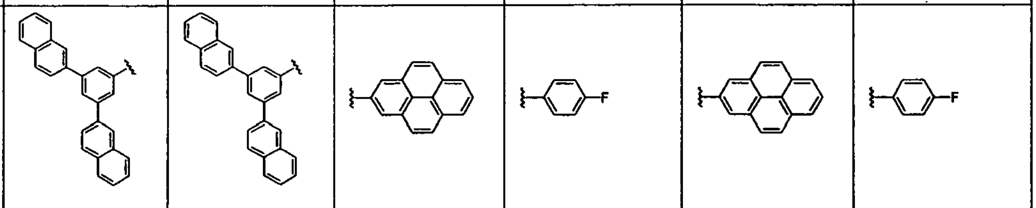
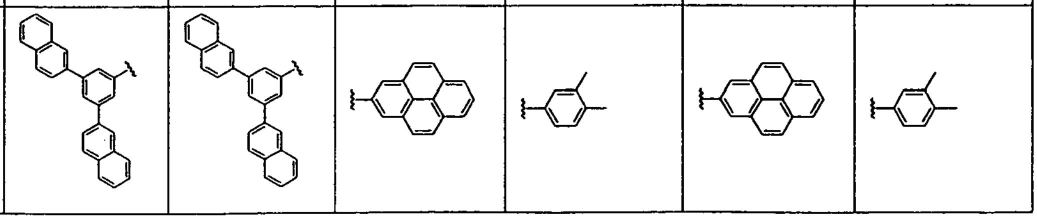
602	
603	
604	
605	
606	
607	
608	
609	

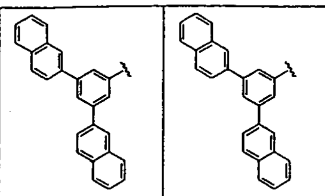
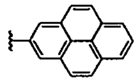
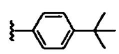
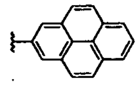
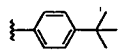
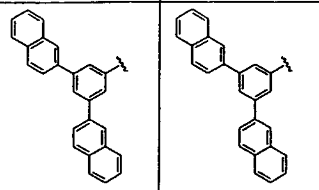
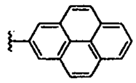
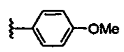
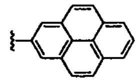
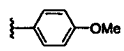
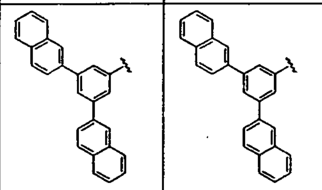
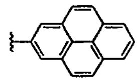
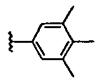
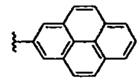
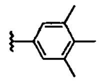
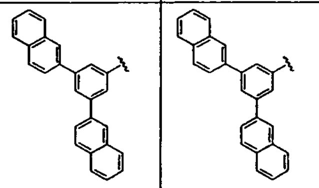
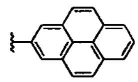
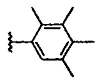
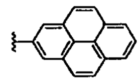
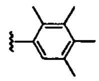
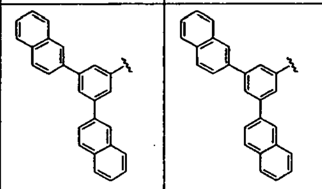
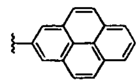
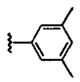
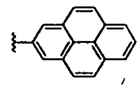
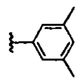
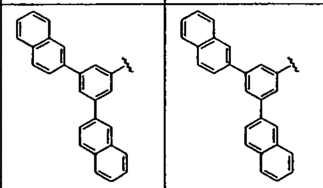
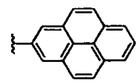
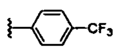
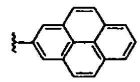
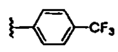
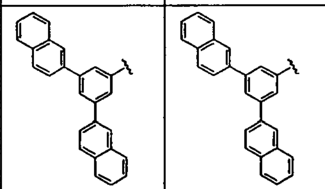
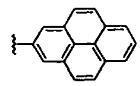
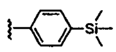
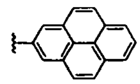
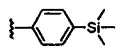
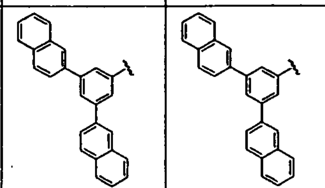
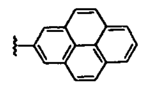
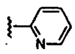
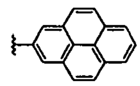
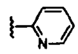
610	
611	
612	
613	
614	
615	
616	
617	

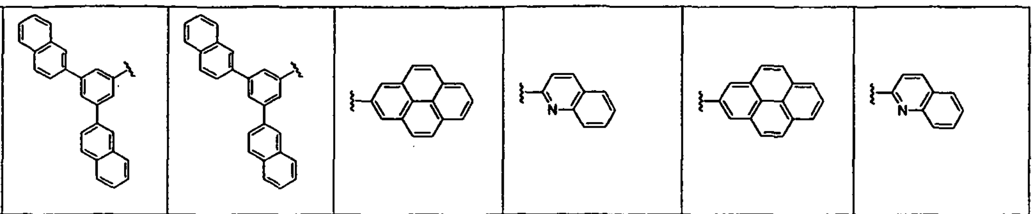
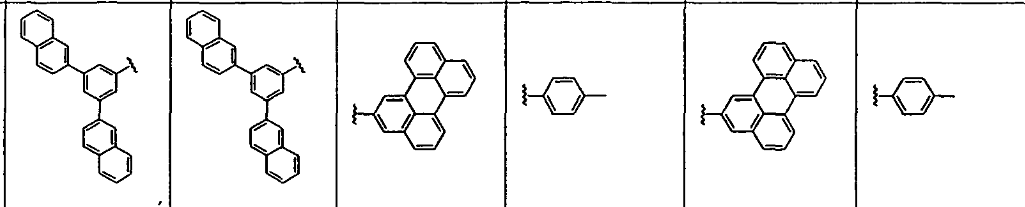
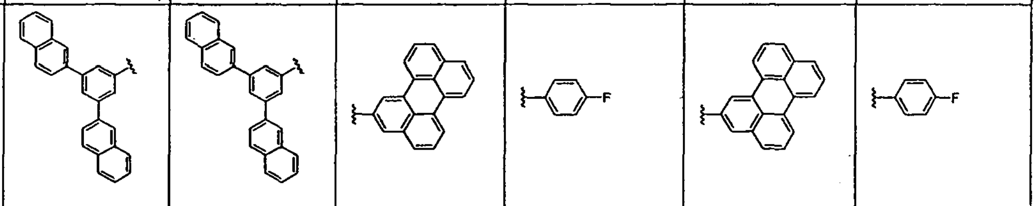
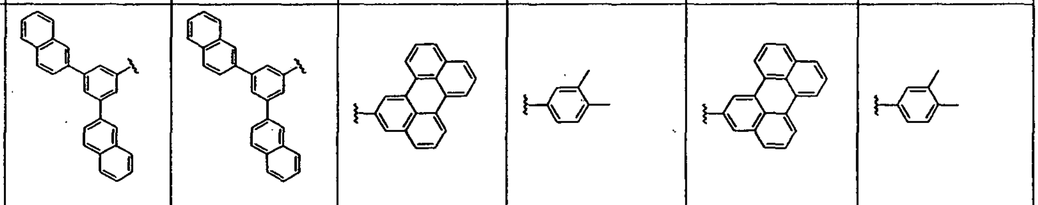
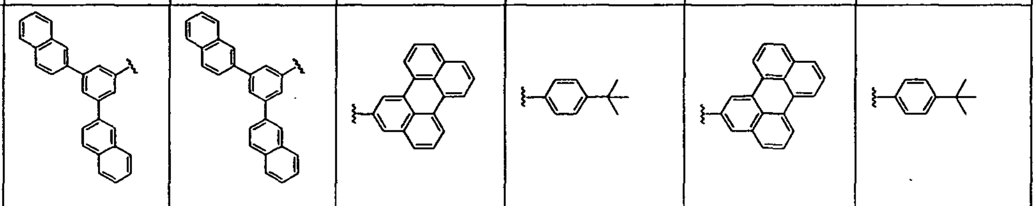
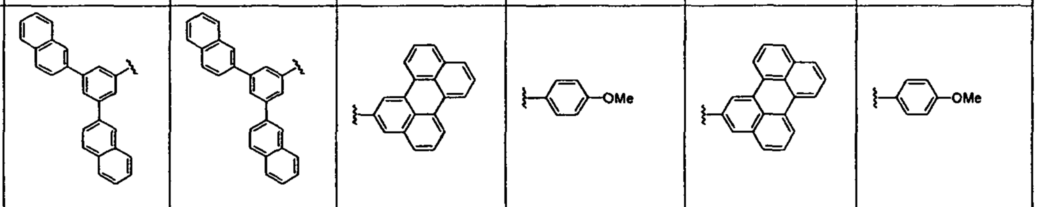
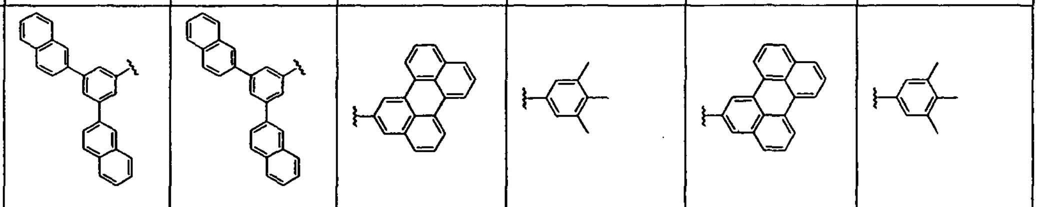
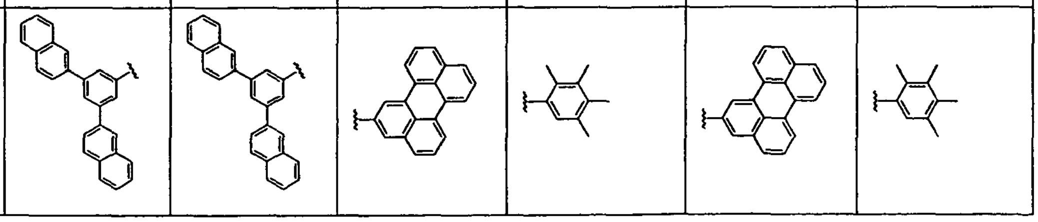
618	
619	
620	
621	
622	
623	
624	
625	

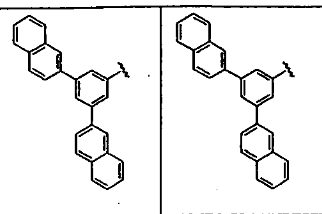
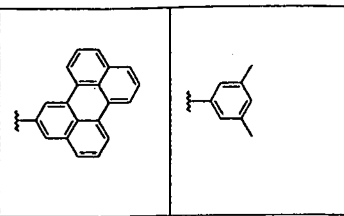
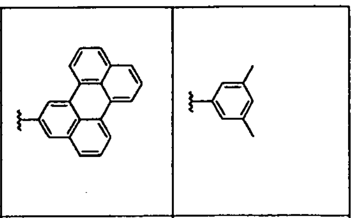
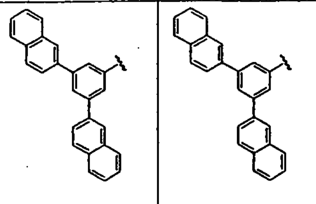
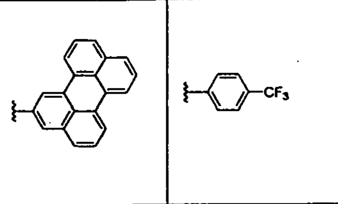
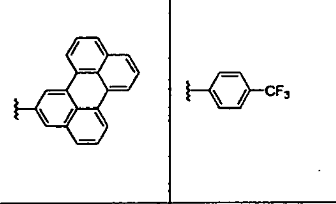
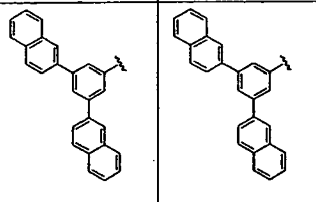
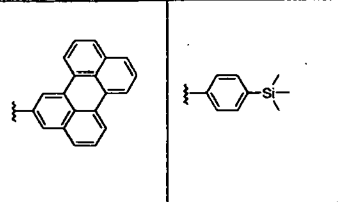
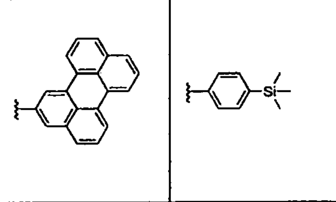
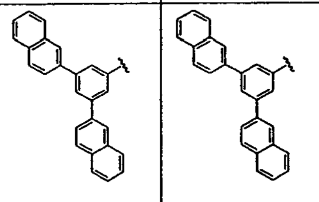
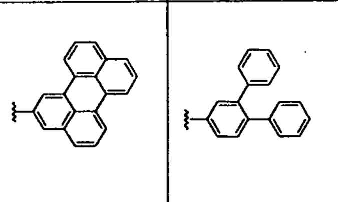
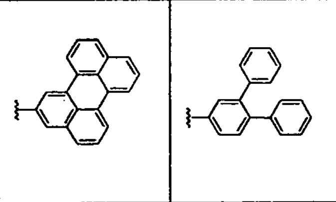
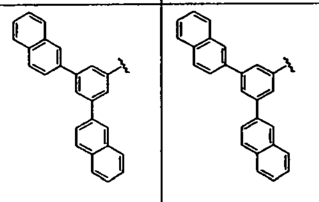
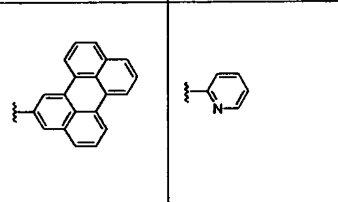
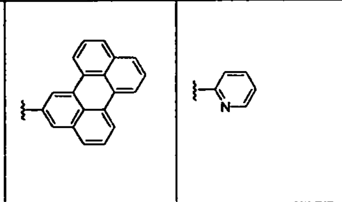
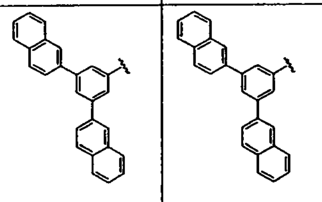
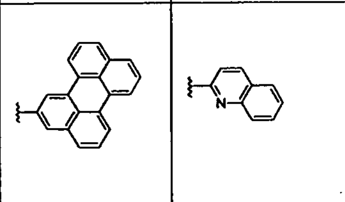
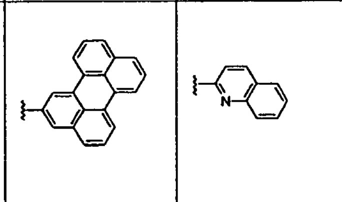
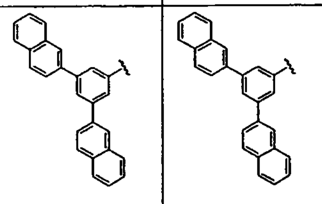
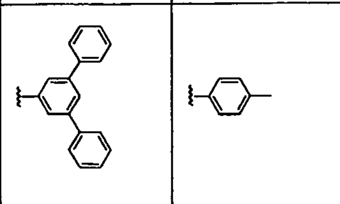
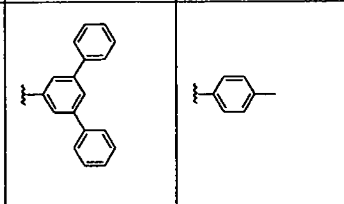
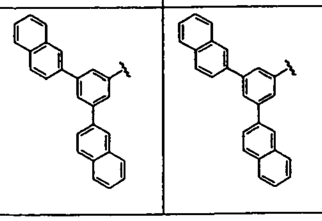
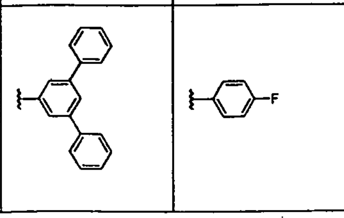
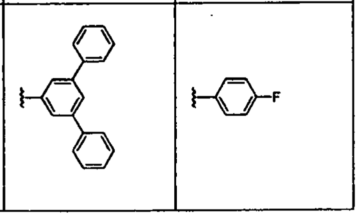
626	
627	
628	
629	
630	
631	
632	
633	

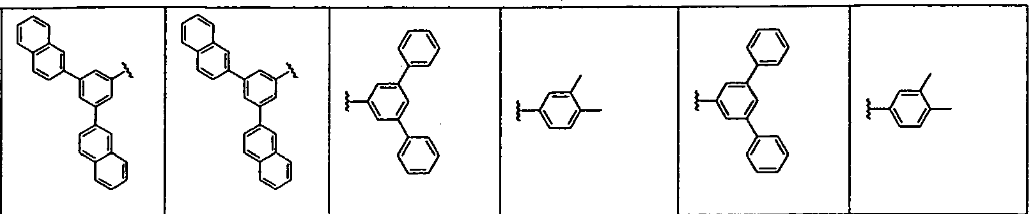
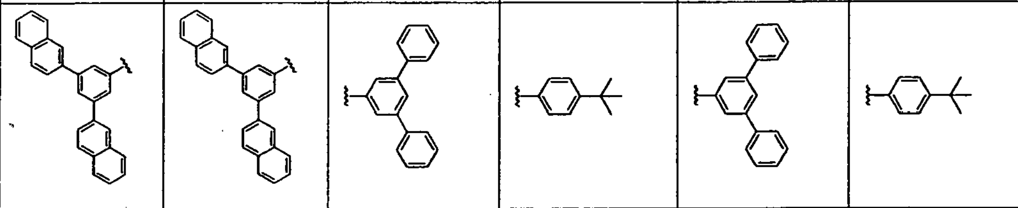
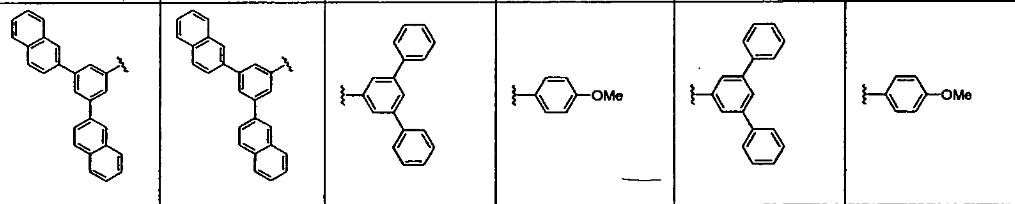
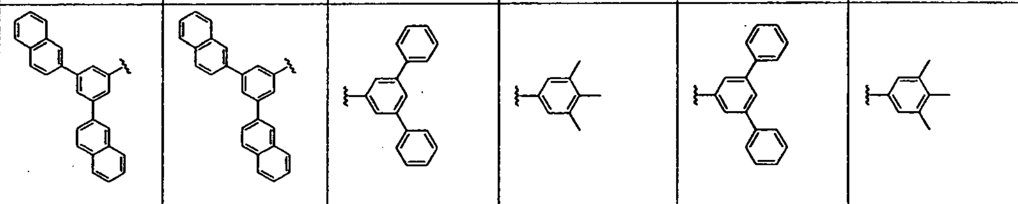
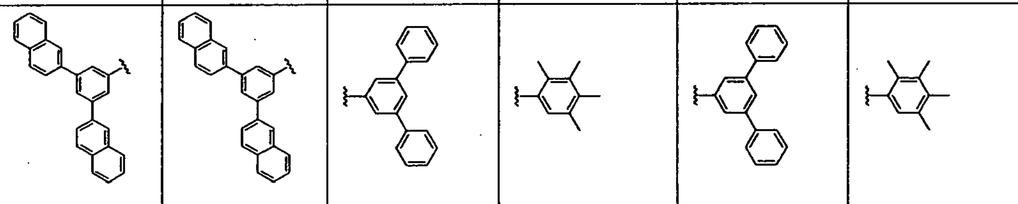
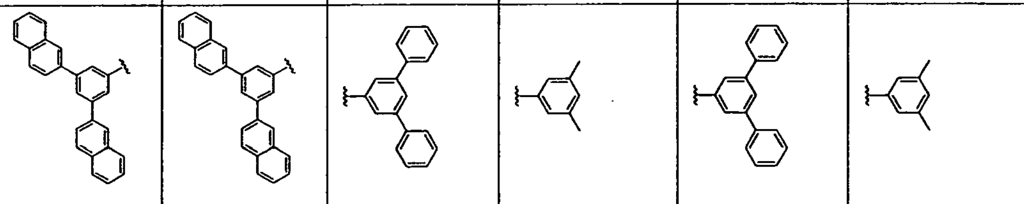
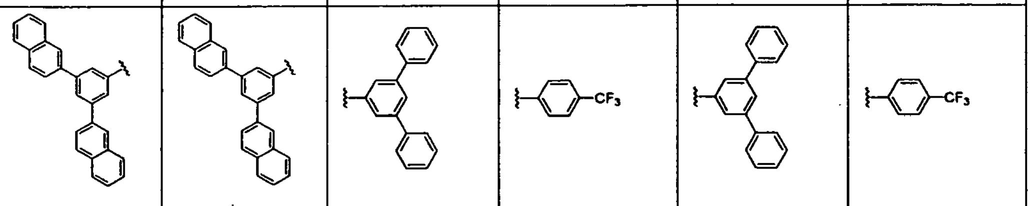
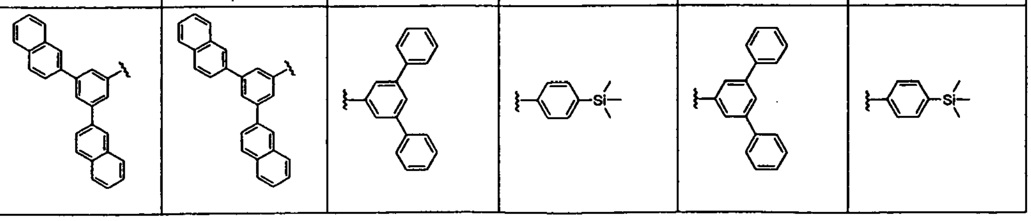
634	
635	
636	
637	
638	
639	
640	
641	

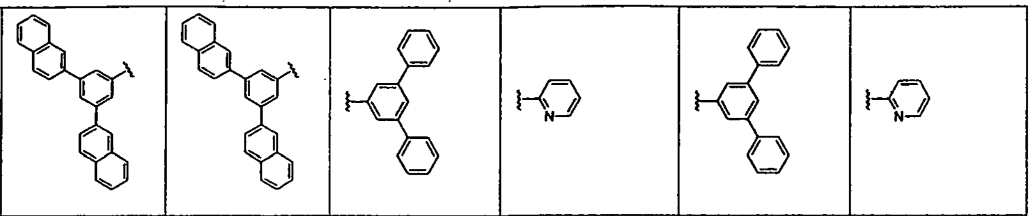
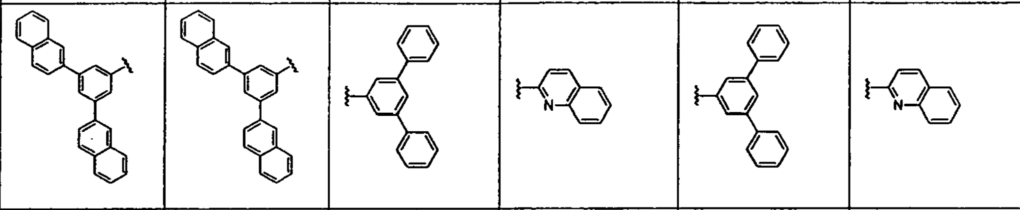
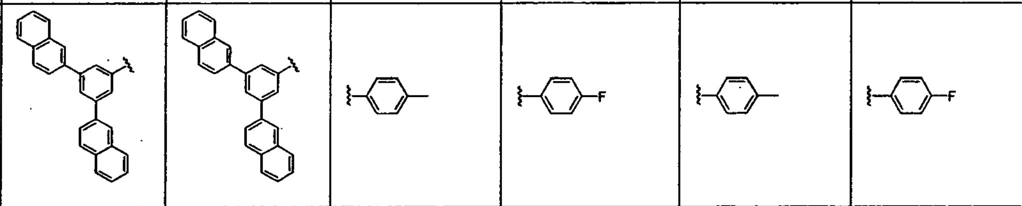
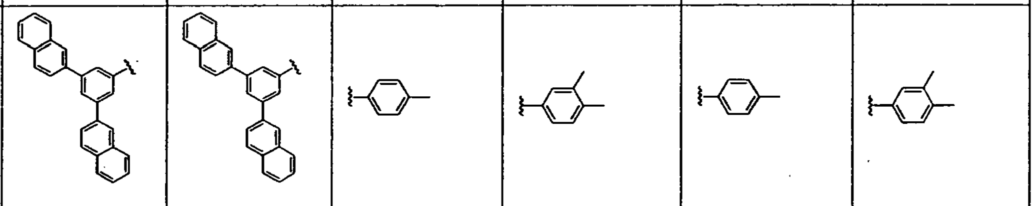
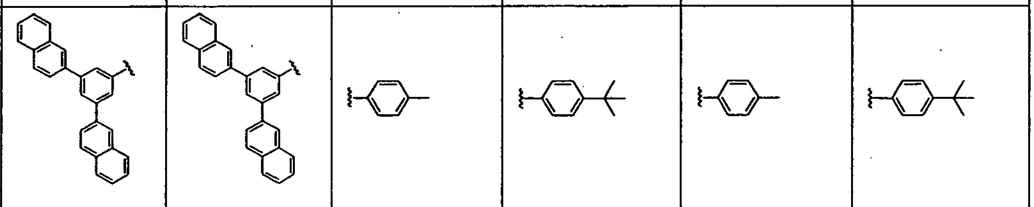
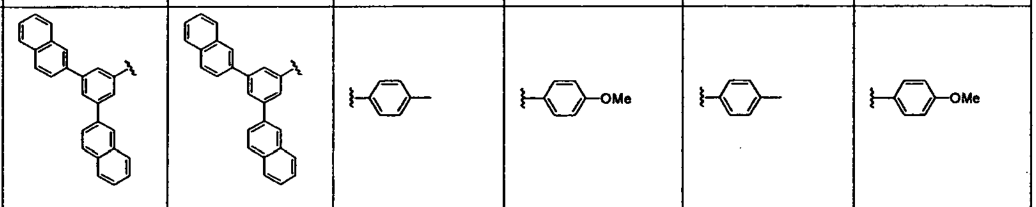
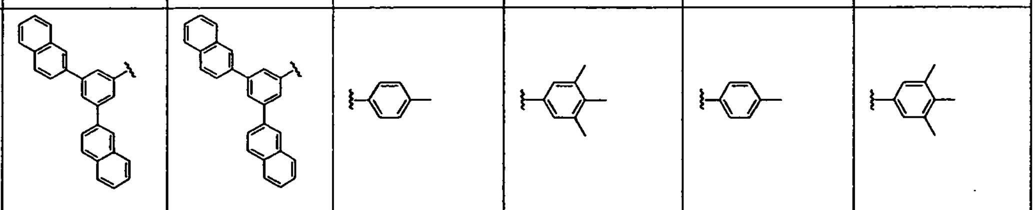
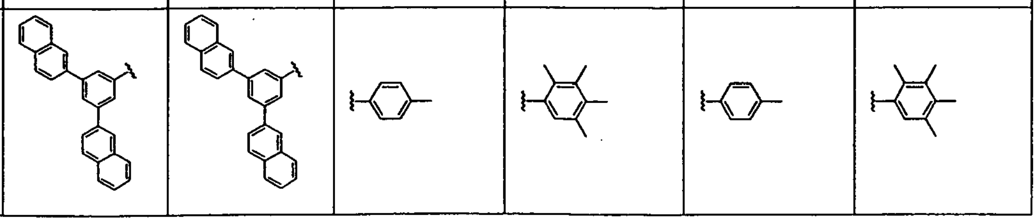
642	
643	
644	
645	
646	
647	
648	
649	

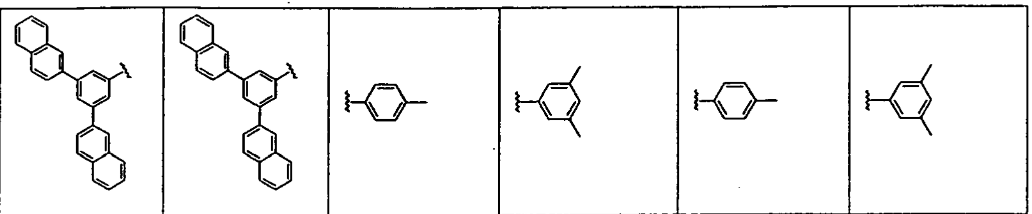
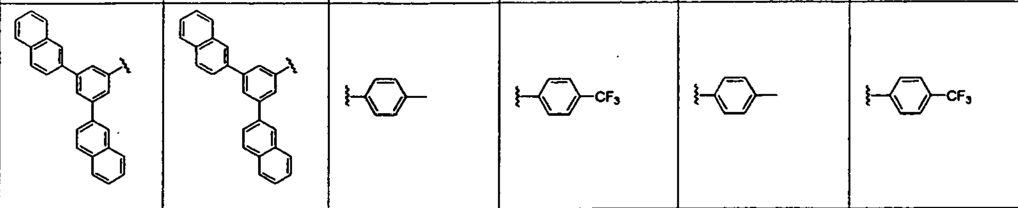
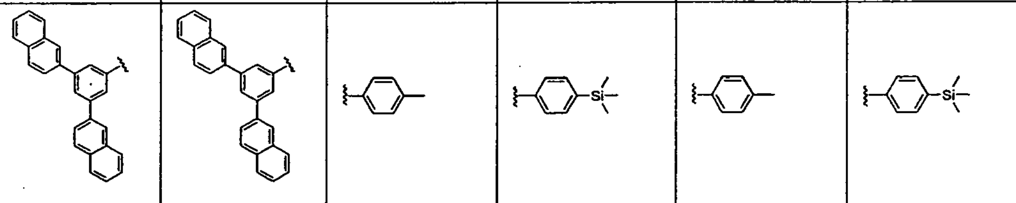
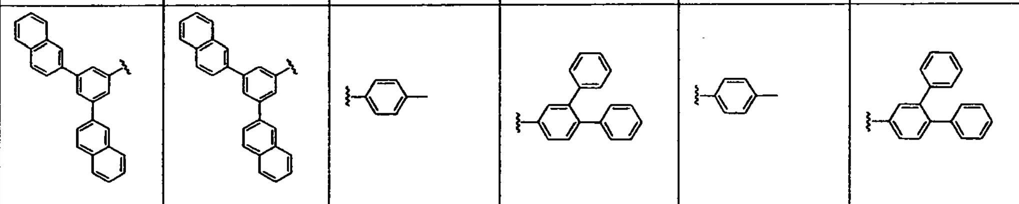
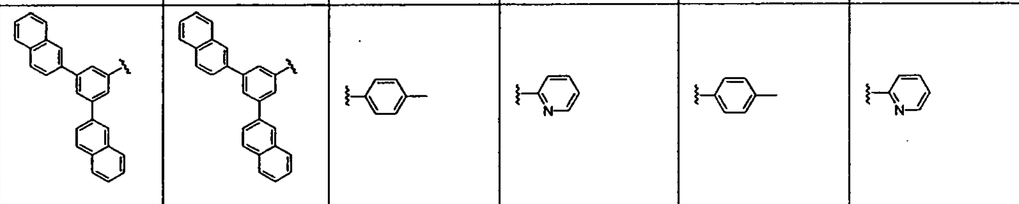
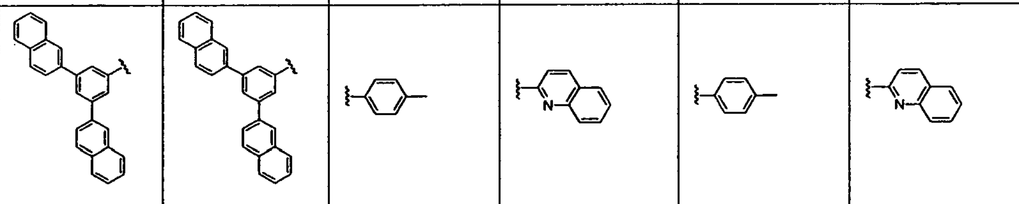
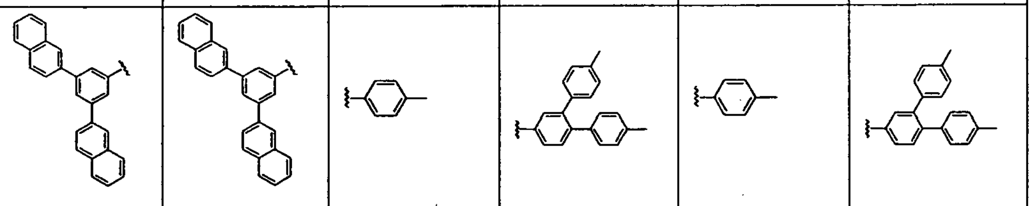
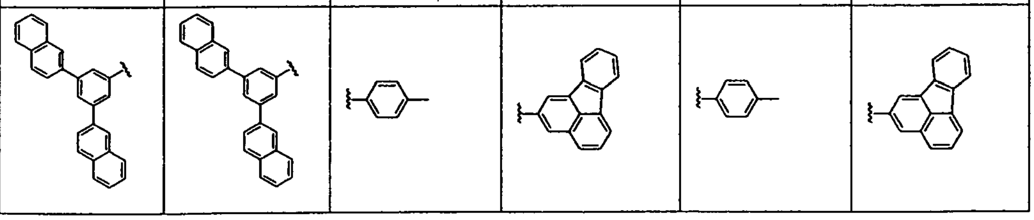
650					
651					
652					
653					
654					
655					
656					
657					

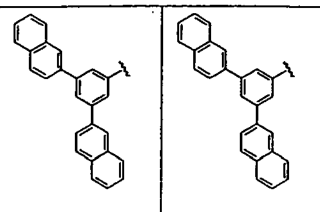
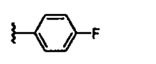
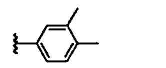
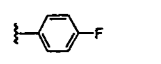
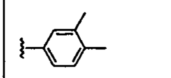
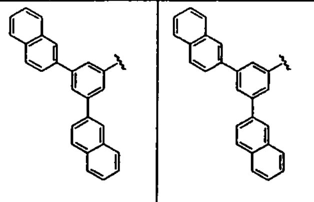
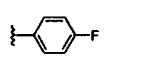
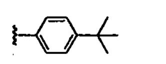
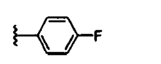
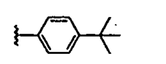
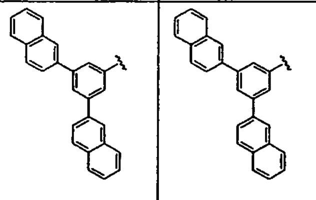
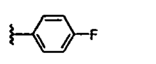
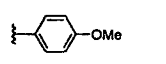
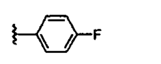
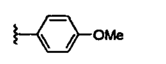
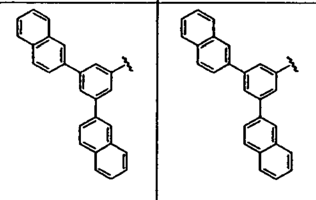
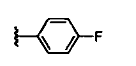
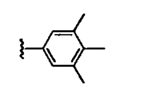
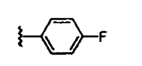
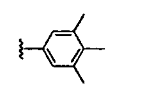
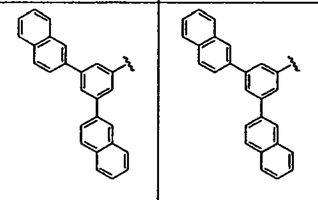
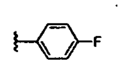
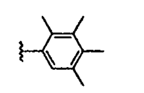
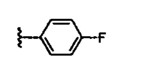
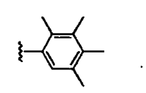
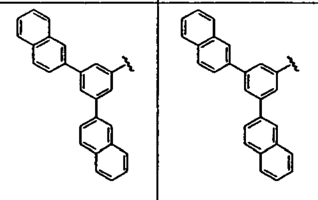
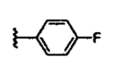
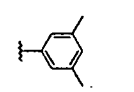
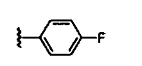
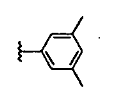
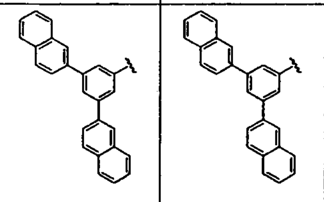
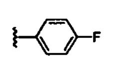
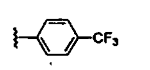
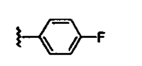
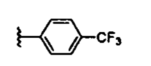
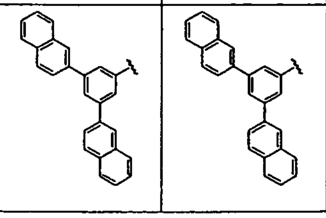
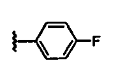
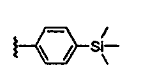
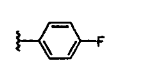
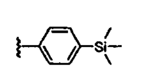
658	
659	
660	
661	
662	
663	
664	
665	

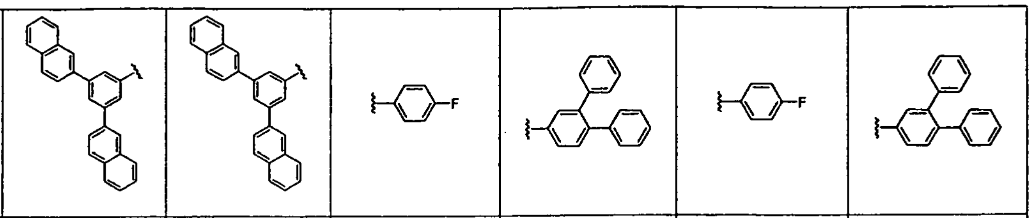
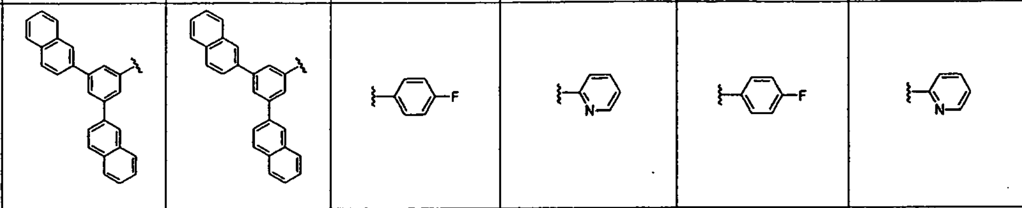
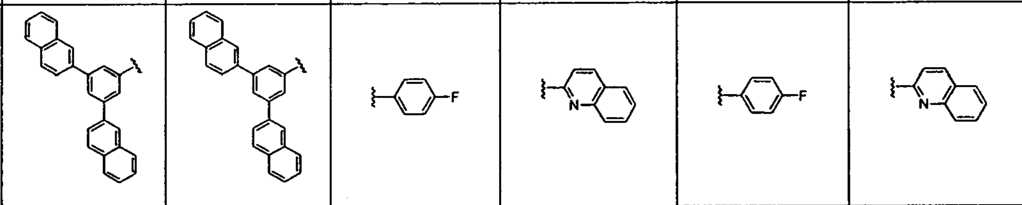
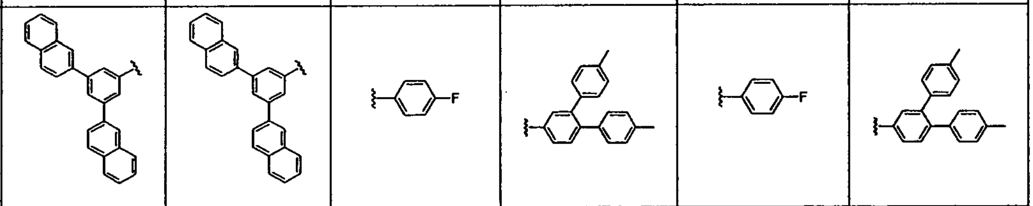
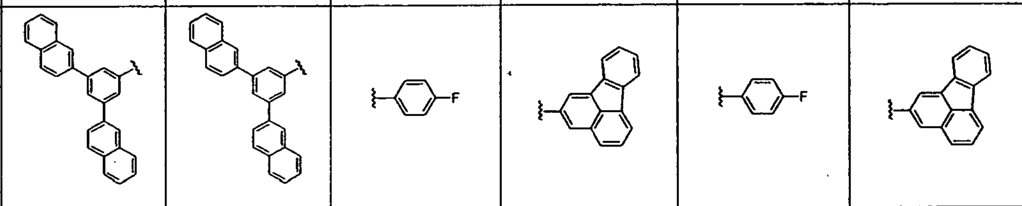
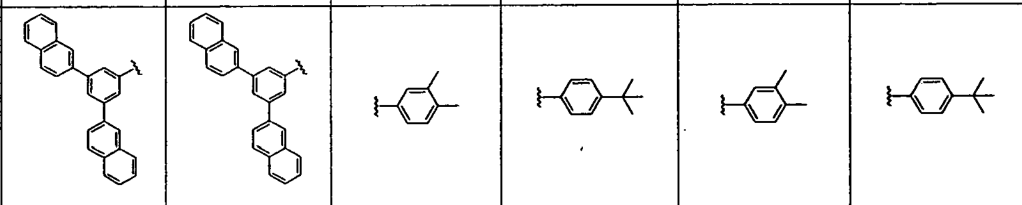
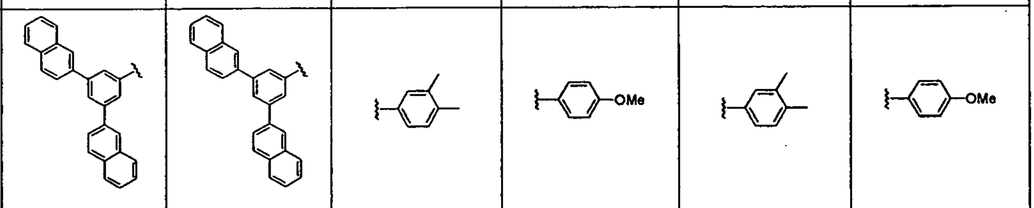
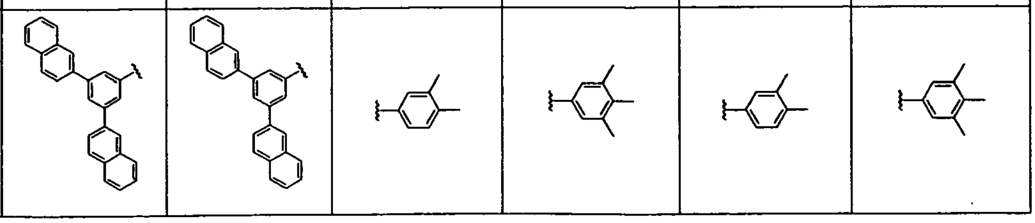
666						
667						
668						
669						
670						
671						
672						
673						

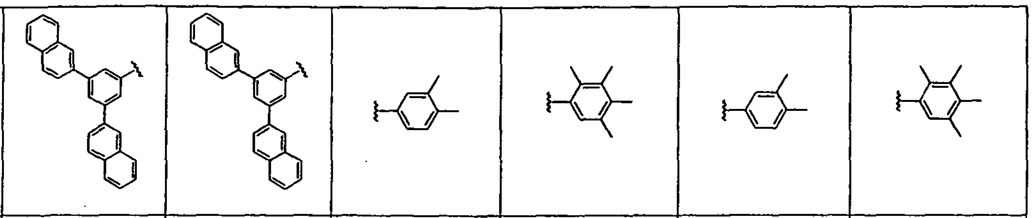
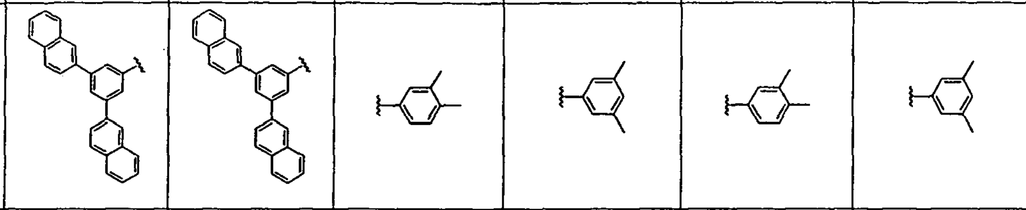
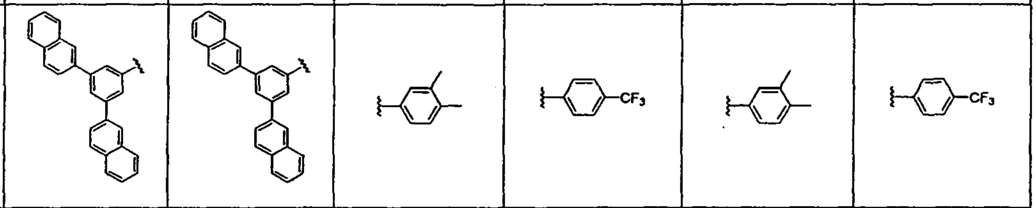
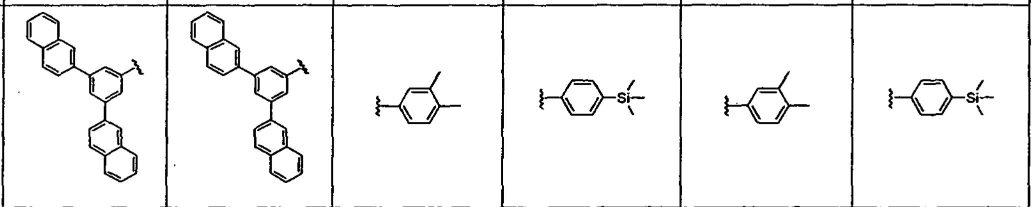
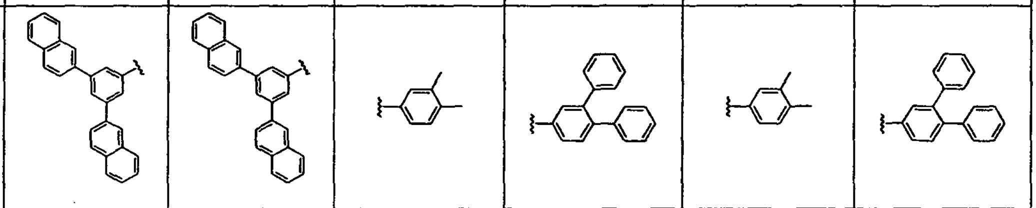
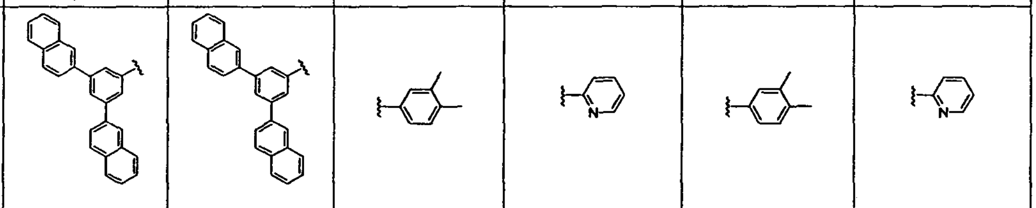
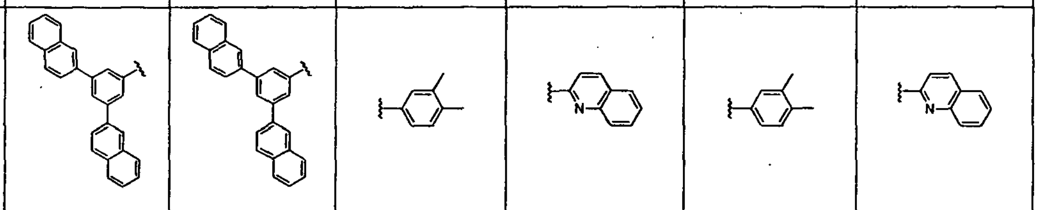
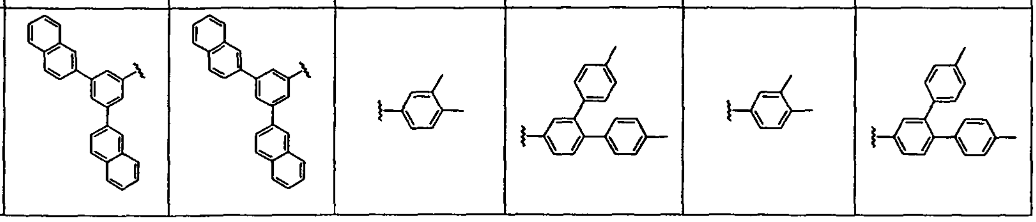
674	
675	
676	
677	
678	
679	
680	
681	

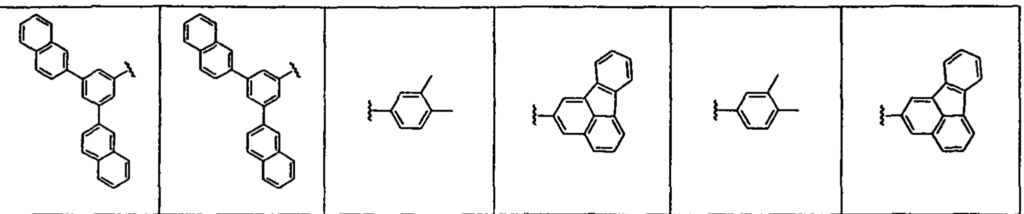
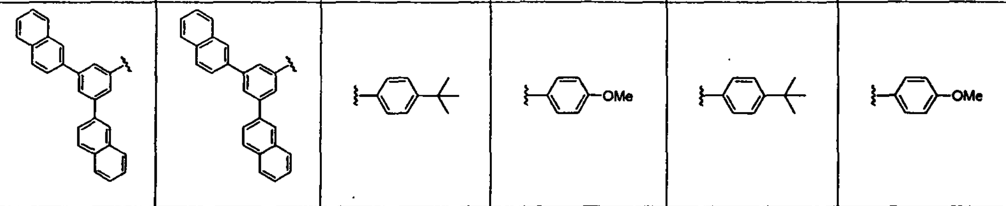
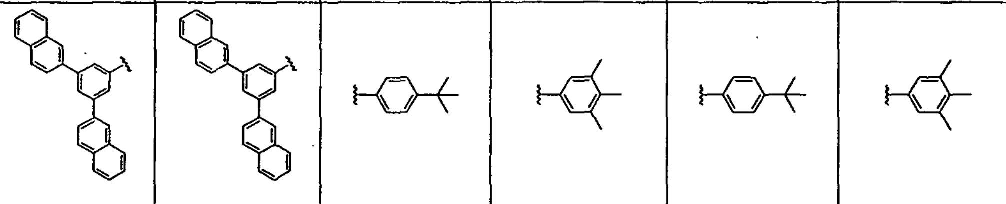
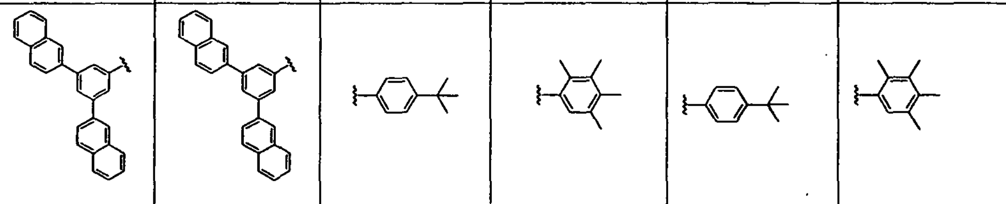
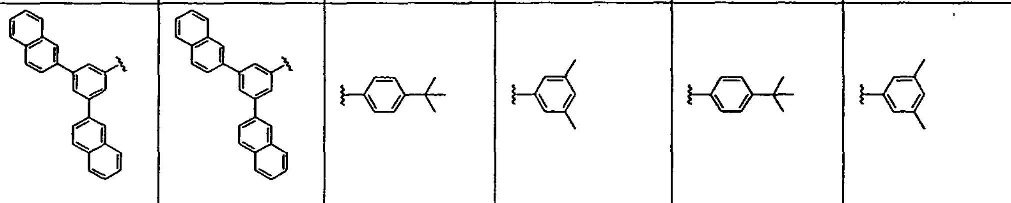
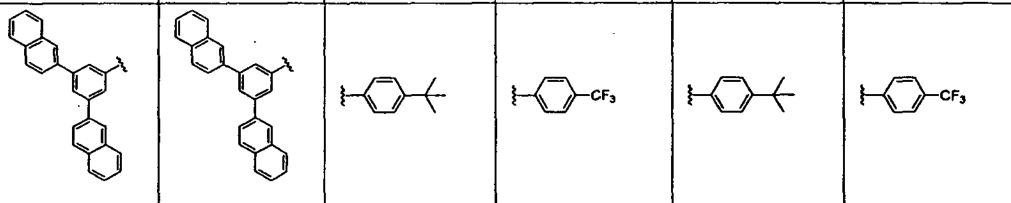
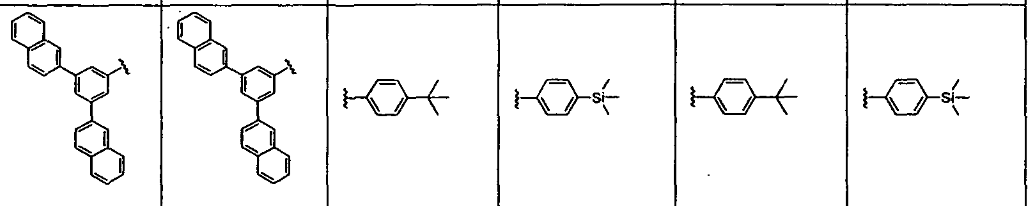
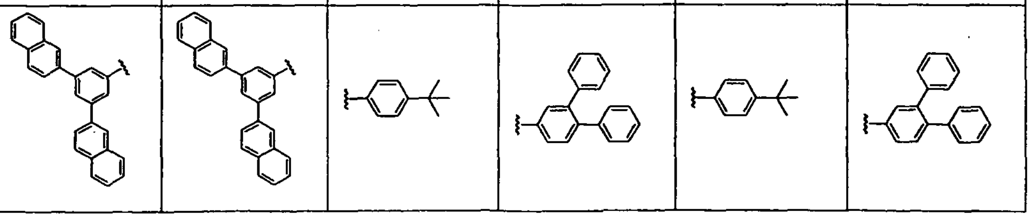
682	
683	
684	
685	
686	
687	
688	
689	

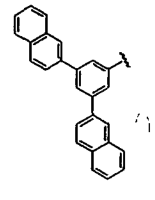
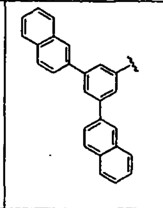
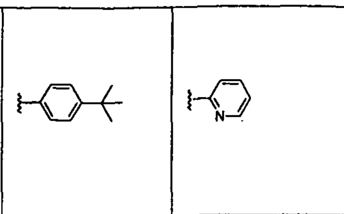
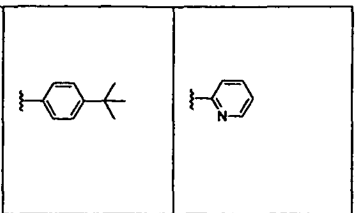
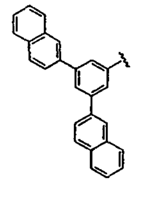
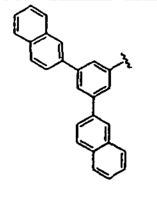
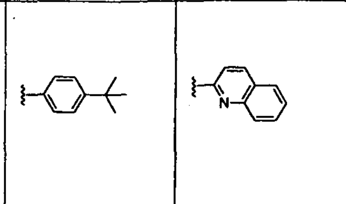
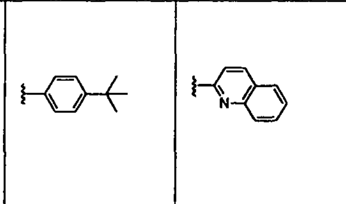
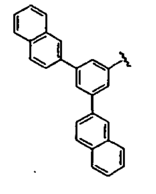
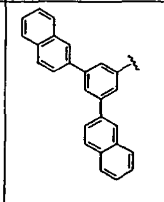
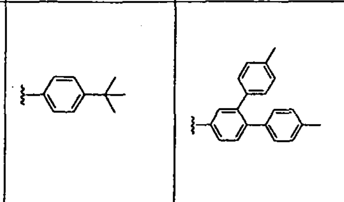
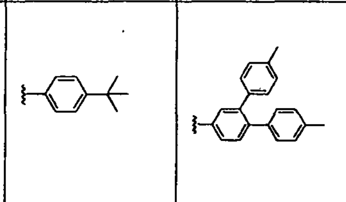
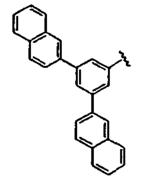
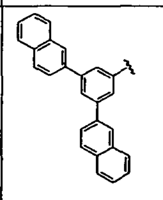
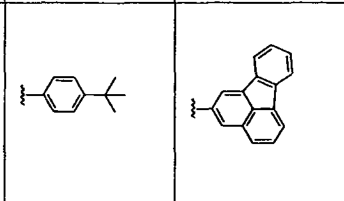
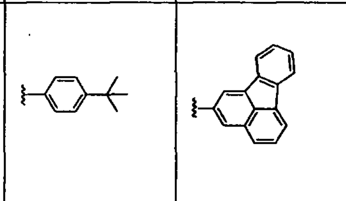
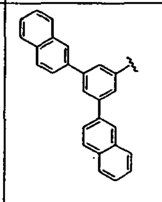
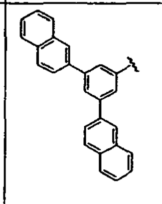
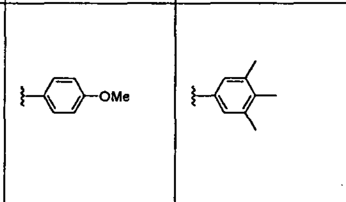
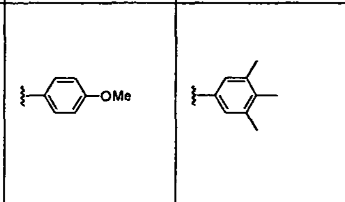
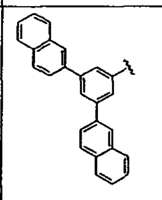
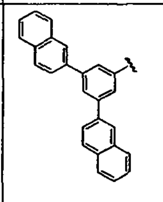
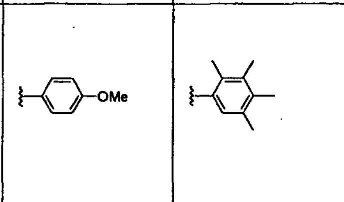
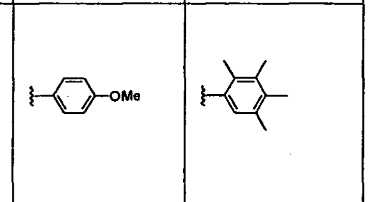
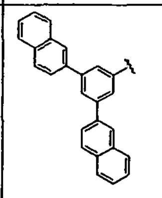
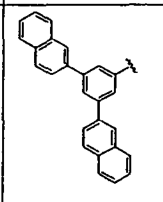
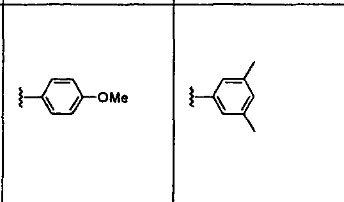
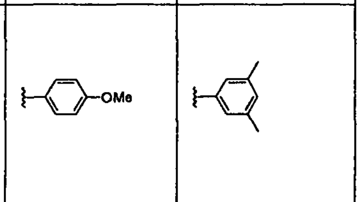
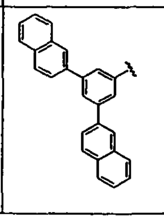
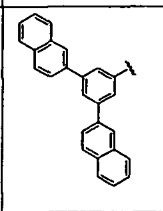
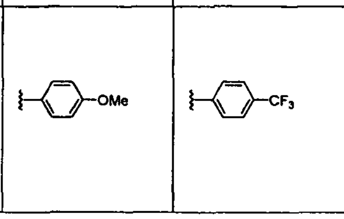
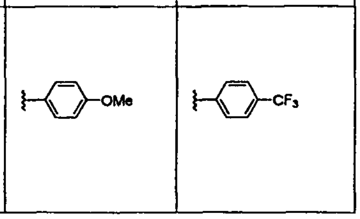
690	
691	
692	
693	
694	
695	
696	
697	

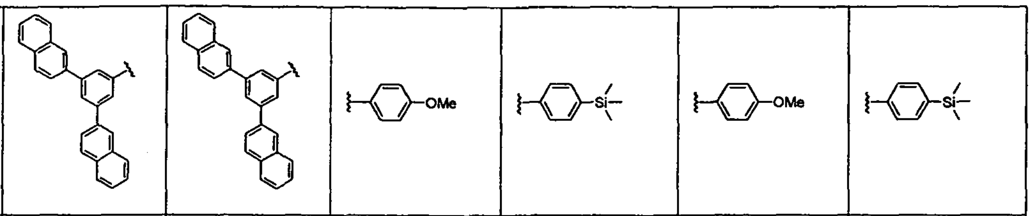
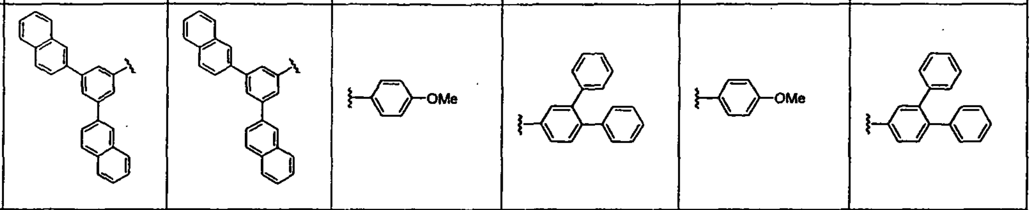
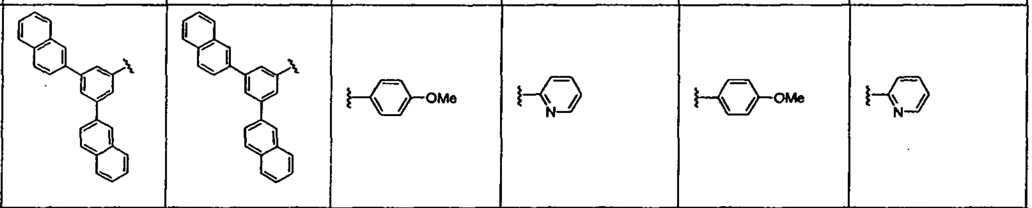
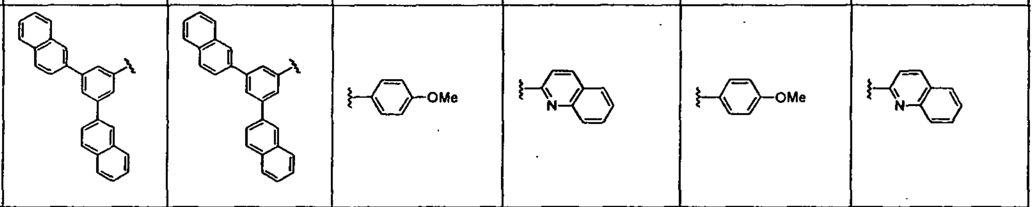
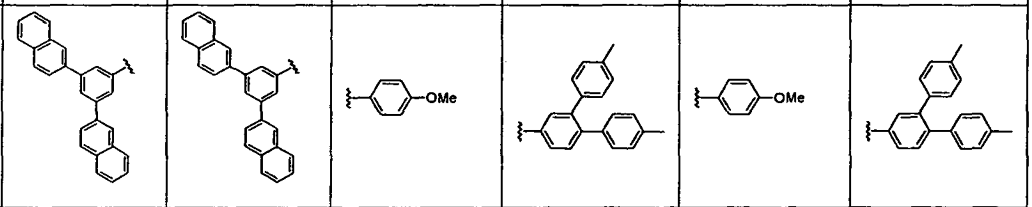
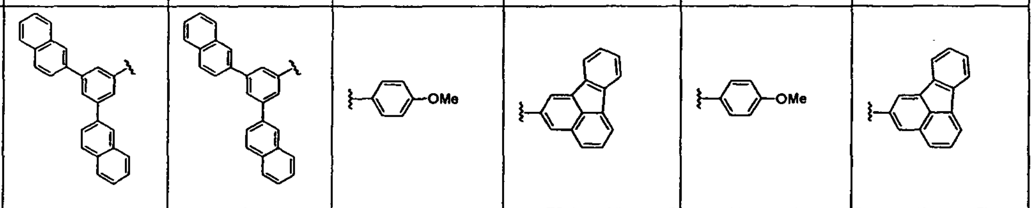
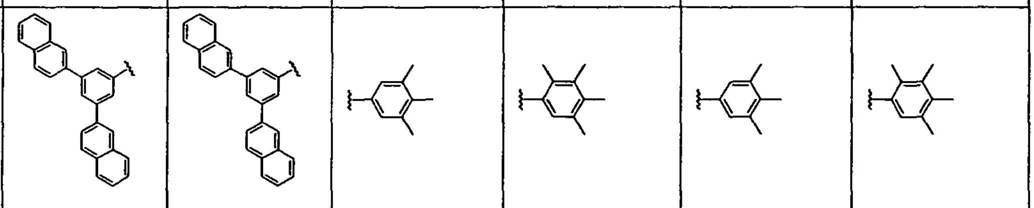
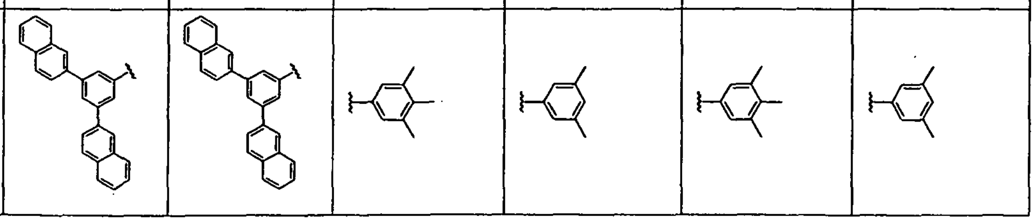
698					
699					
700					
701					
702					
703					
704					
705					

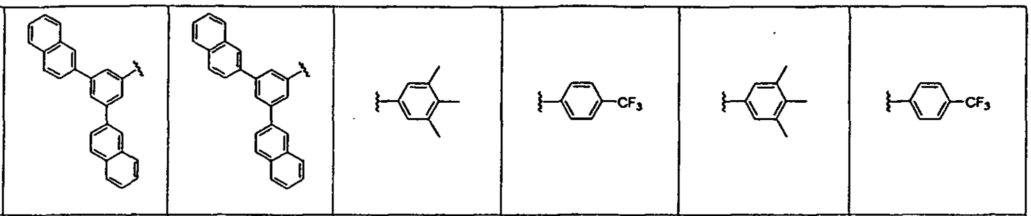
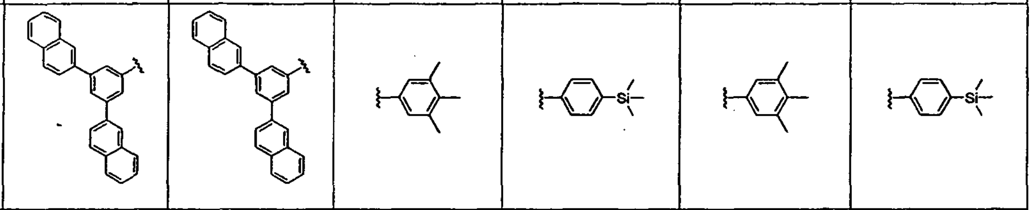
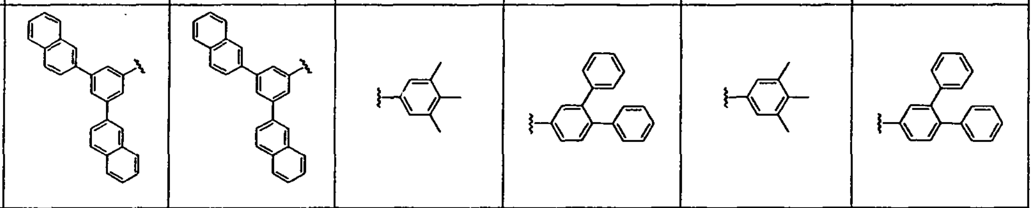
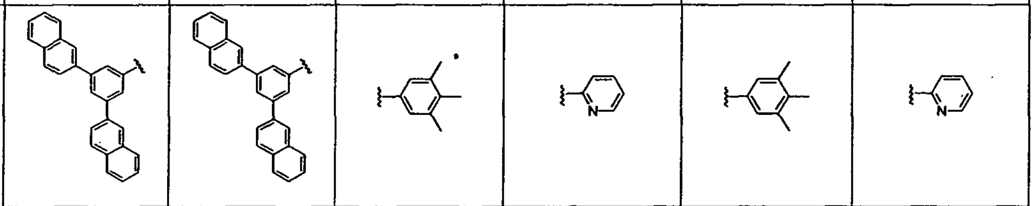
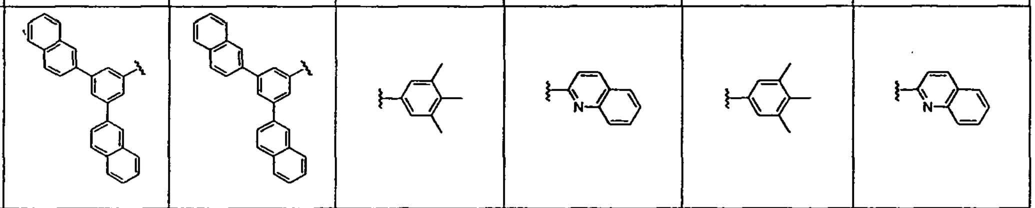
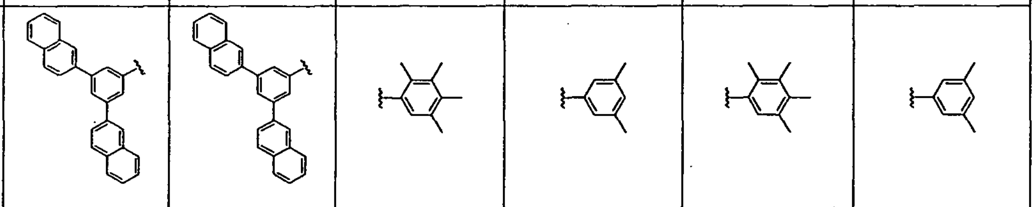
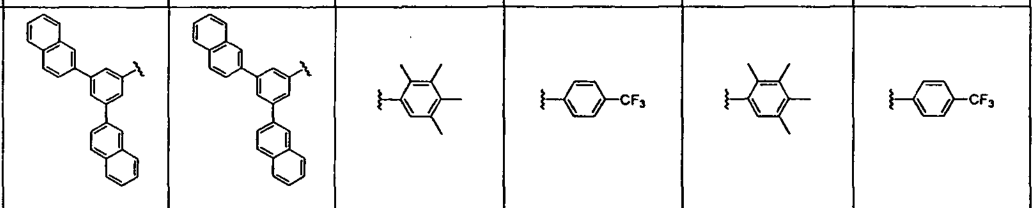
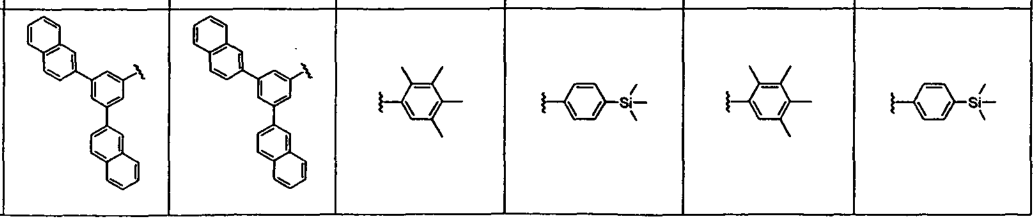
706	
707	
708	
709	
710	
711	
712	
713	

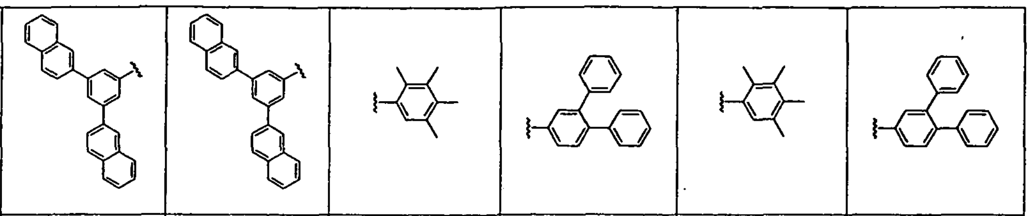
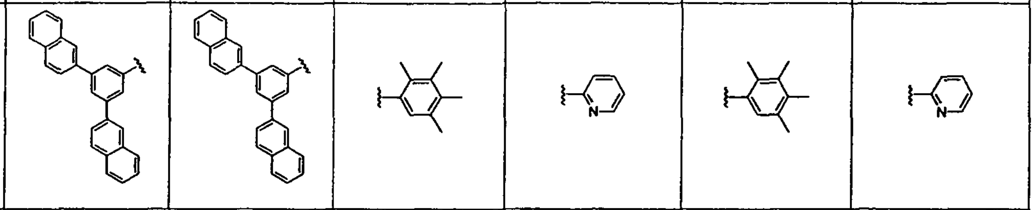
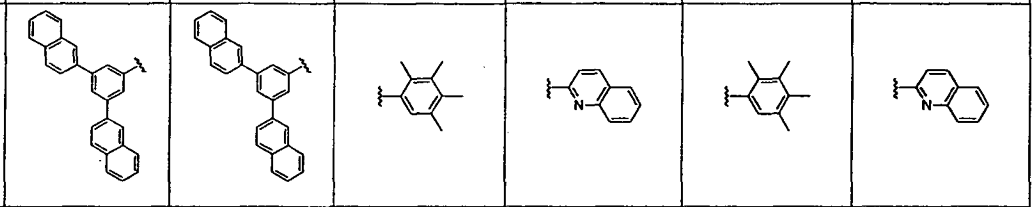
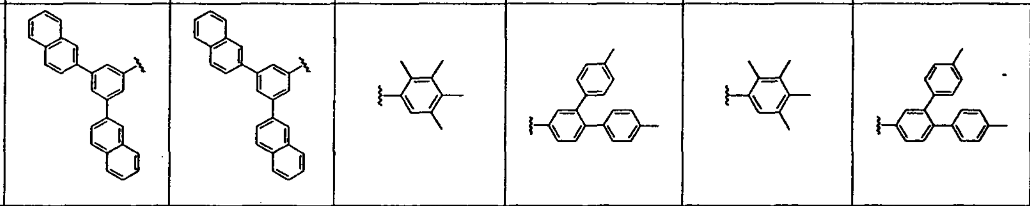
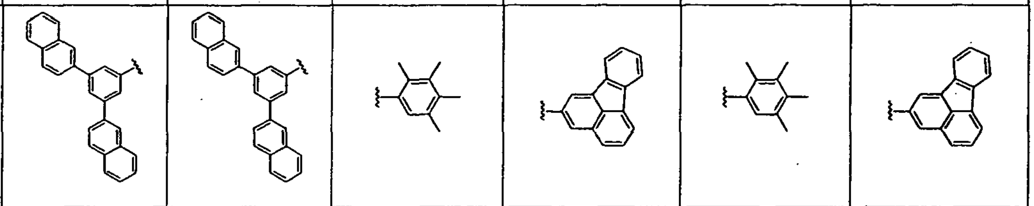
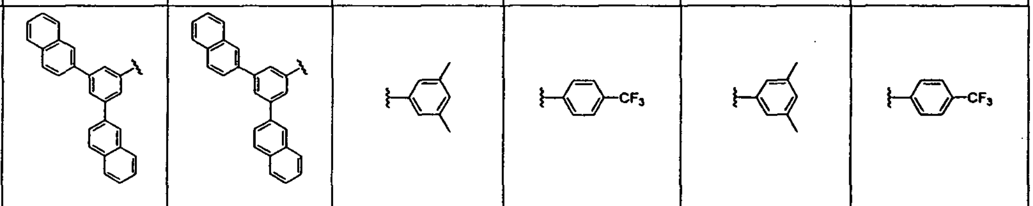
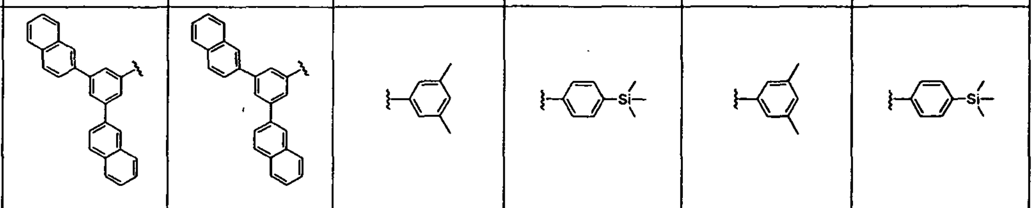
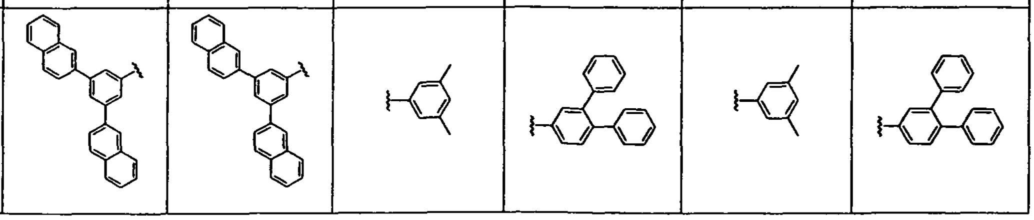
714	
715	
716	
717	
718	
719	
720	
721	

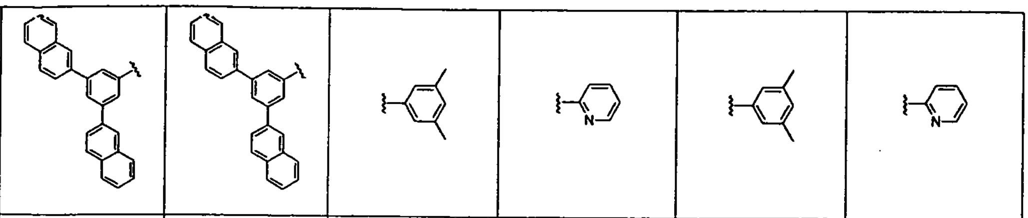
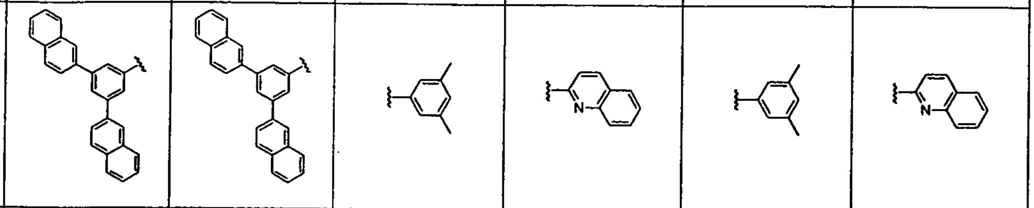
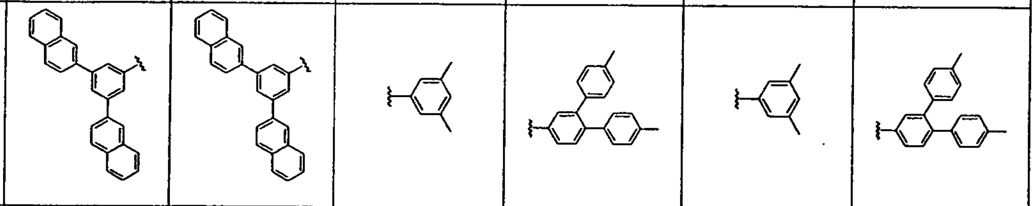
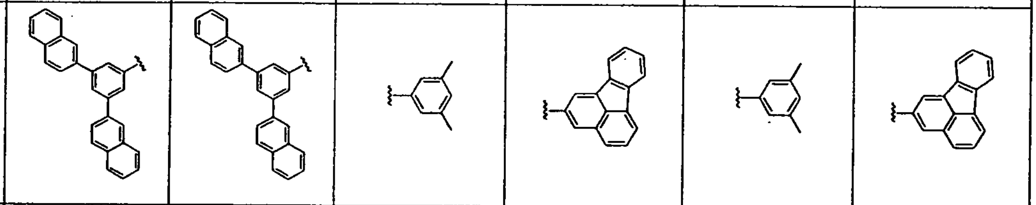
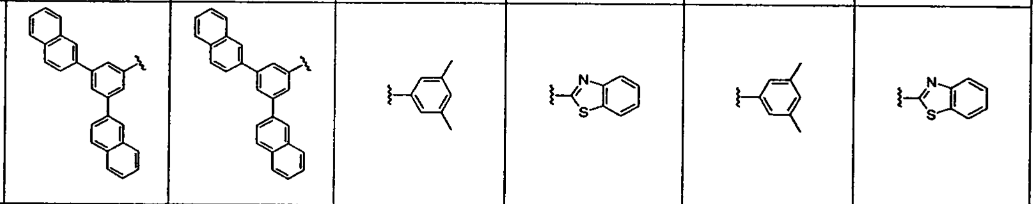
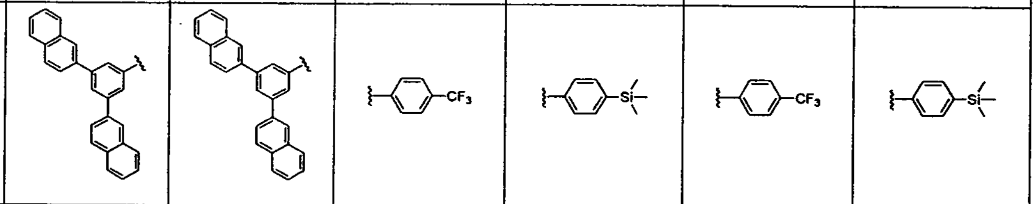
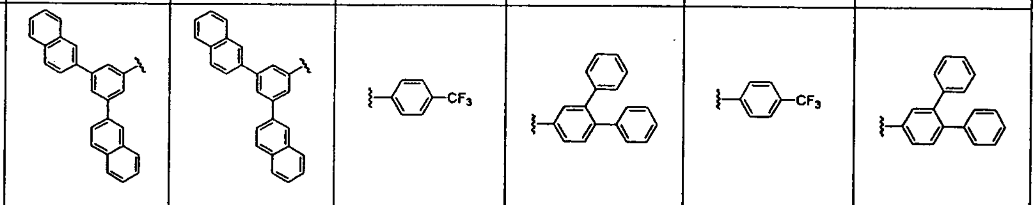
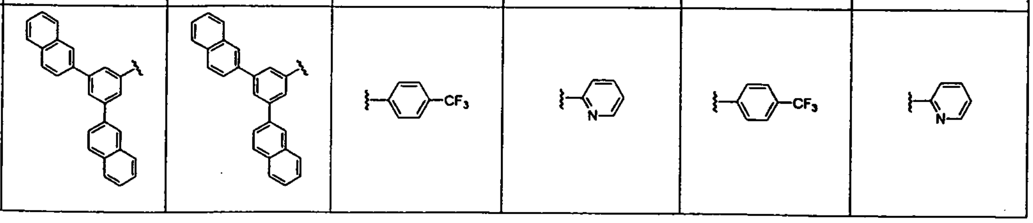
722	
723	
724	
725	
726	
727	
728	
729	

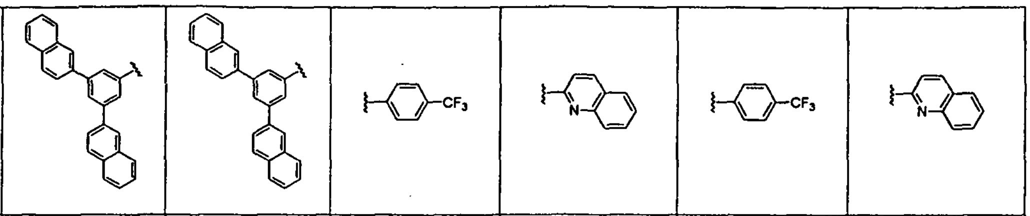
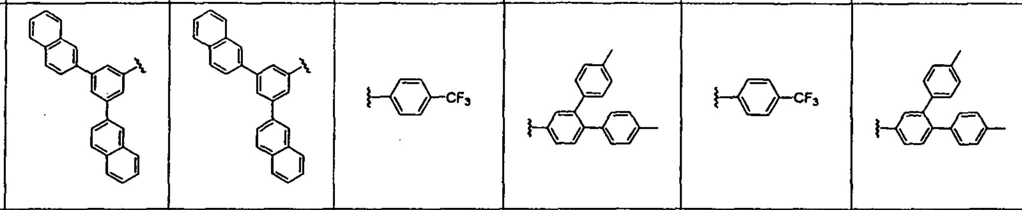
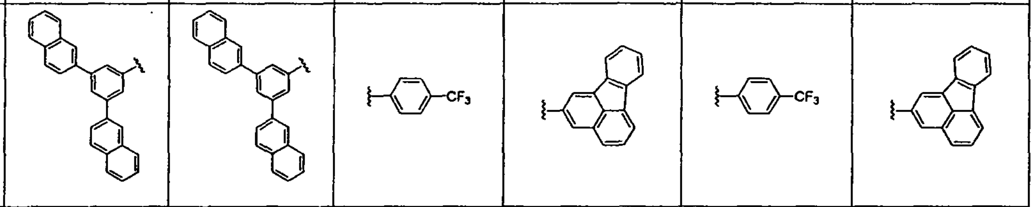
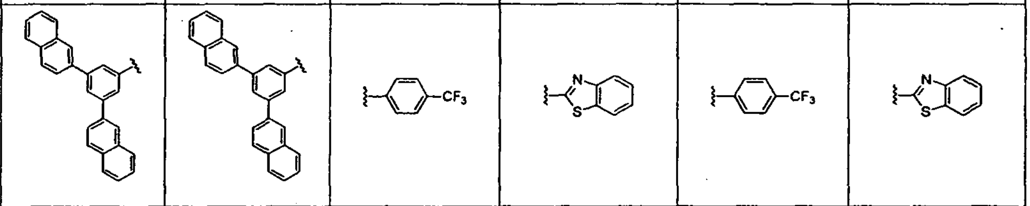
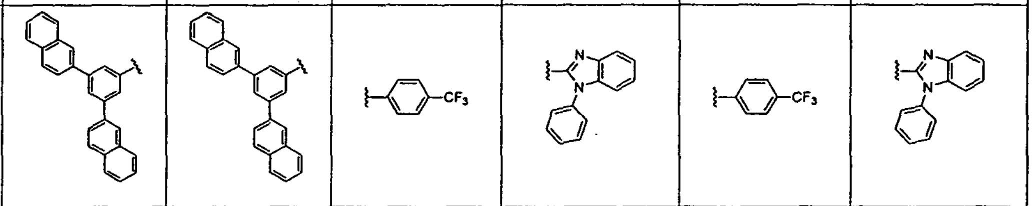
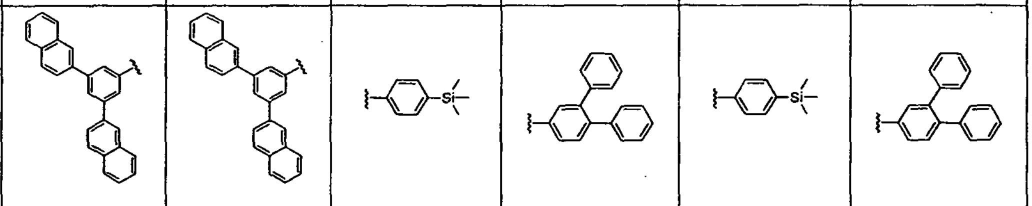
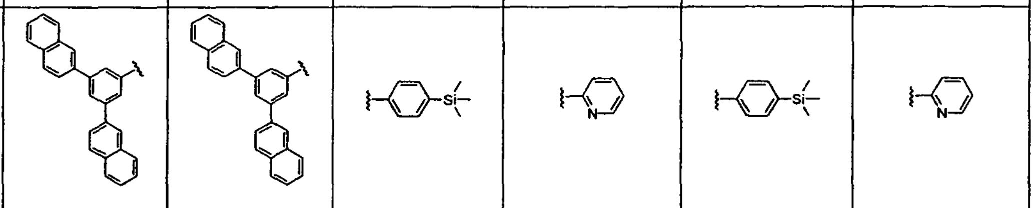
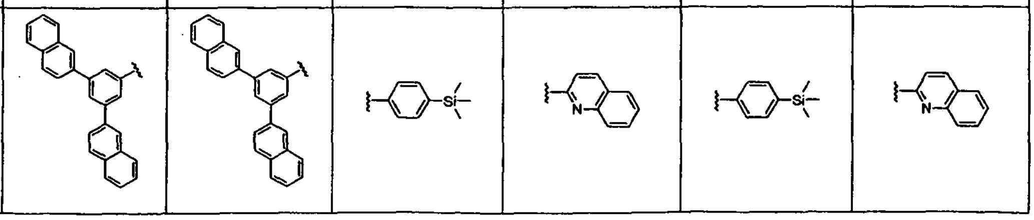
730						
731						
732						
733						
734						
735						
736						
737						

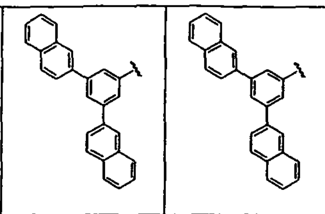
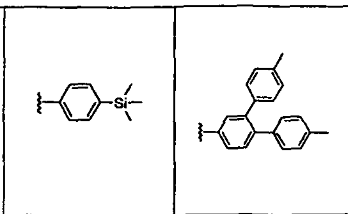
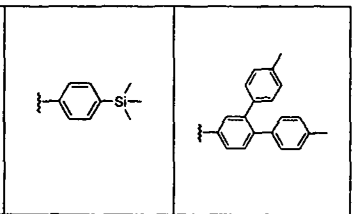
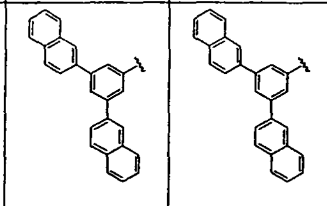
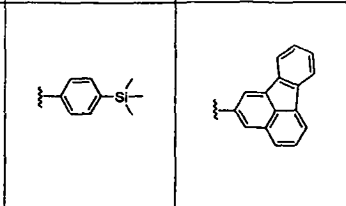
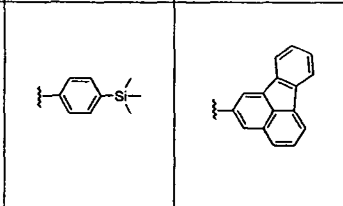
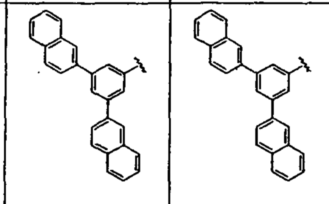
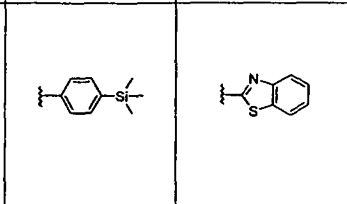
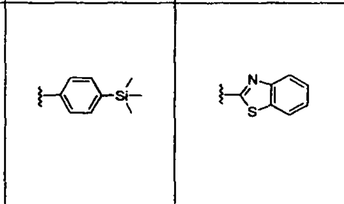
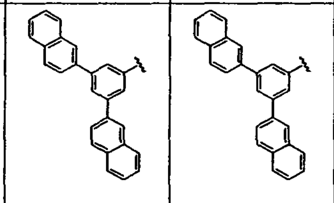
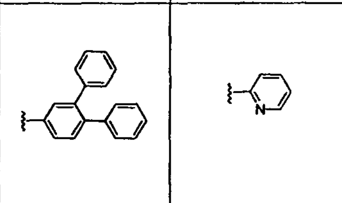
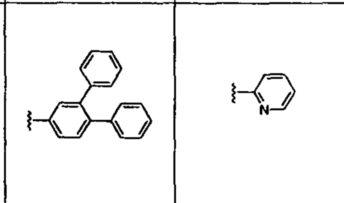
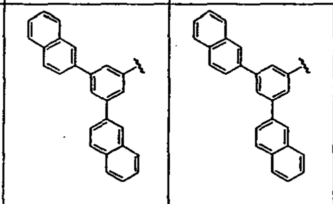
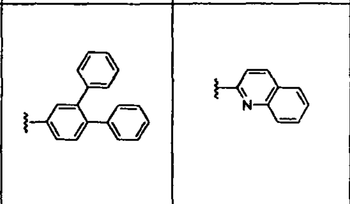
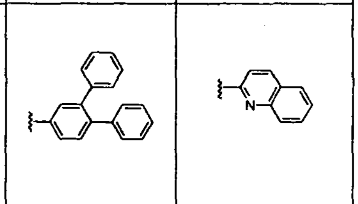
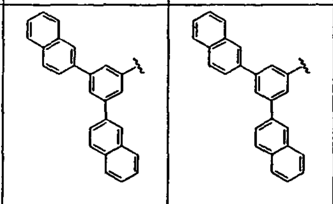
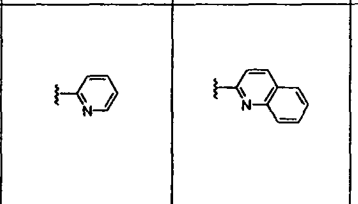
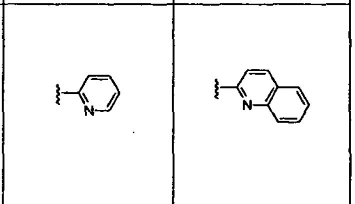
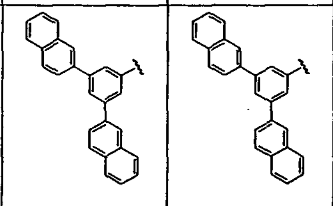
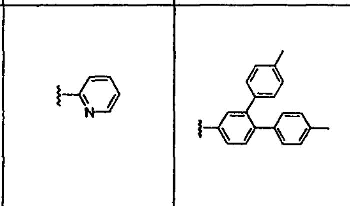
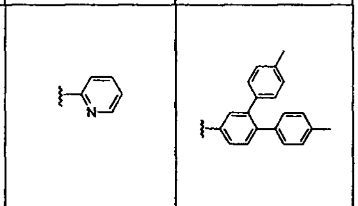
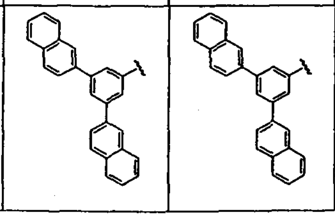
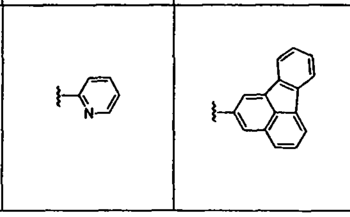
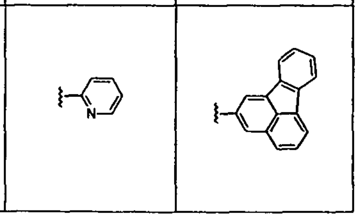
738	
739	
740	
741	
742	
743	
744	
745	

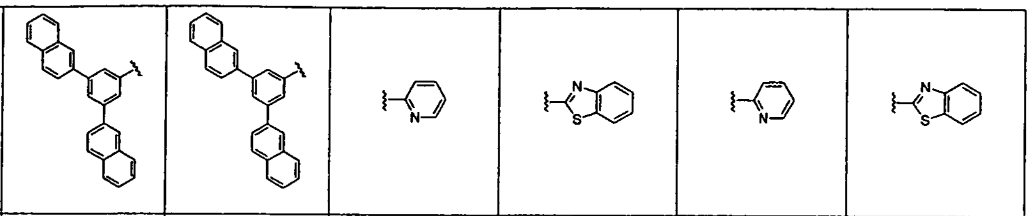
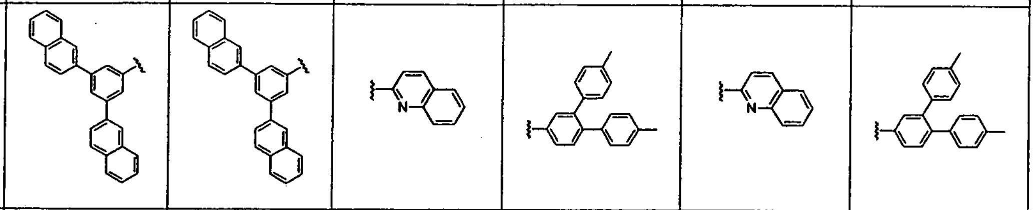
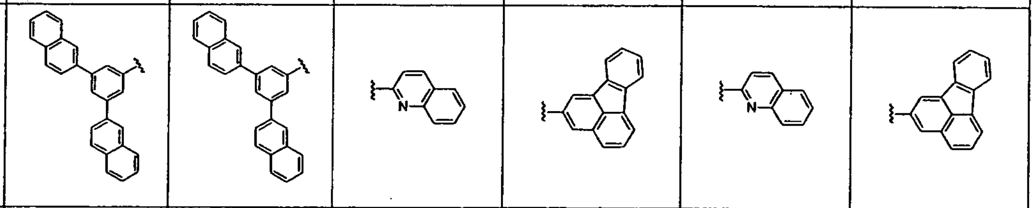
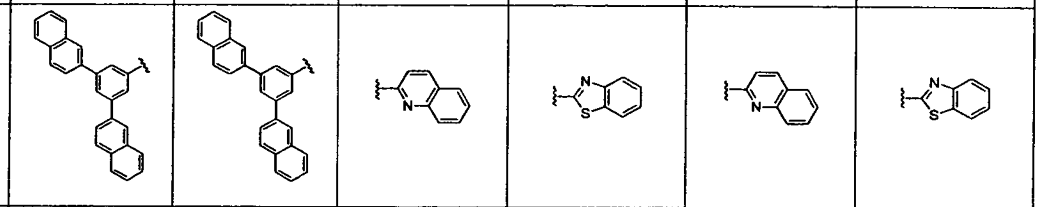
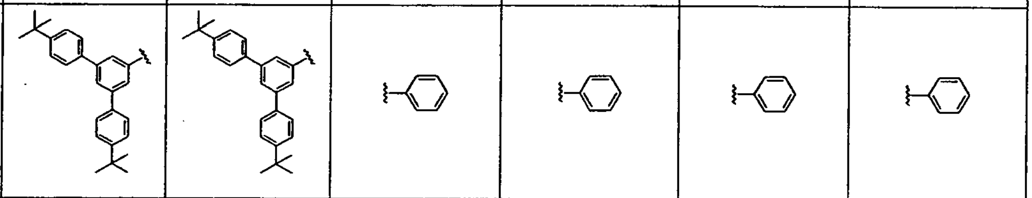
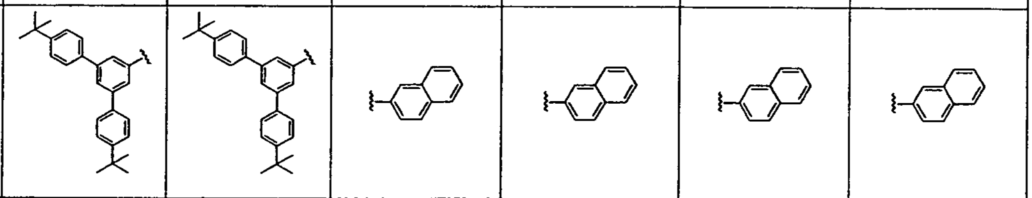
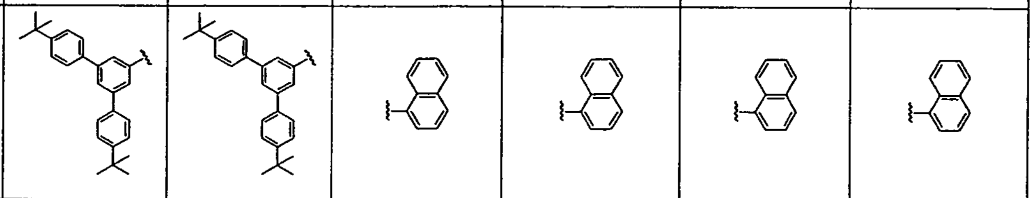
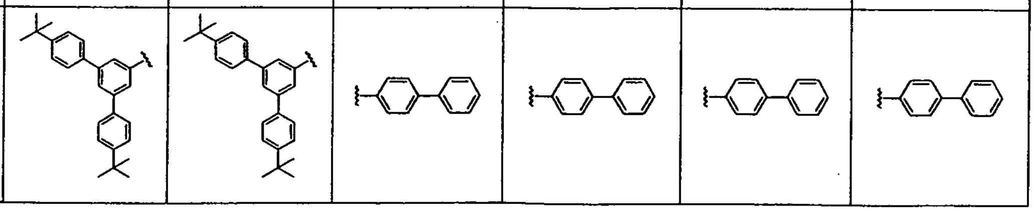
746	
747	
748	
749	
750	
751	
752	
753	

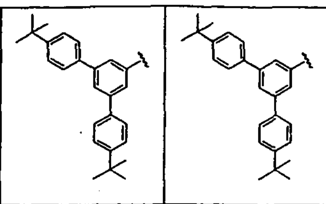
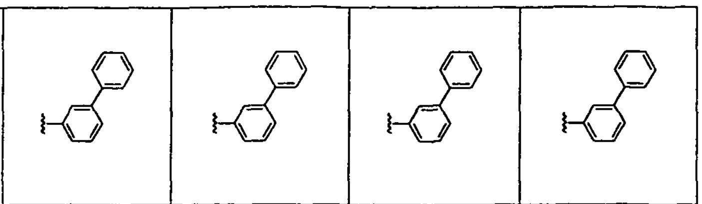
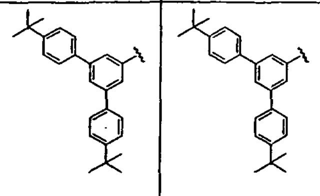
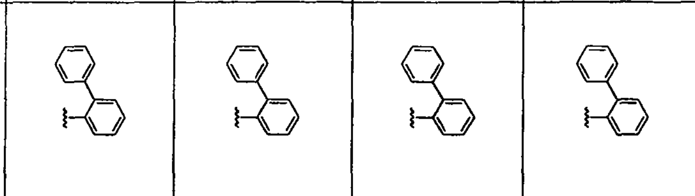
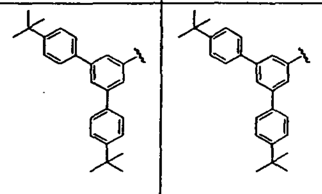
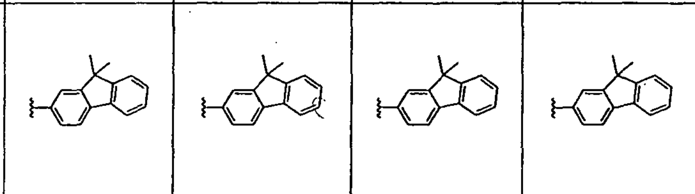
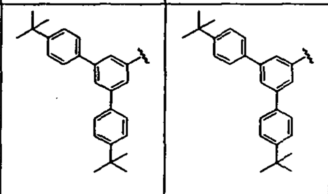
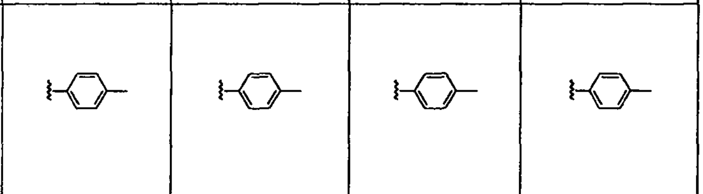
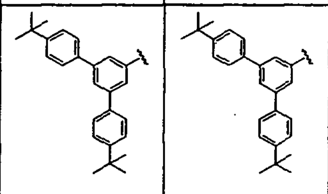
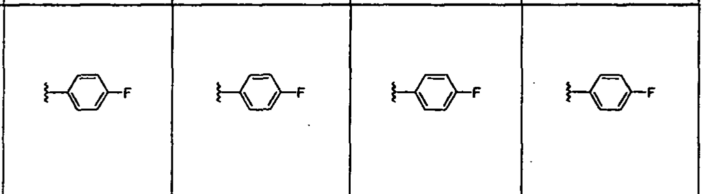
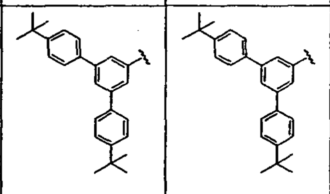
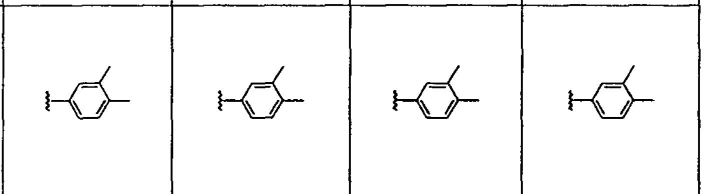
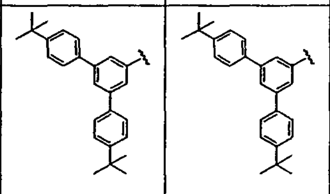
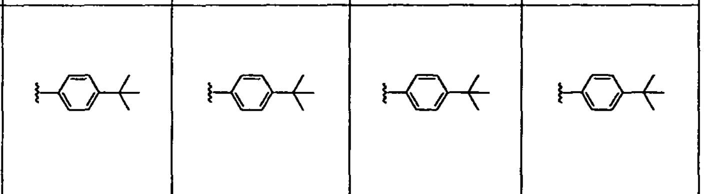
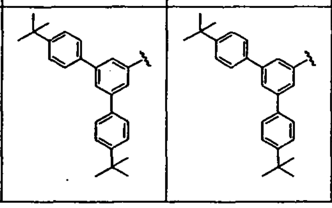
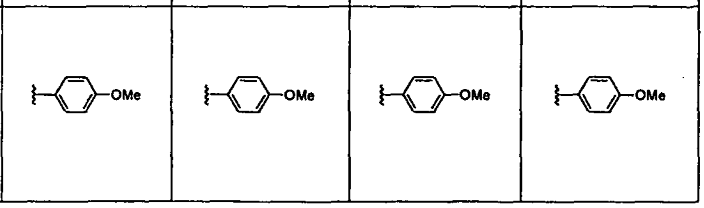
754	
755	
756	
757	
758	
759	
760	
761	

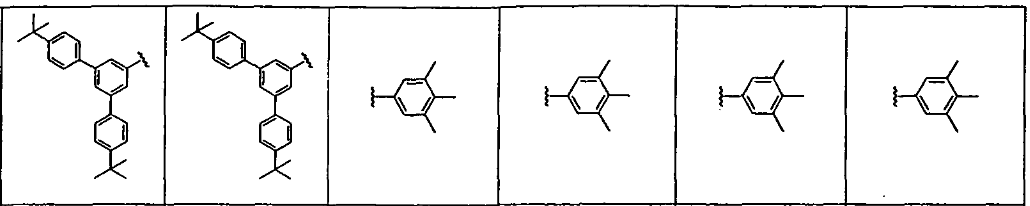
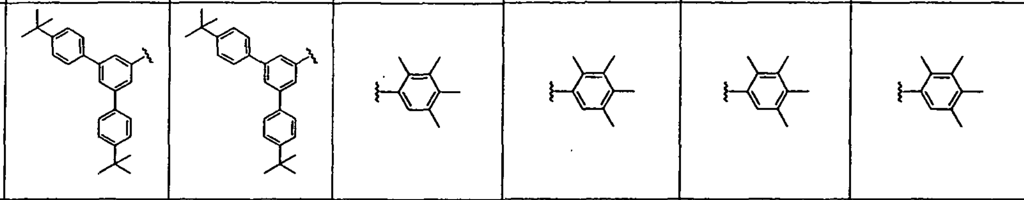
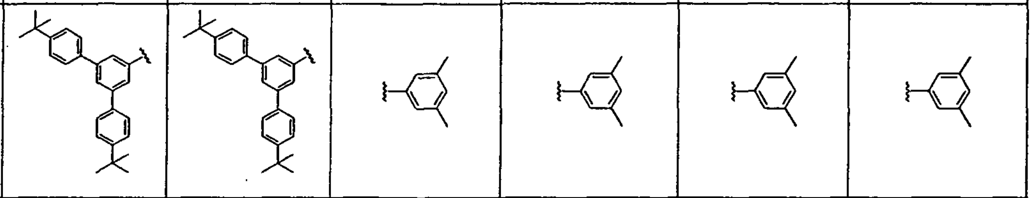
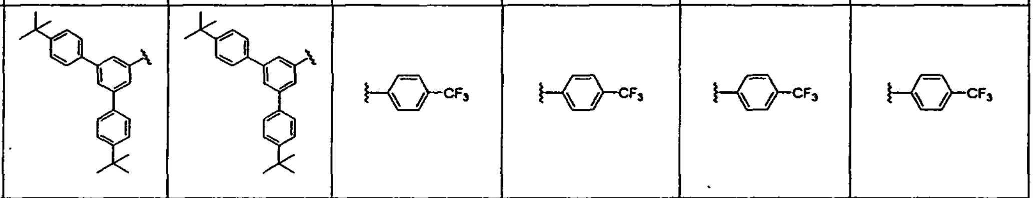
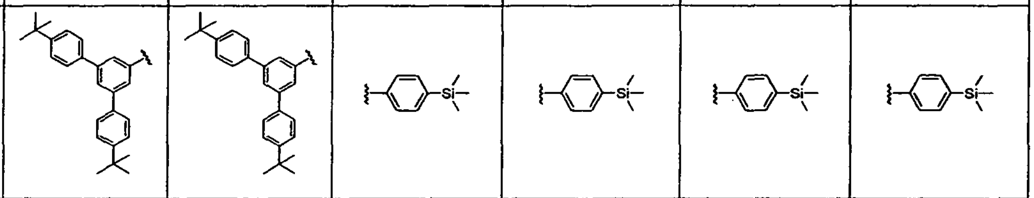
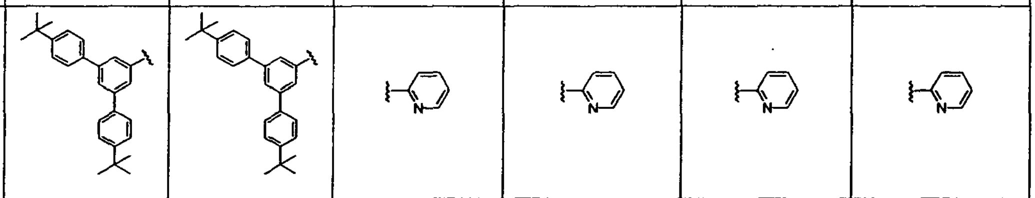
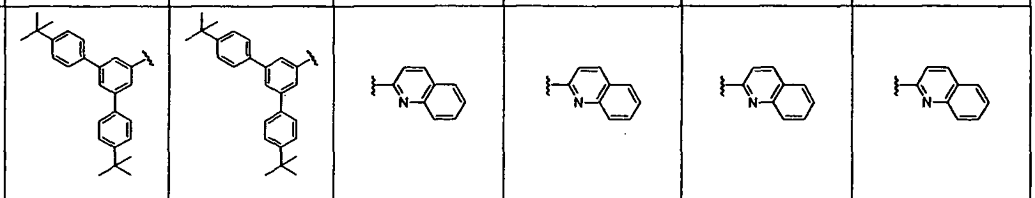
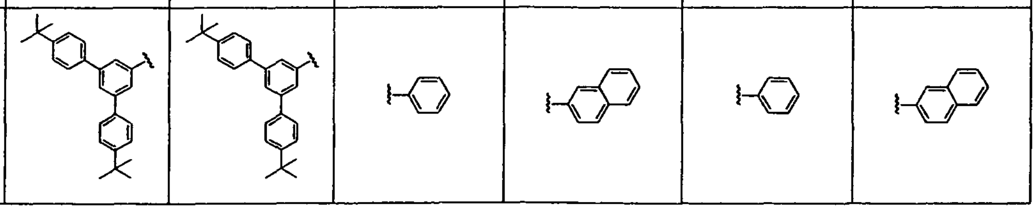
762	
763	
764	
765	
766	
767	
768	
769	

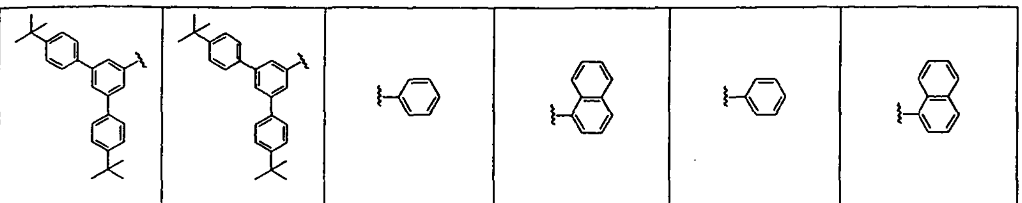
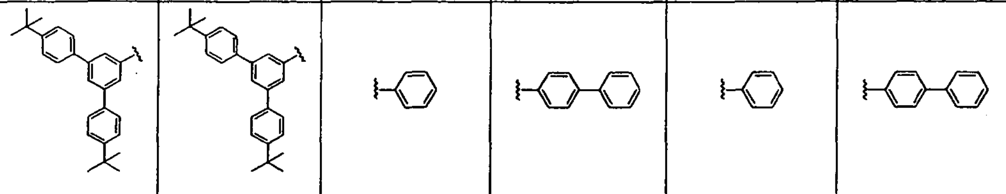
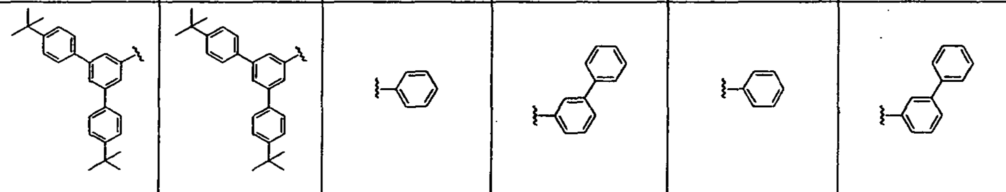
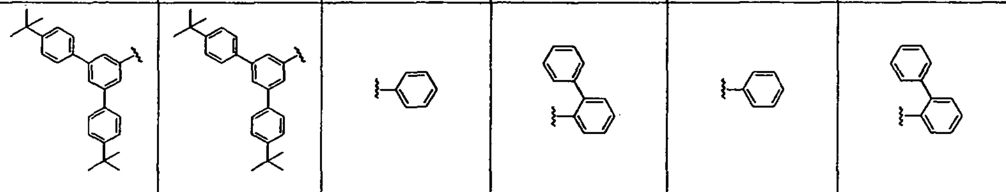
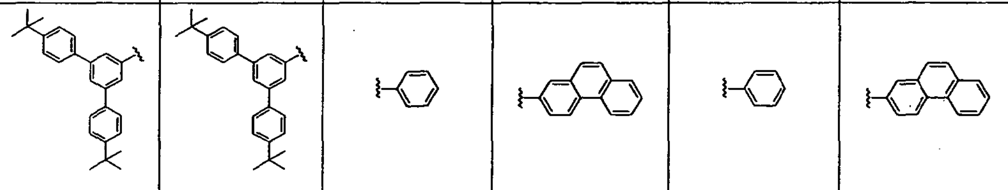
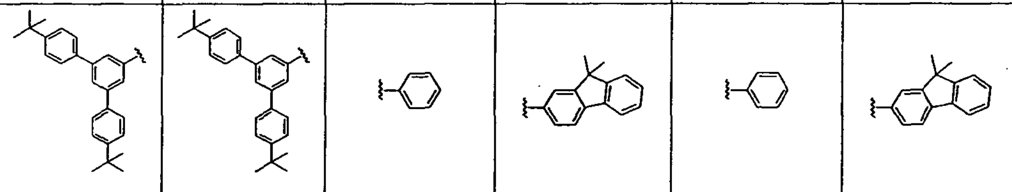
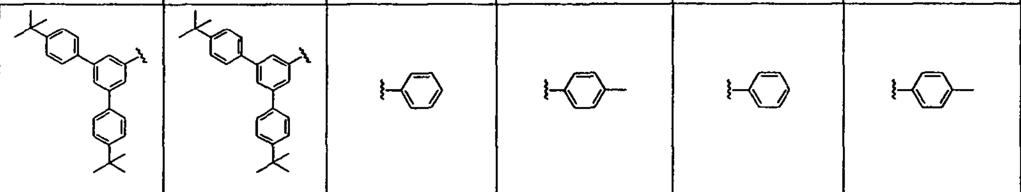
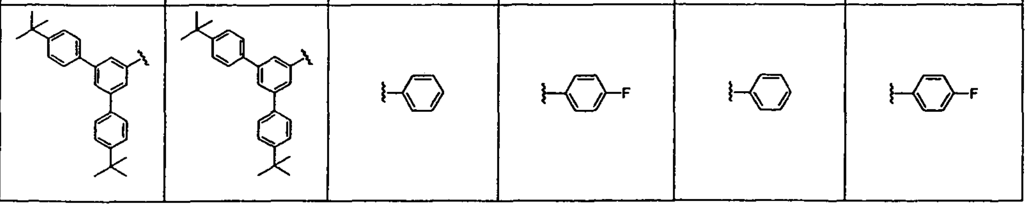
770	
771	
772	
773	
774	
775	
776	
777	

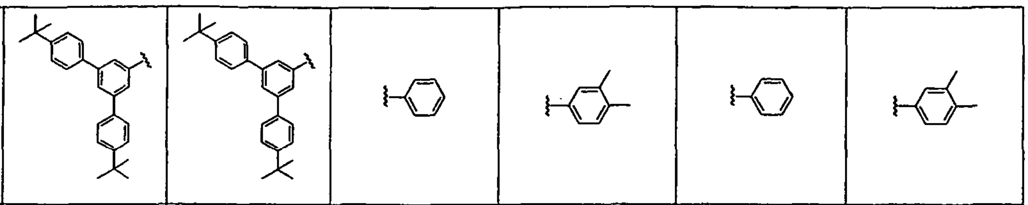
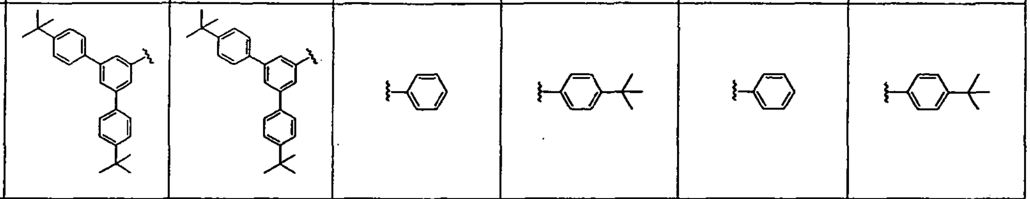
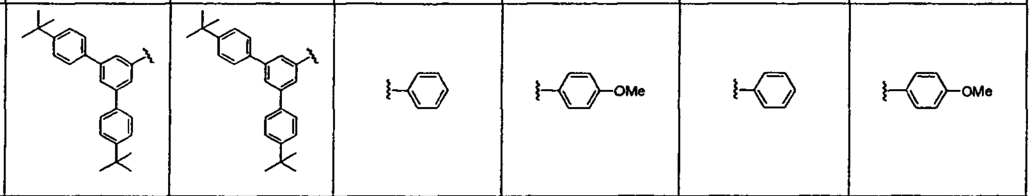
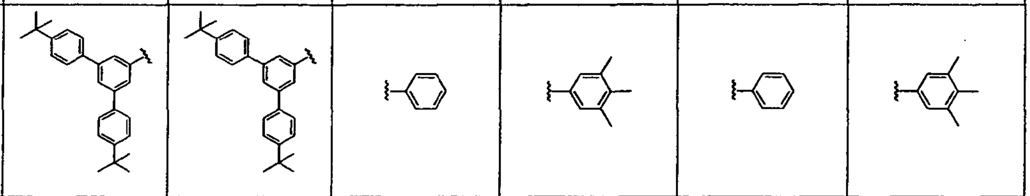
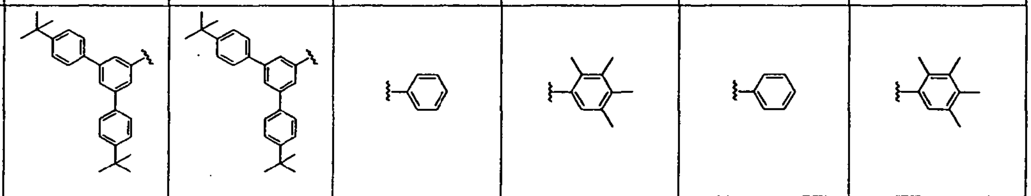
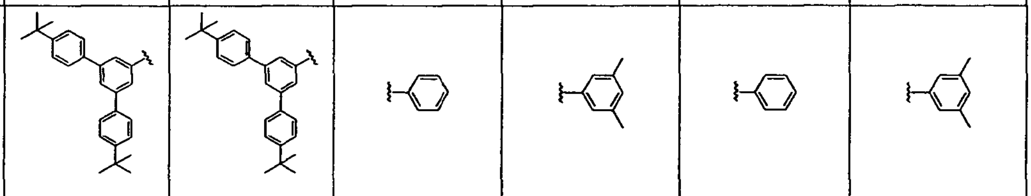
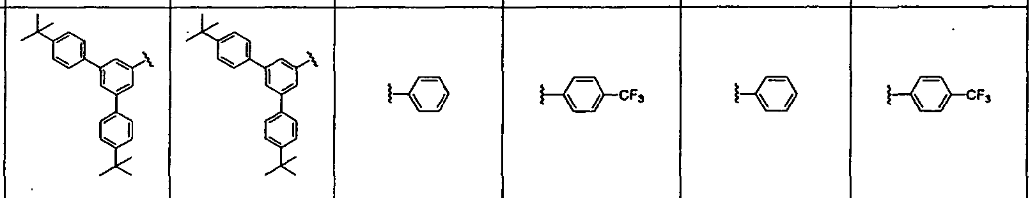
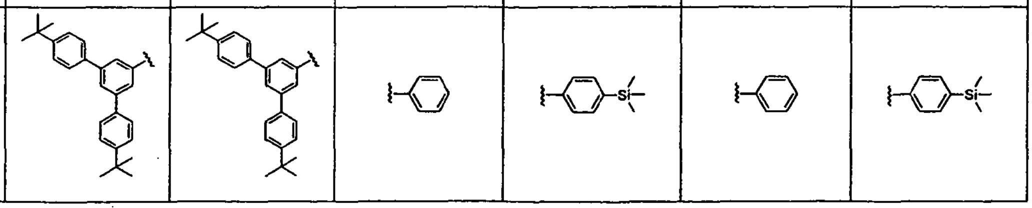
778			
779			
780			
781			
782			
783			
784			
785			

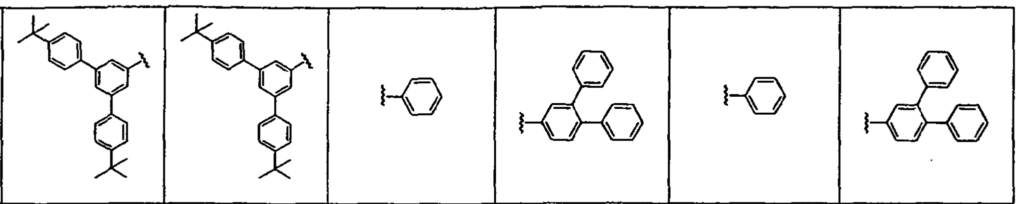
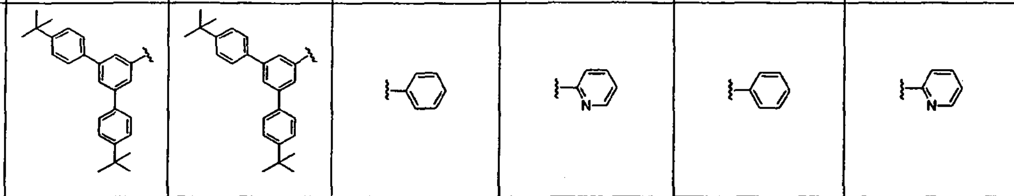
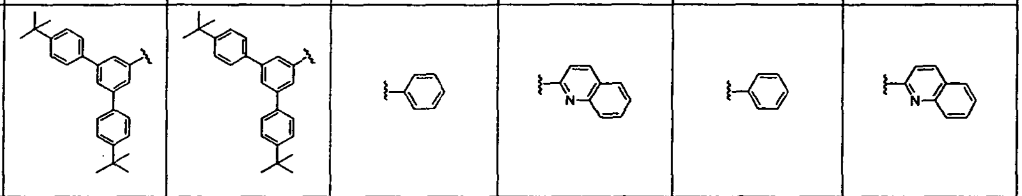
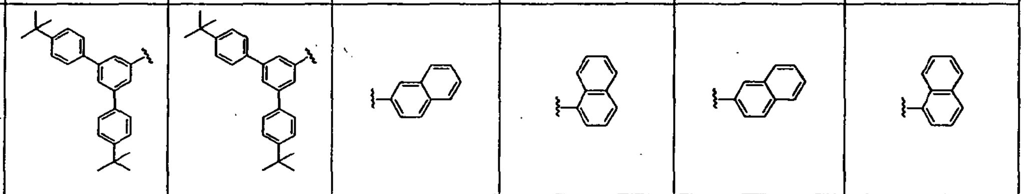
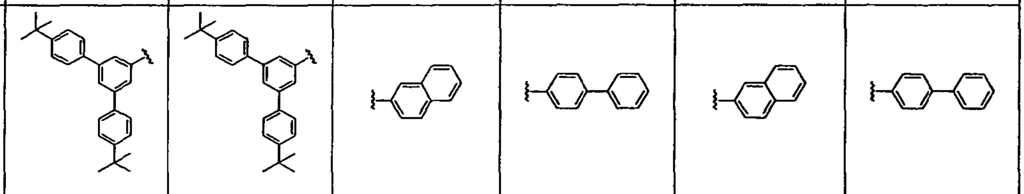
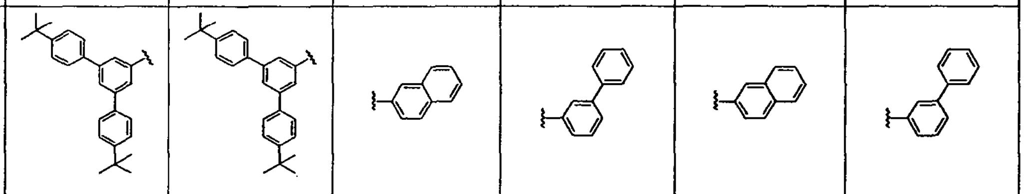
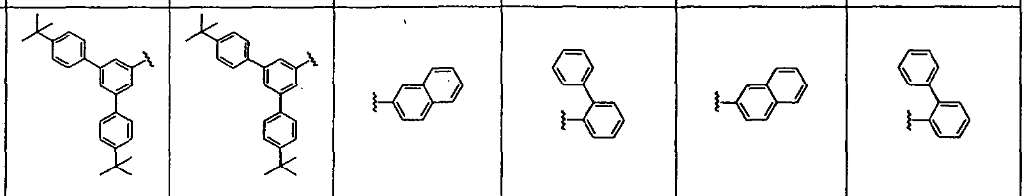
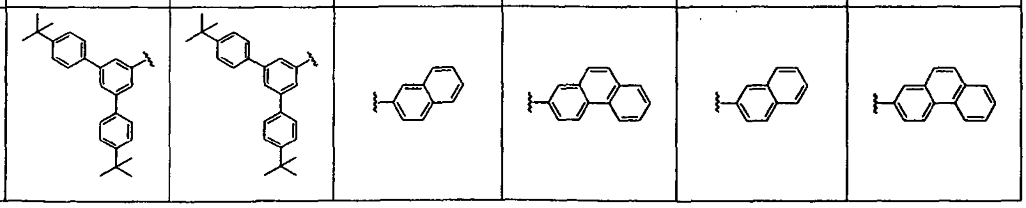
786	
787	
788	
789	
790	
791	
792	
793	

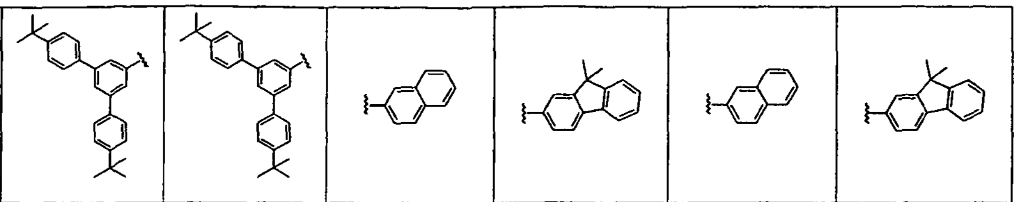
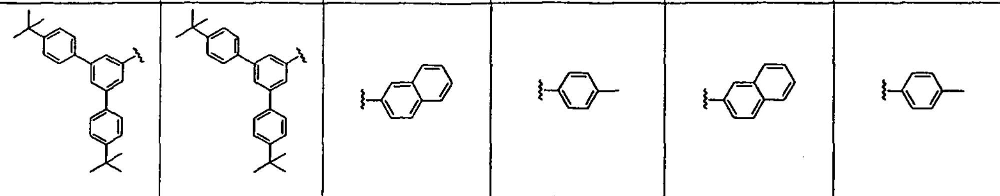
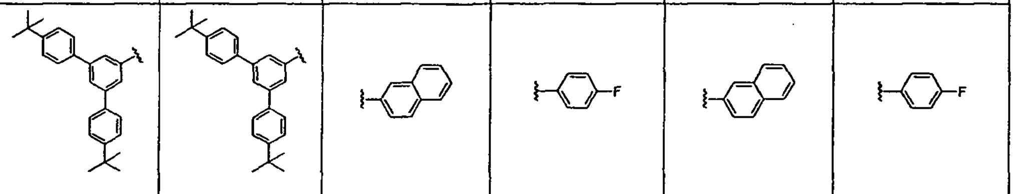
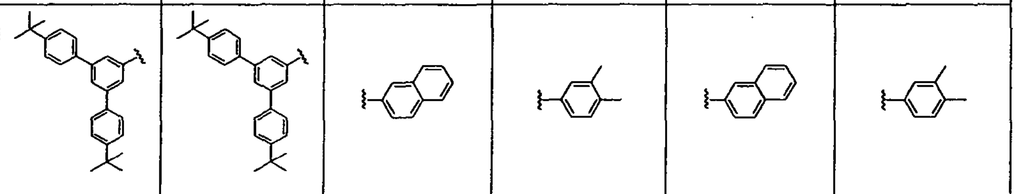
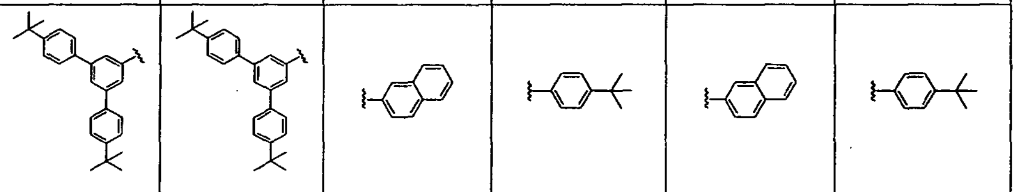
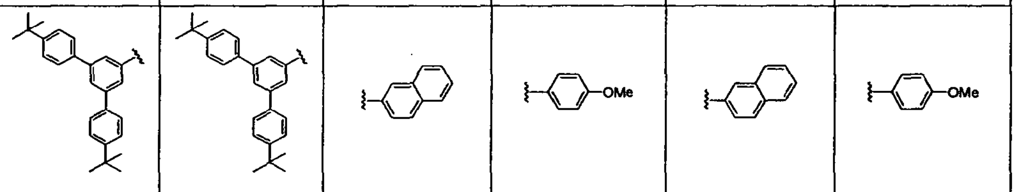
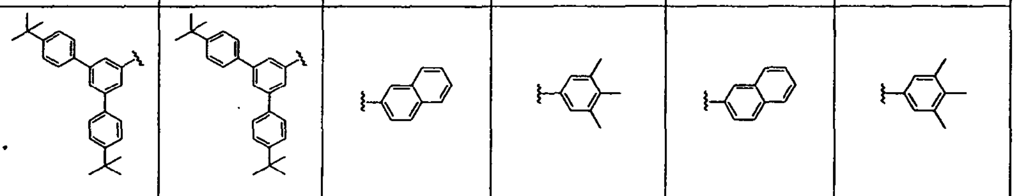
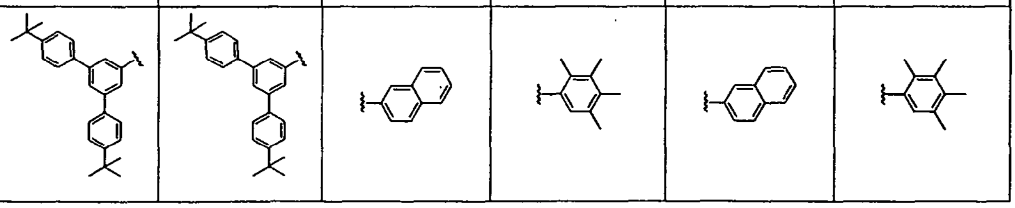
794						
795						
796						
797						
798						
799						
800						
801						

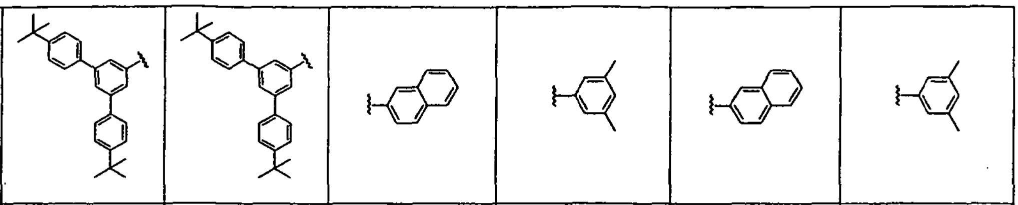
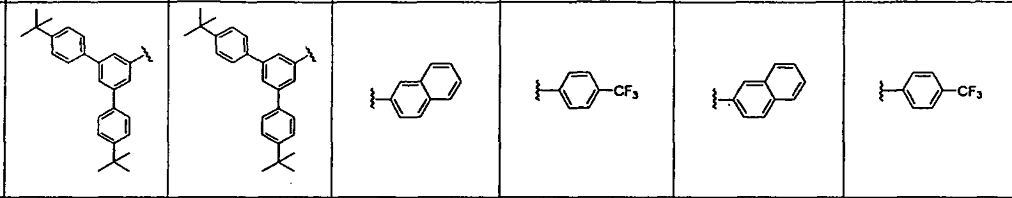
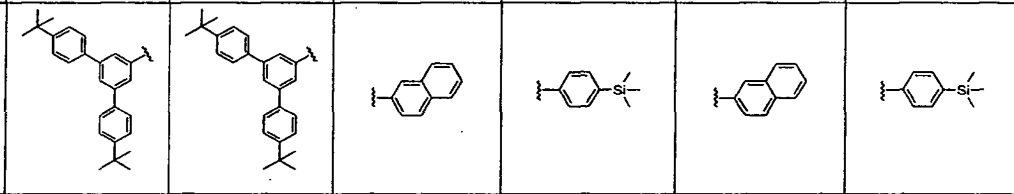
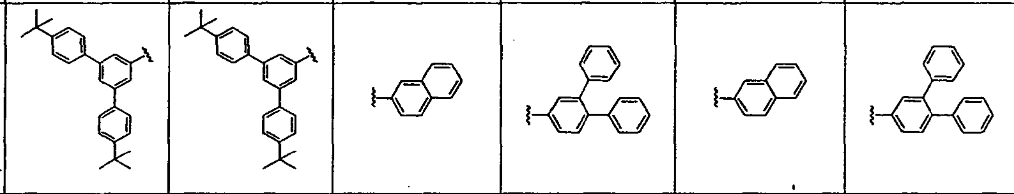
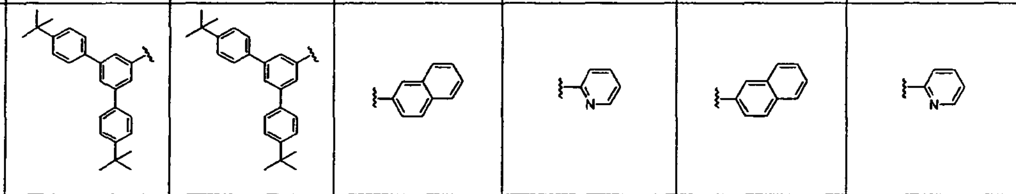
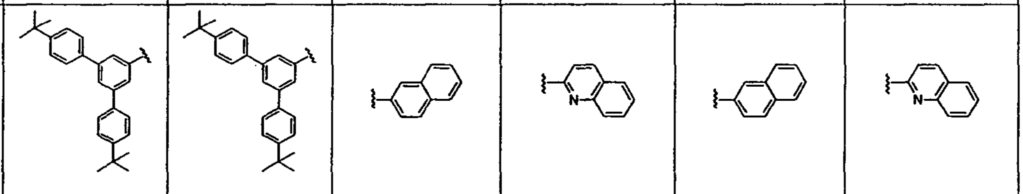
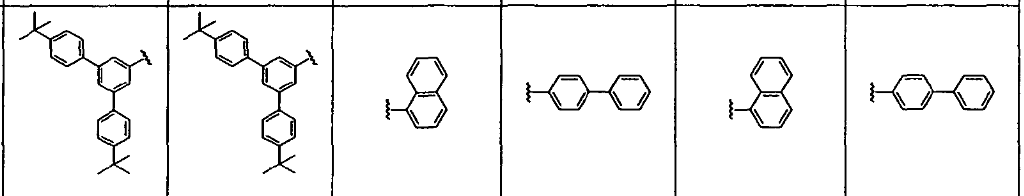
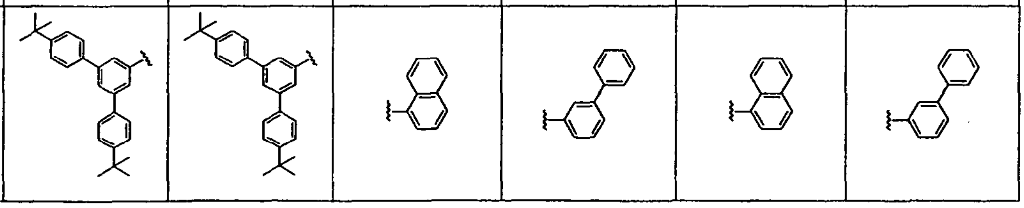
802	
803	
804	
805	
806	
807	
808	
809	

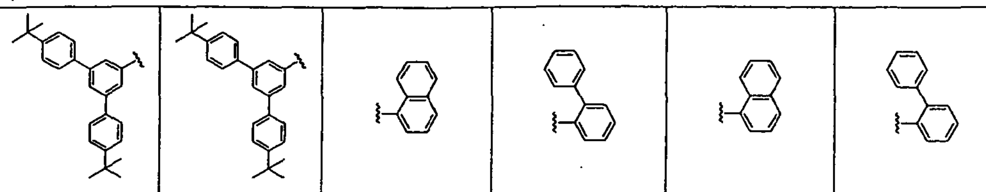
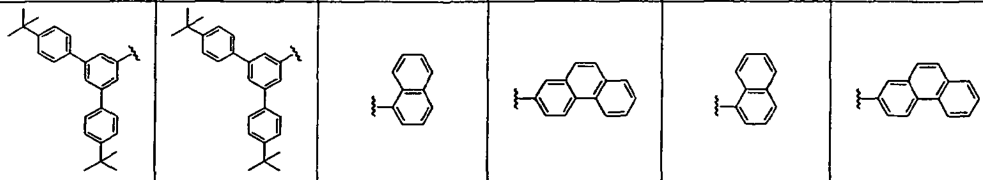
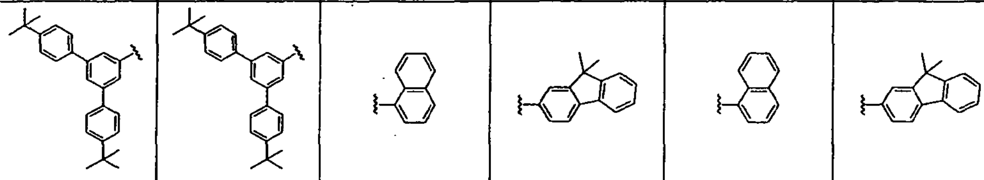
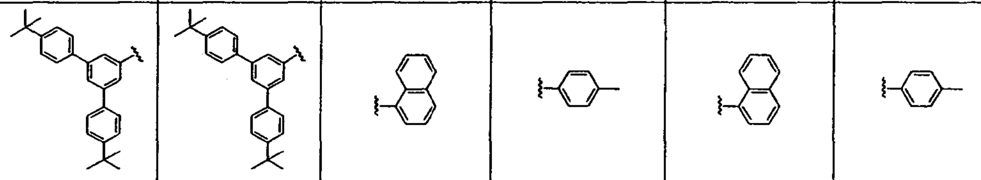
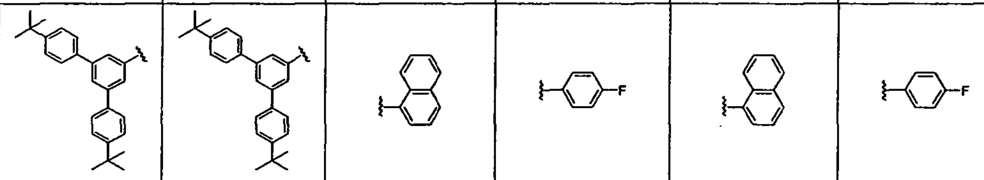
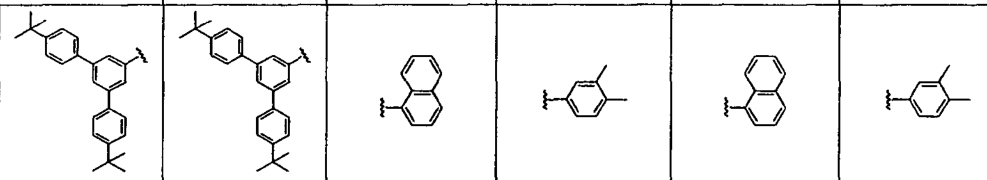
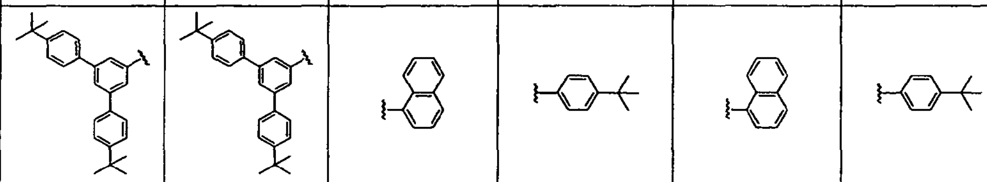
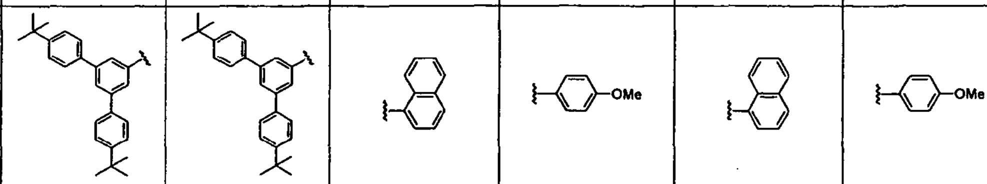
810	
811	
812	
813	
814	
815	
816	
817	

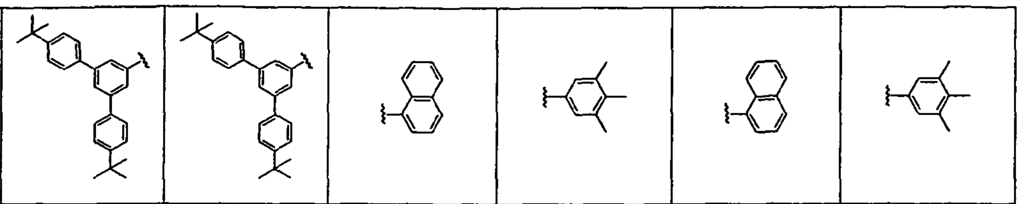
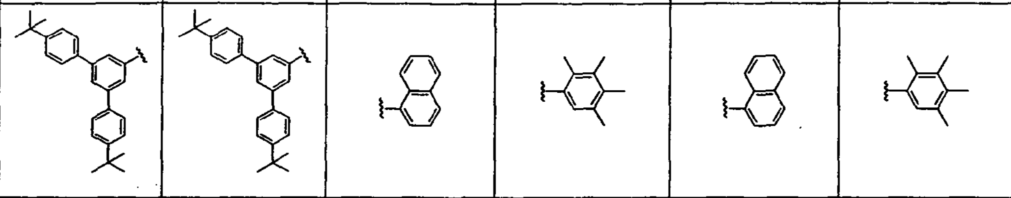
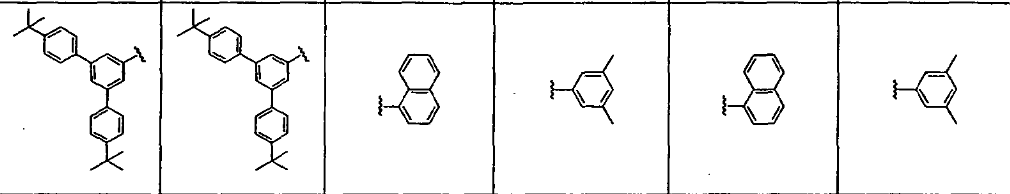
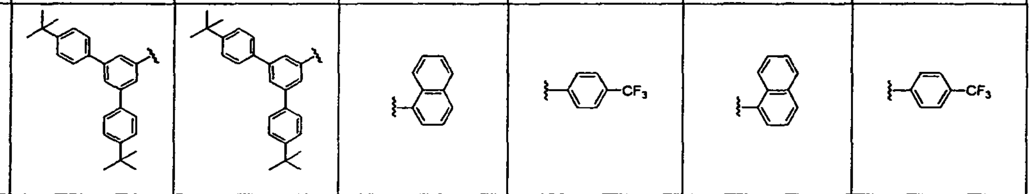
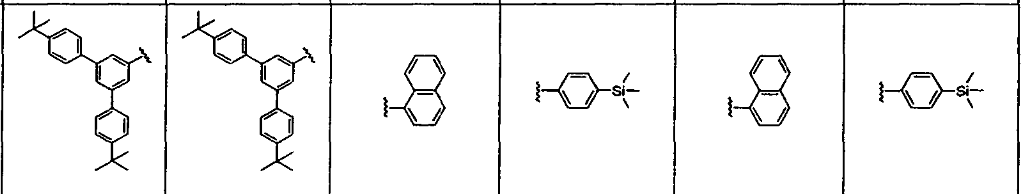
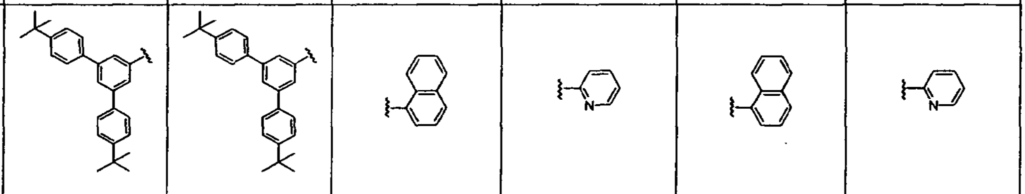
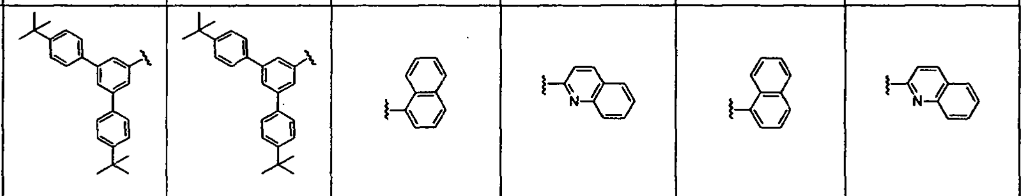
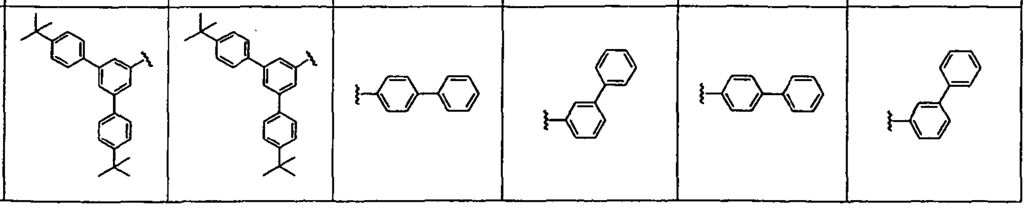
818	
819	
820	
821	
822	
823	
824	
825	

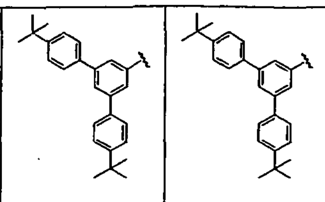
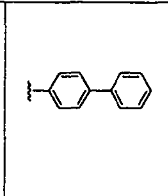
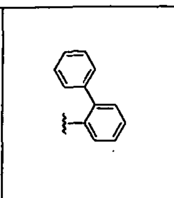
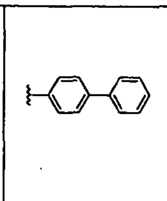
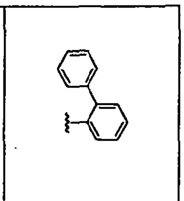
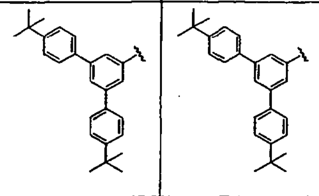
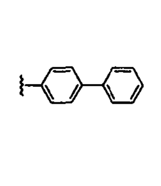
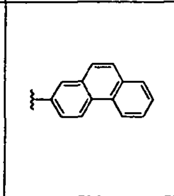
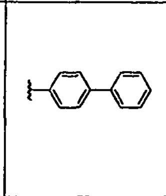
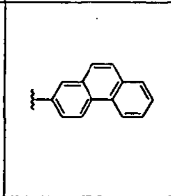
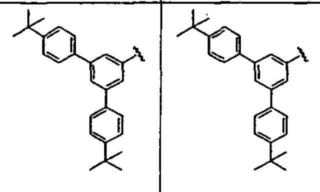
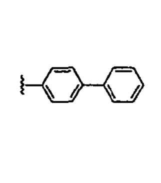
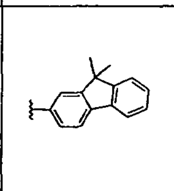
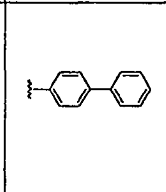
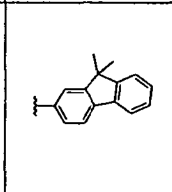
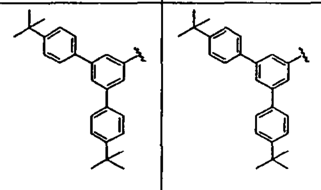
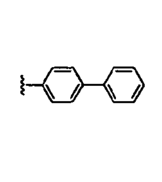
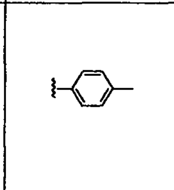
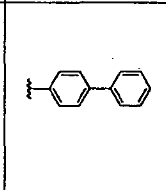
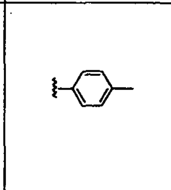
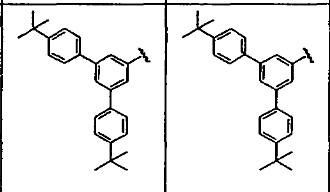
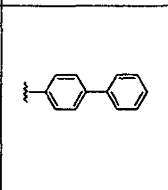
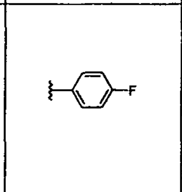
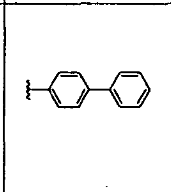
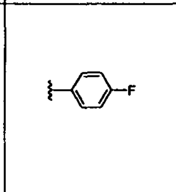
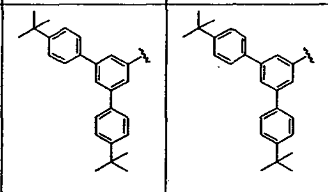
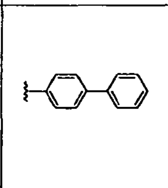
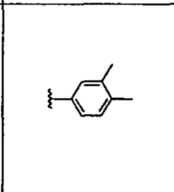
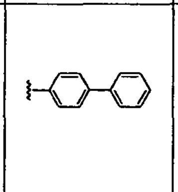
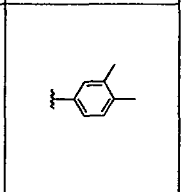
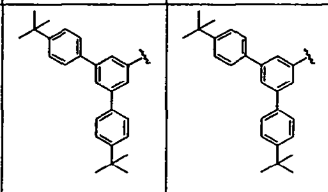
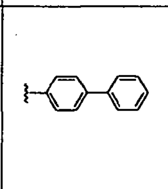
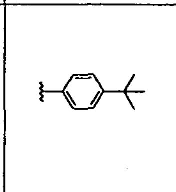
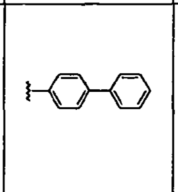
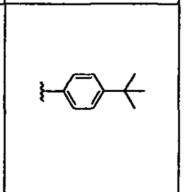
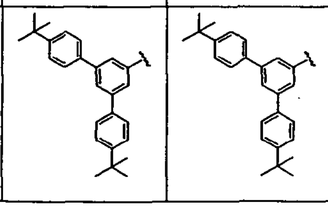
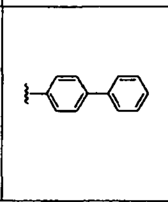
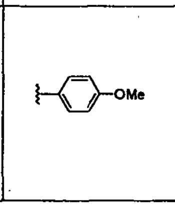
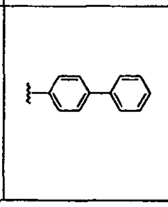
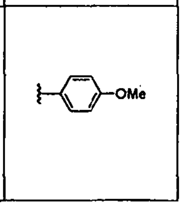
826	
827	
828	
829	
830	
831	
832	
833	

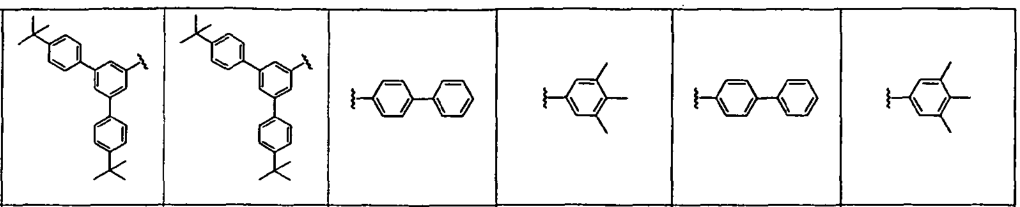
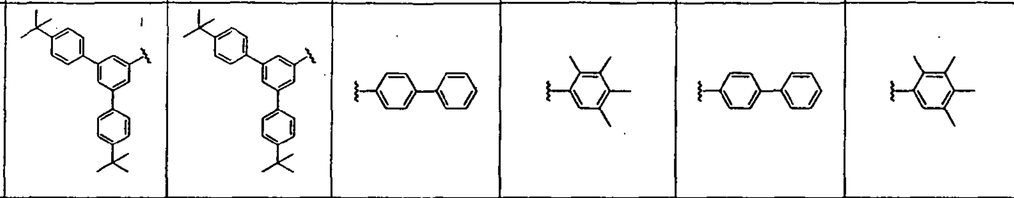
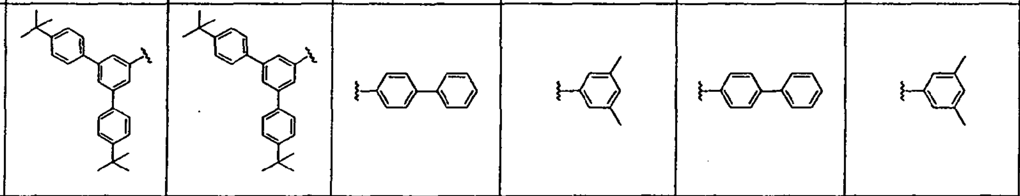
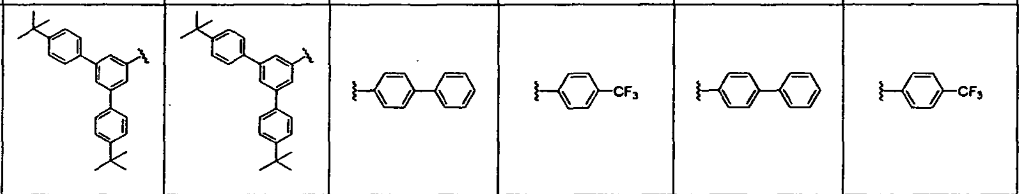
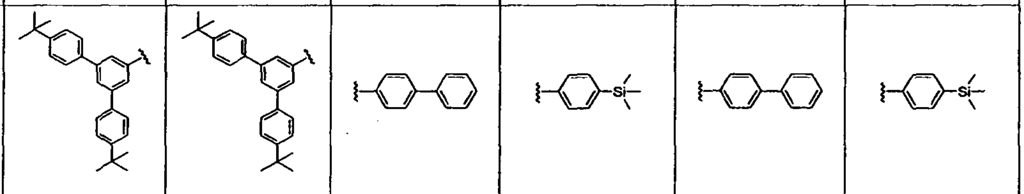
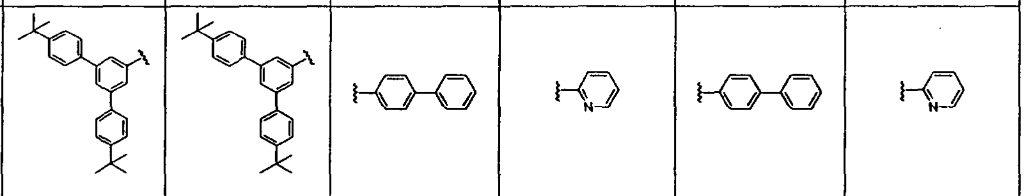
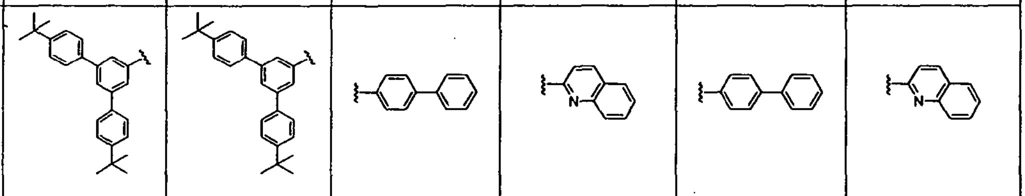
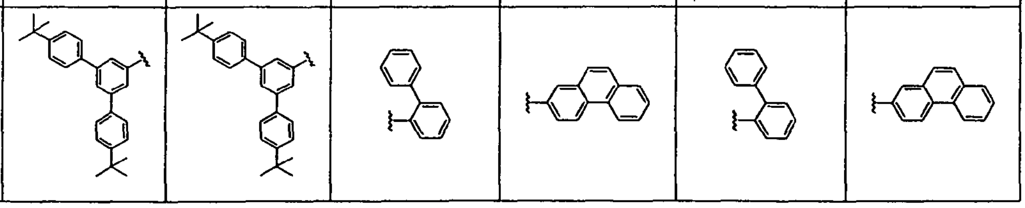
834	
835	
836	
837	
838	
839	
840	
841	

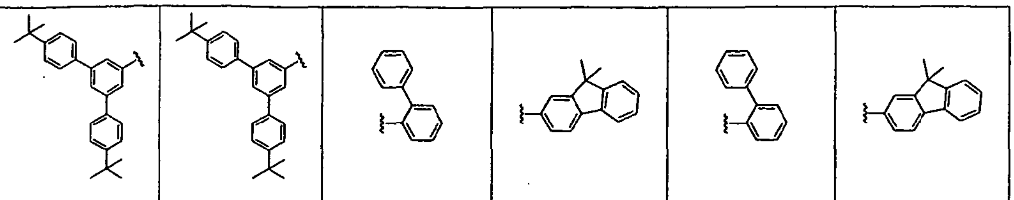
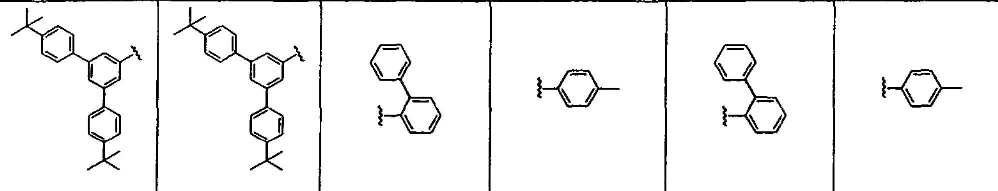
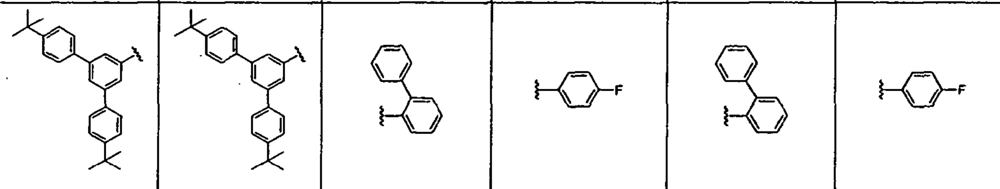
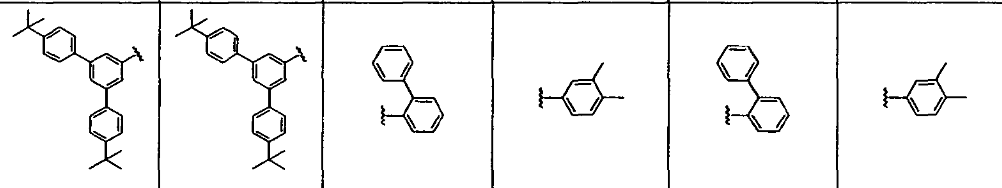
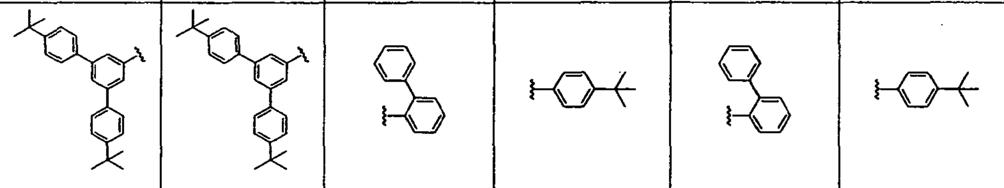
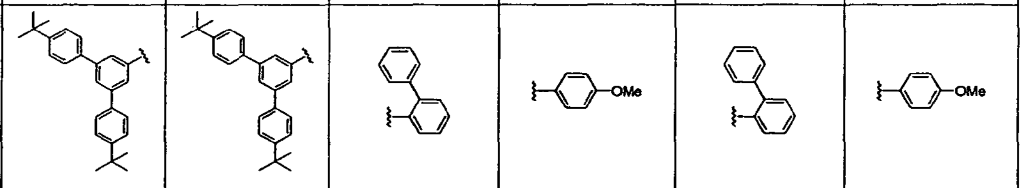
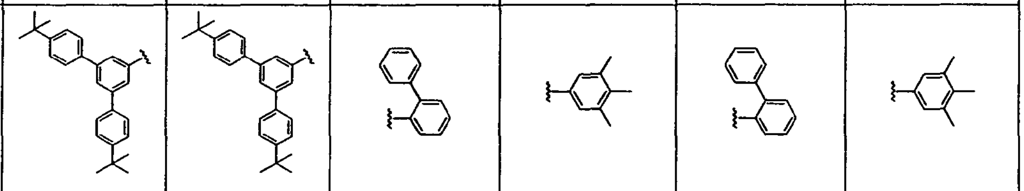
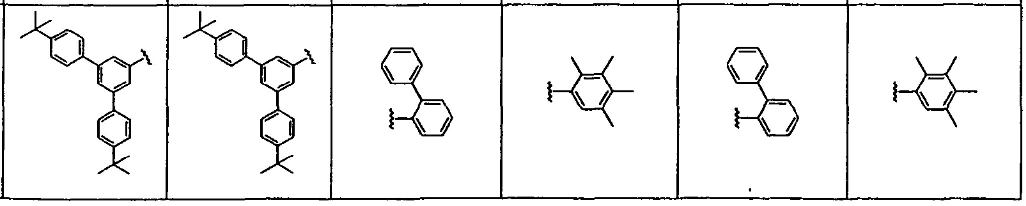
842	
843	
844	
845	
846	
847	
848	
849	

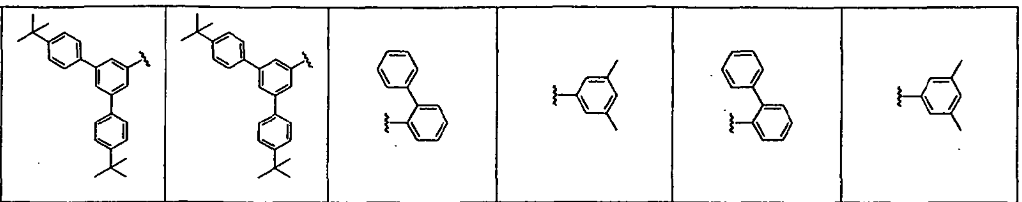
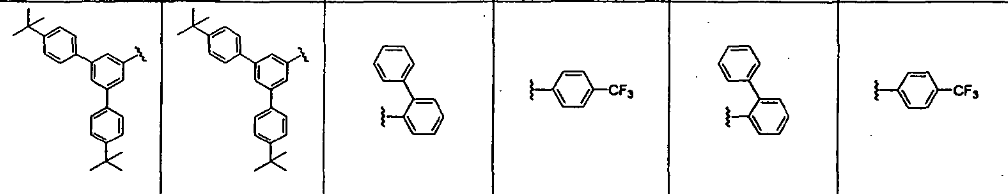
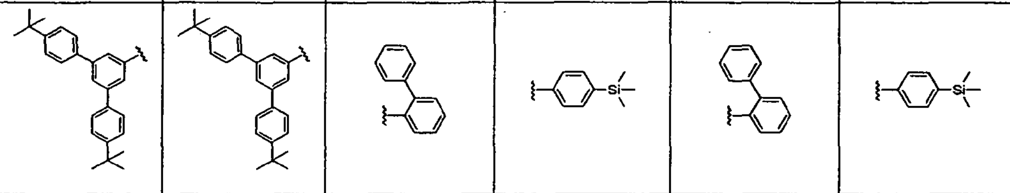
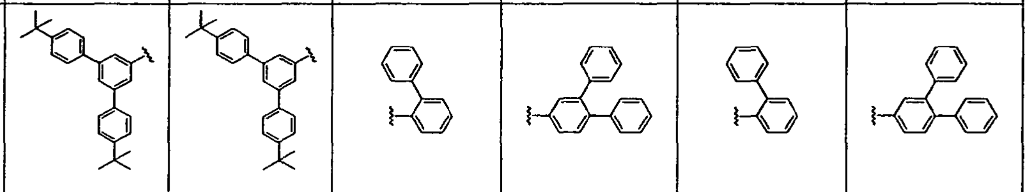
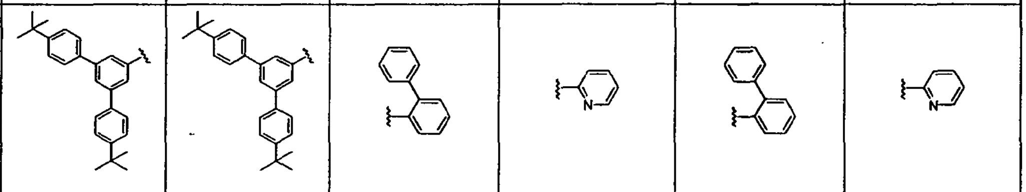
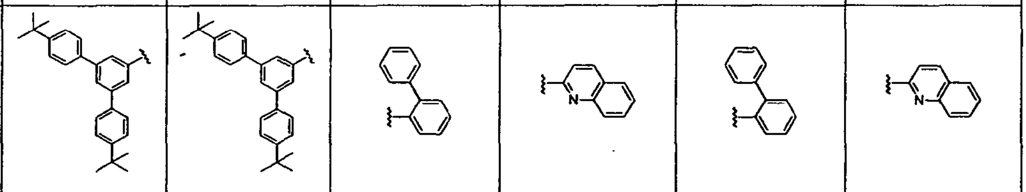
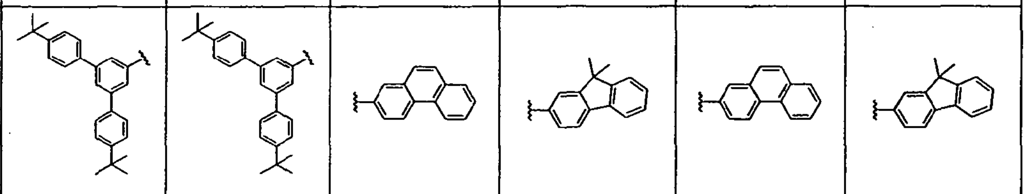
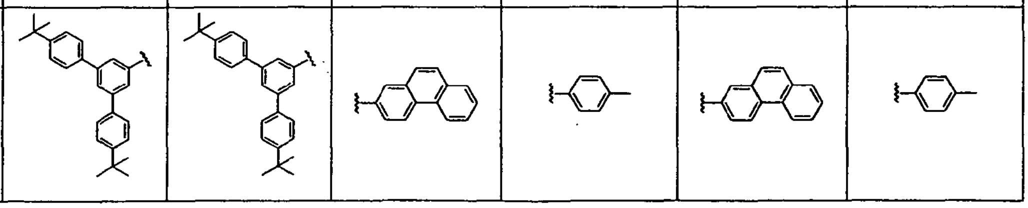
850						
851						
852						
853						
854						
855						
856						
857						

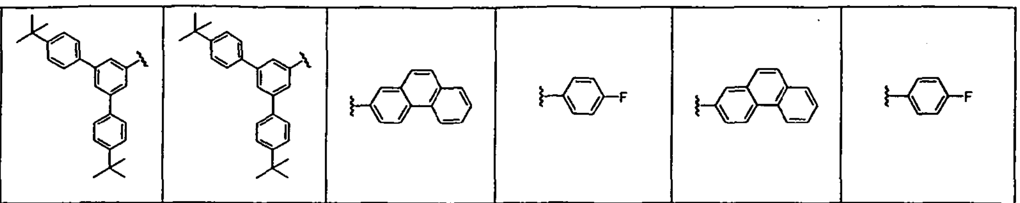
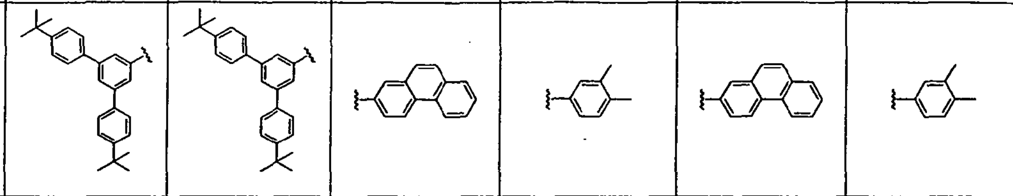
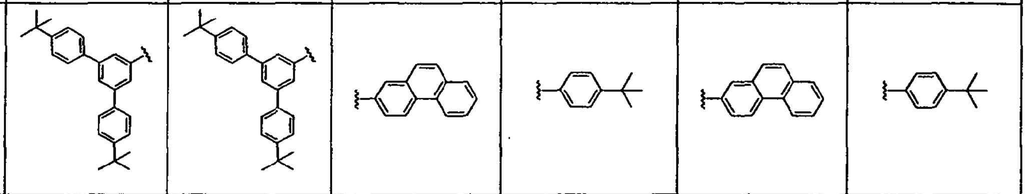
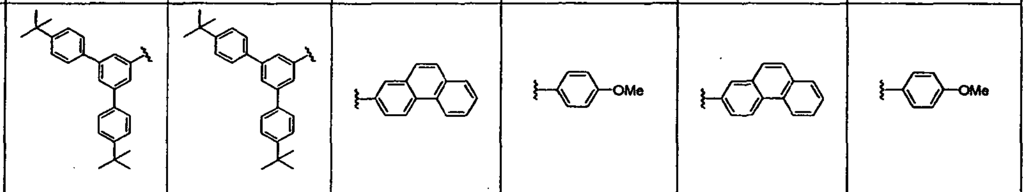
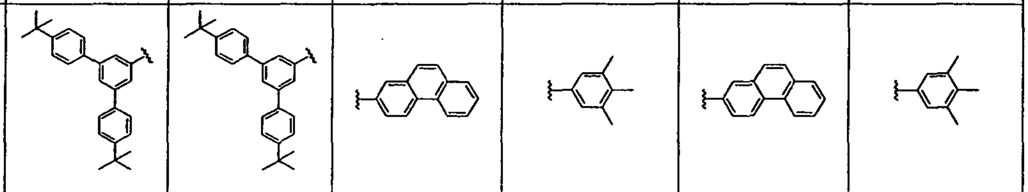
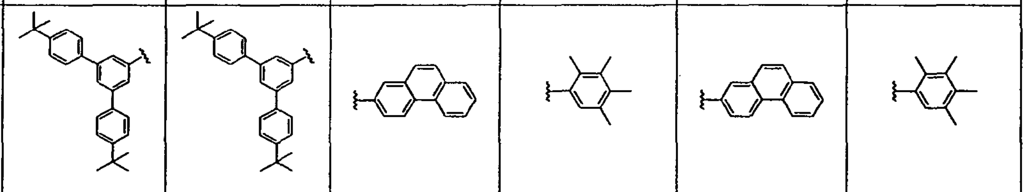
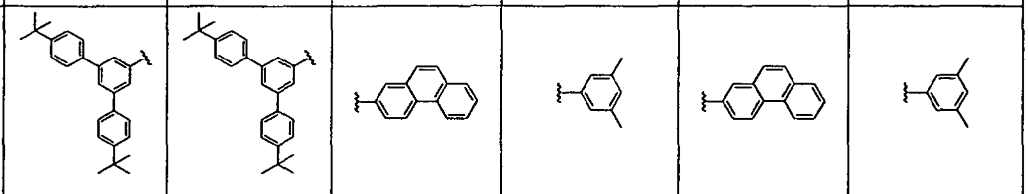
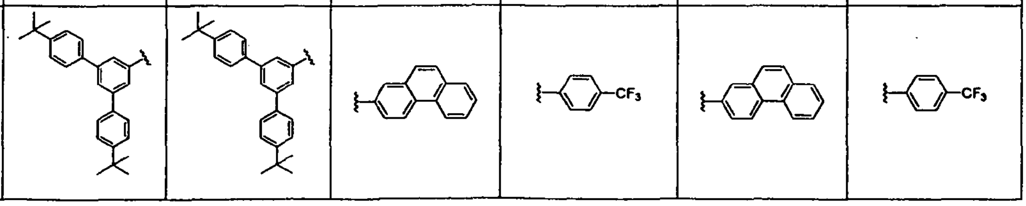
858	
859	
860	
861	
862	
863	
864	
865	

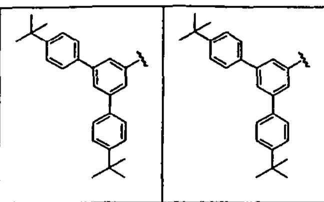
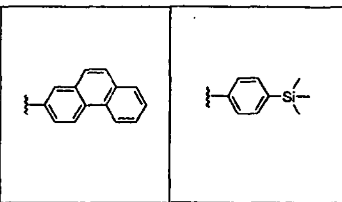
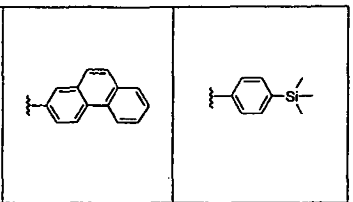
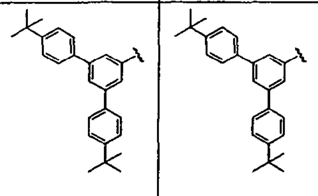
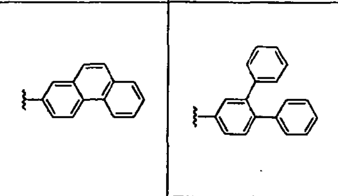
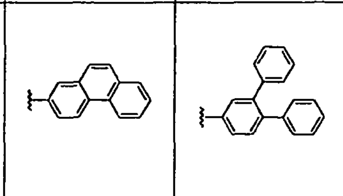
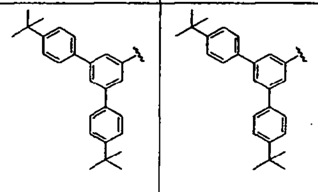
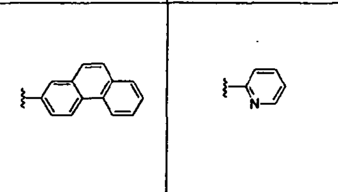
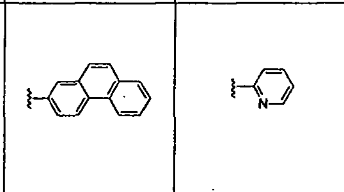
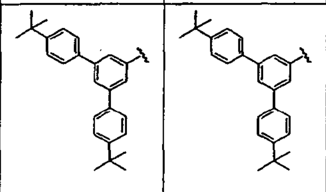
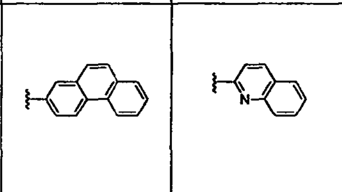
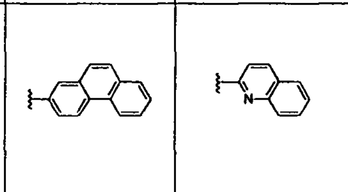
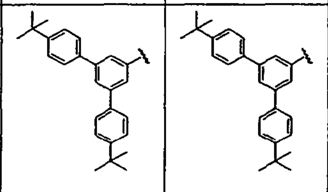
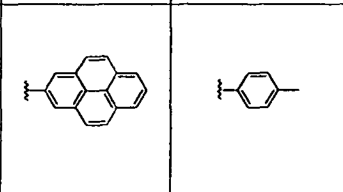
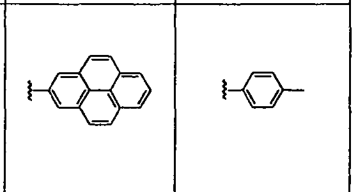
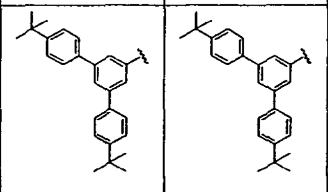
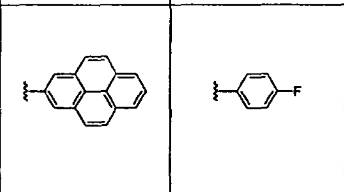
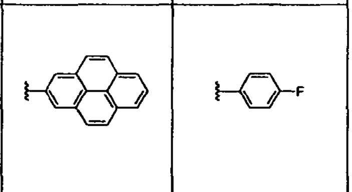
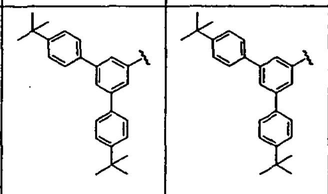
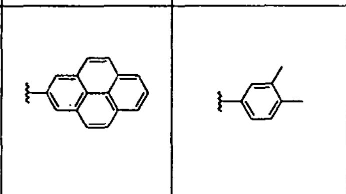
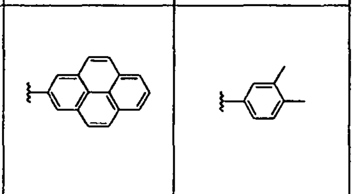
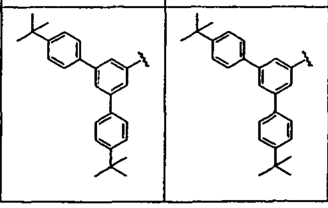
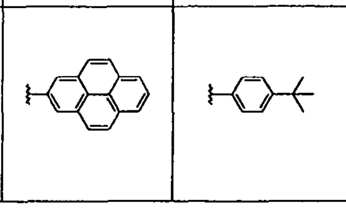
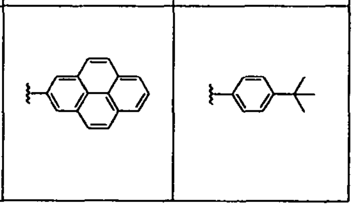
866						
867						
868						
869						
870						
871						
872						
873						

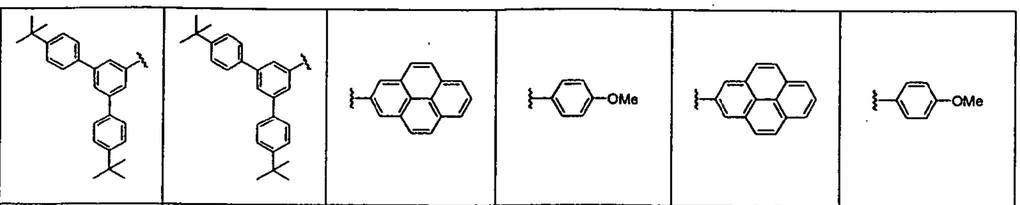
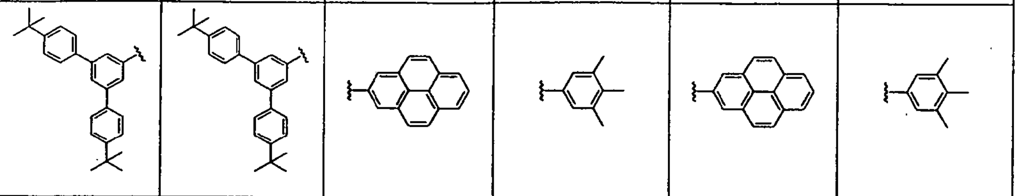
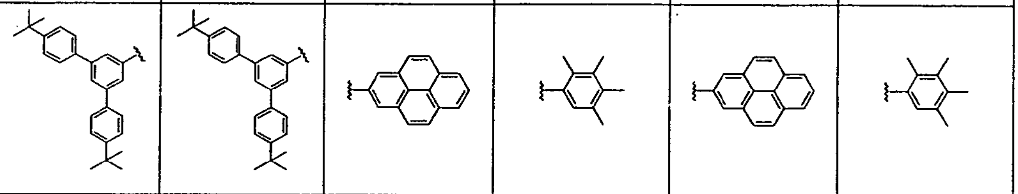
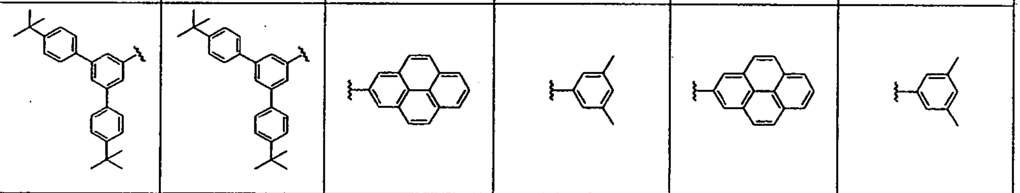
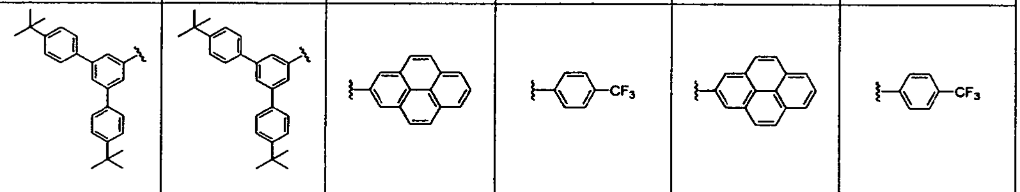
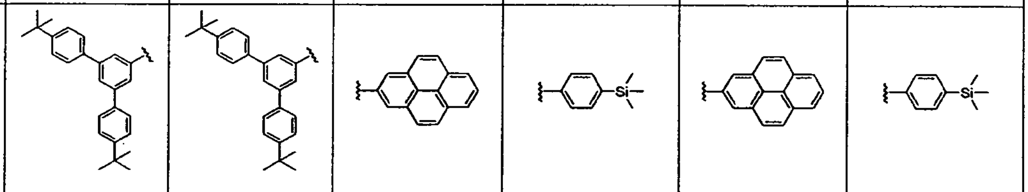
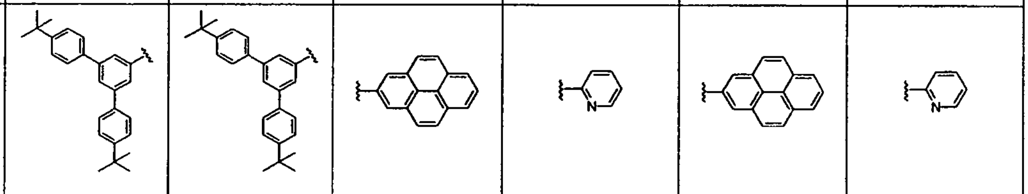
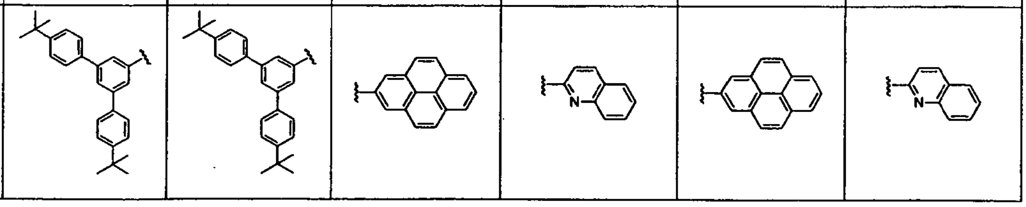
874	
875	
876	
877	
878	
879	
880	
881	

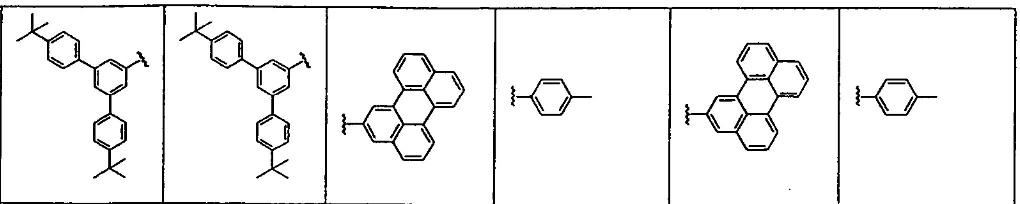
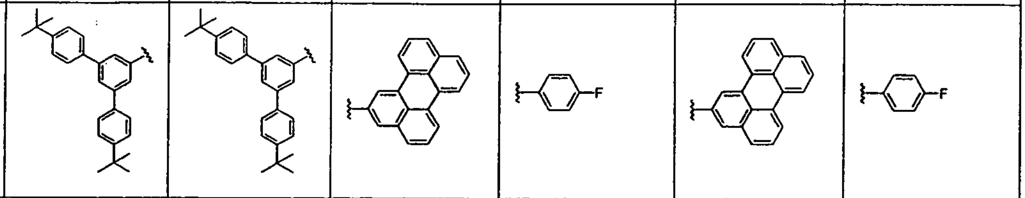
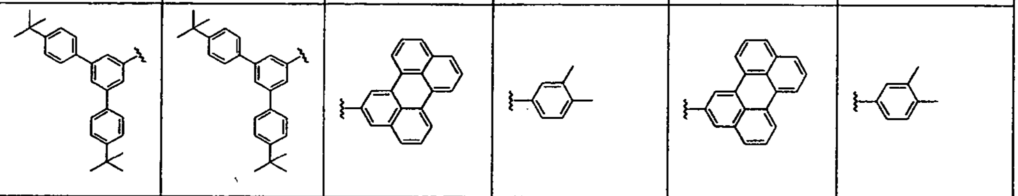
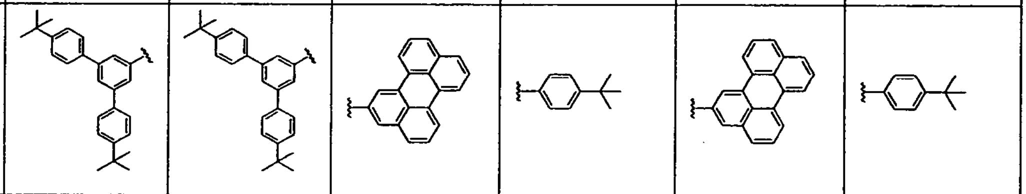
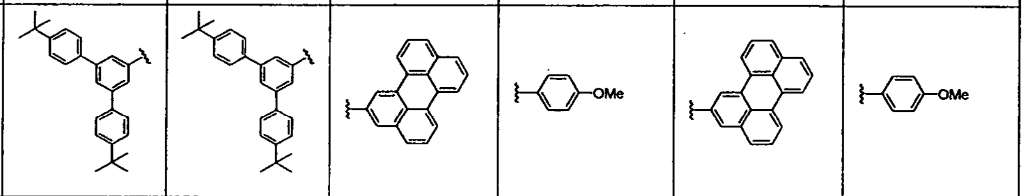
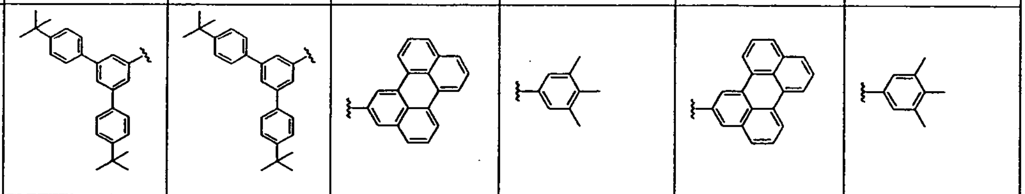
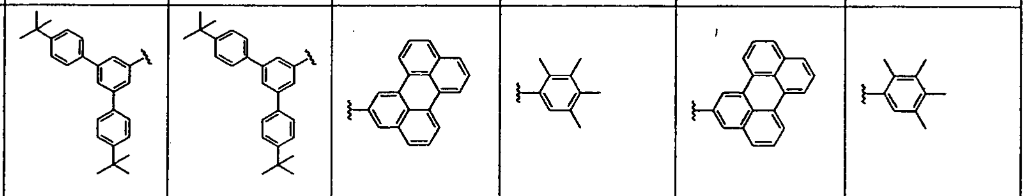
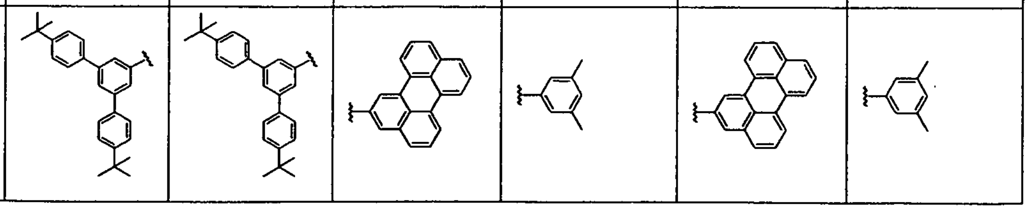
882	
883	
884	
885	
886	
887	
888	
889	

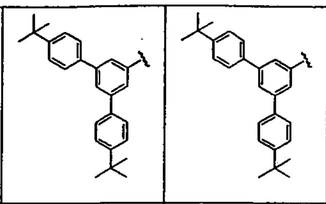
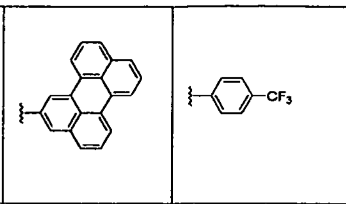
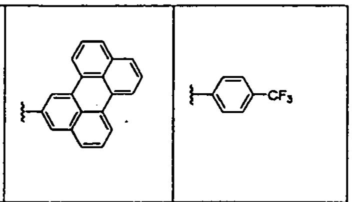
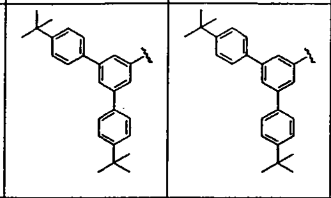
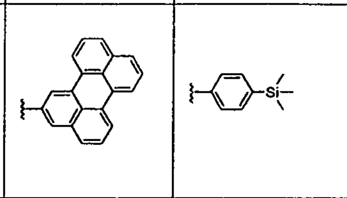
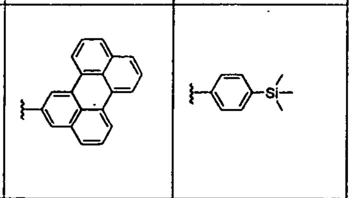
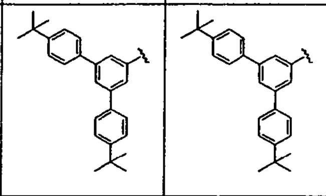
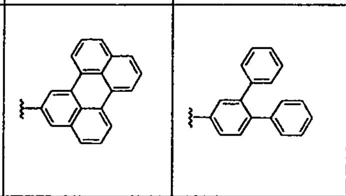
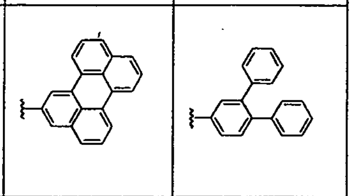
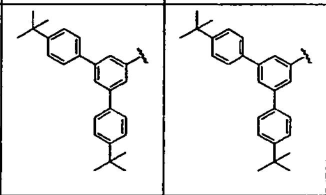
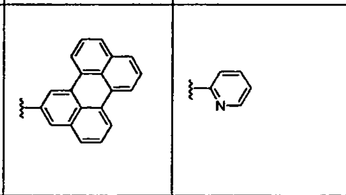
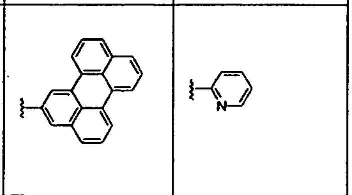
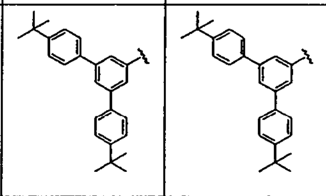
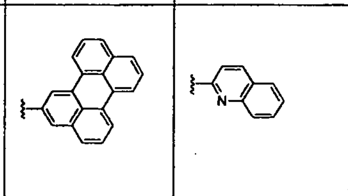
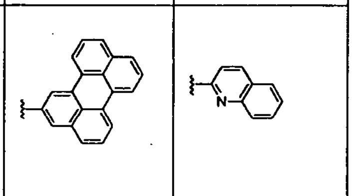
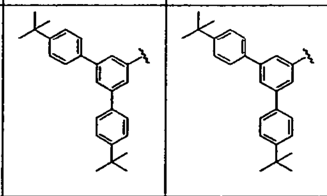
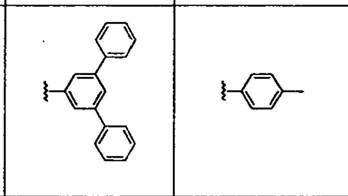
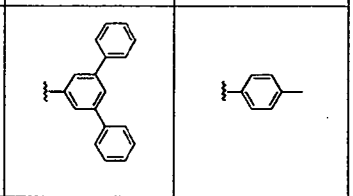
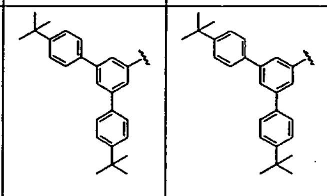
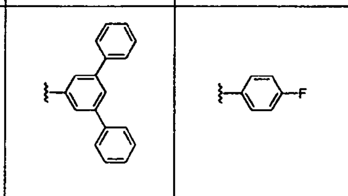
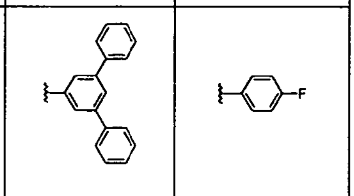
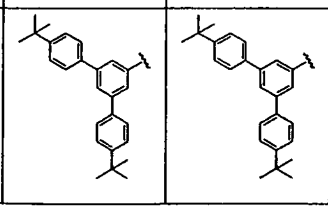
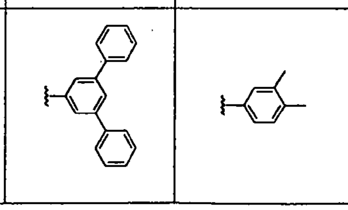
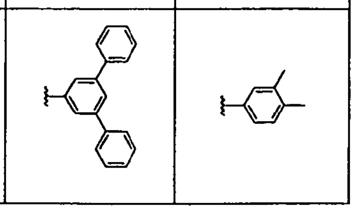
890	
891	
892	
893	
894	
895	
896	
897	

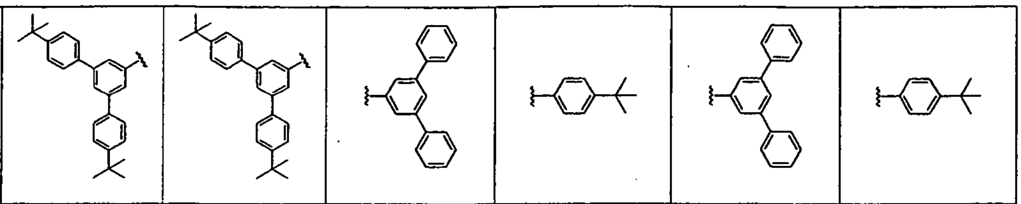
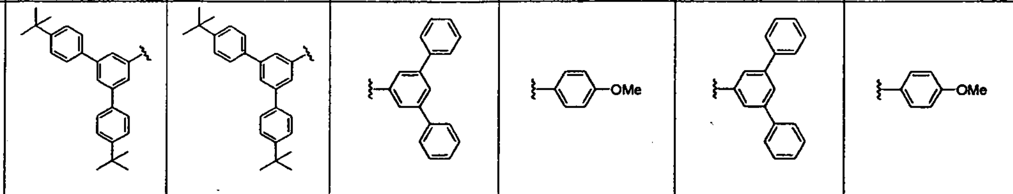
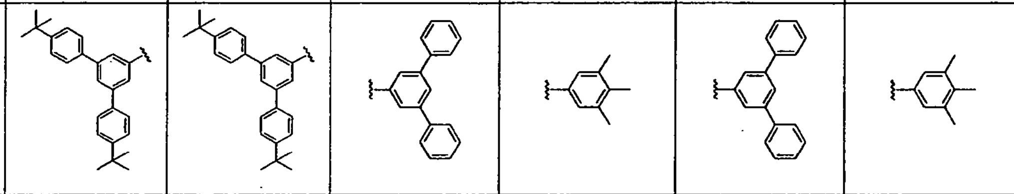
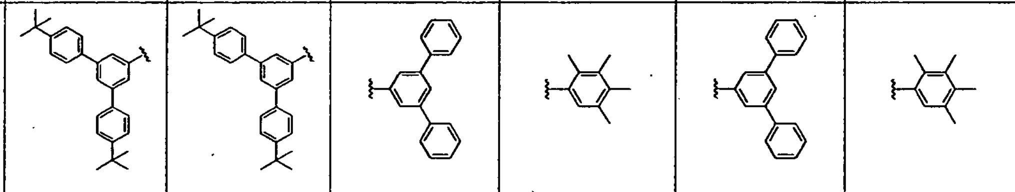
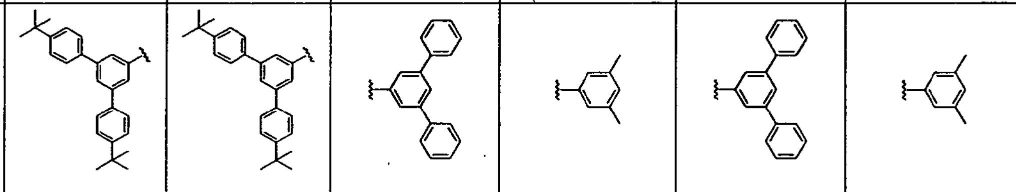
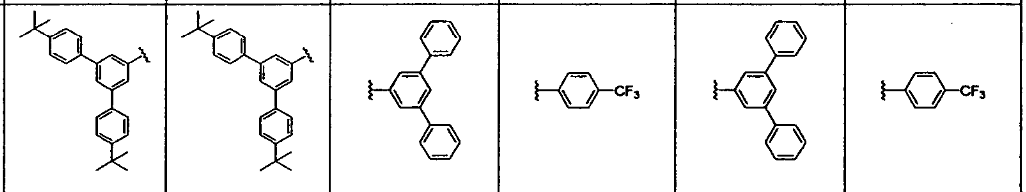
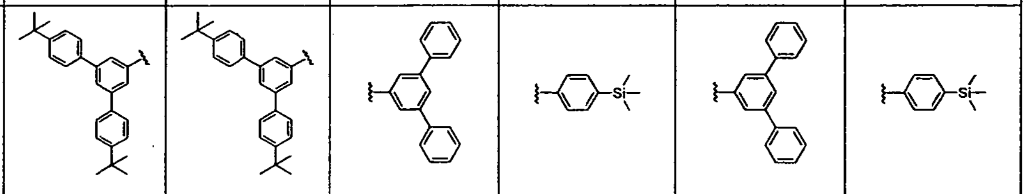
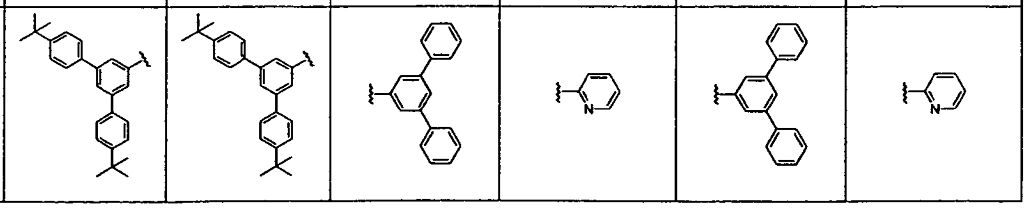
898	
899	
900	
901	
902	
903	
904	
905	

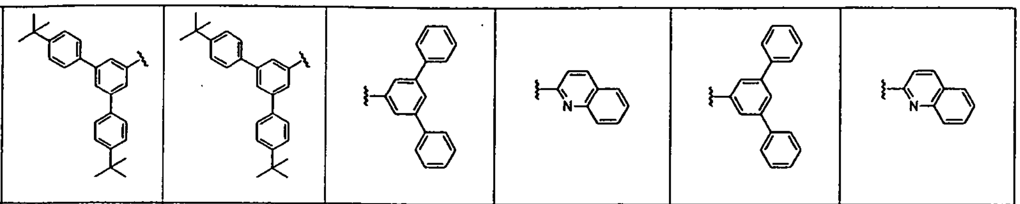
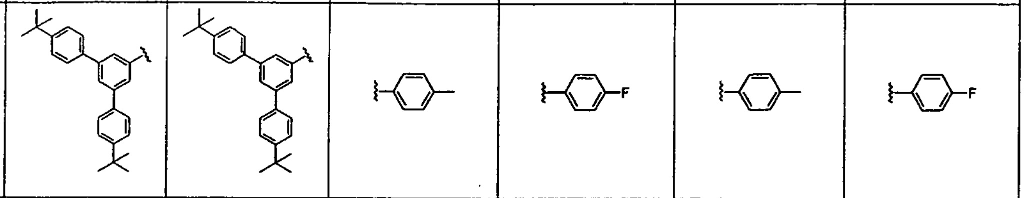
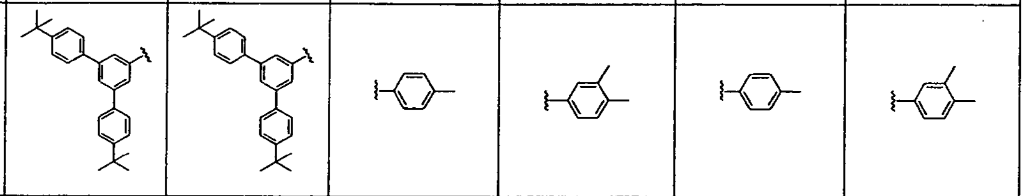
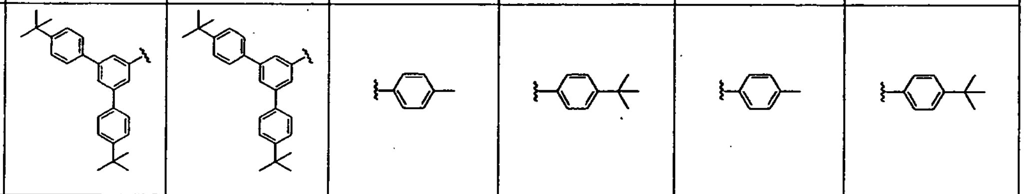
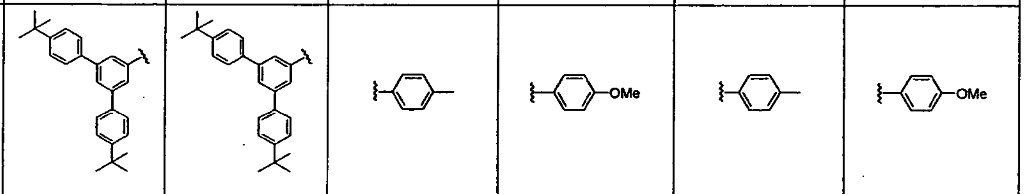
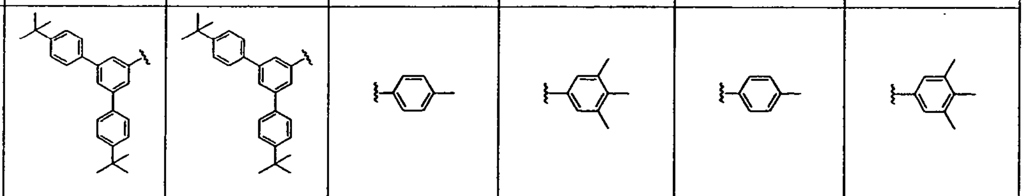
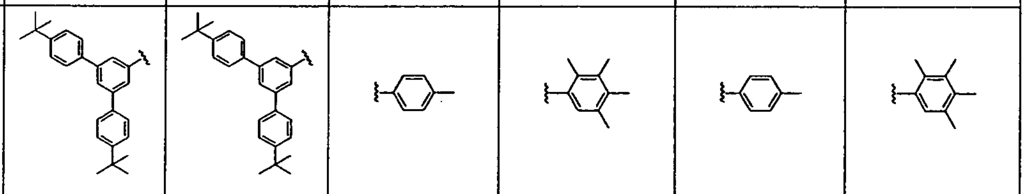
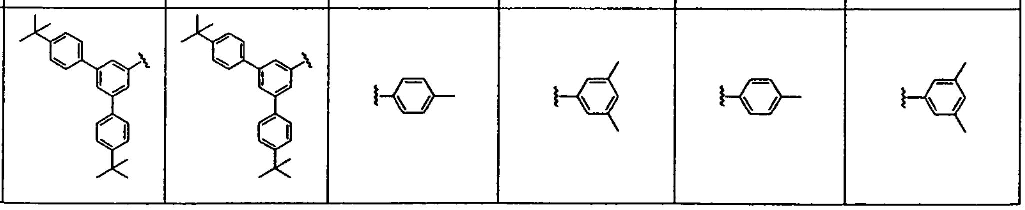
906						
907						
908						
909						
910						
911						
912						
913						

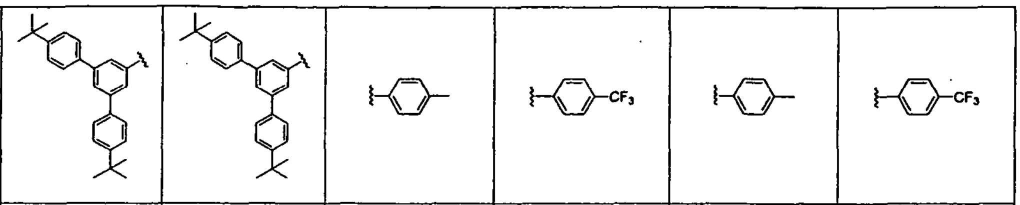
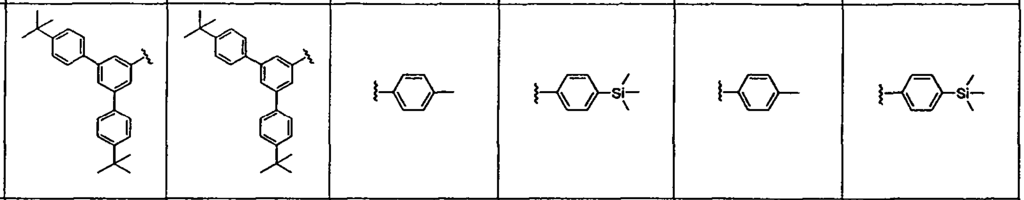
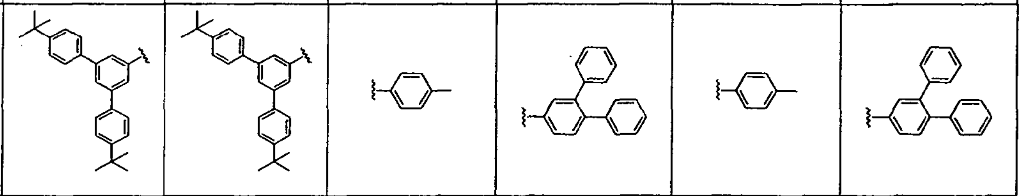
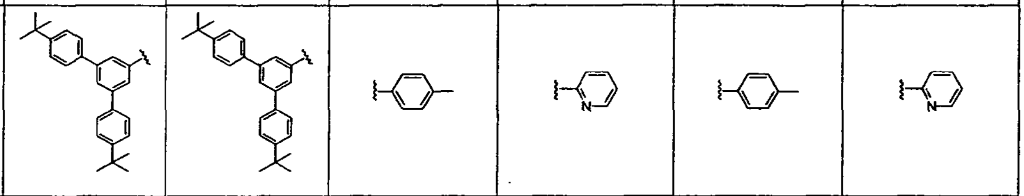
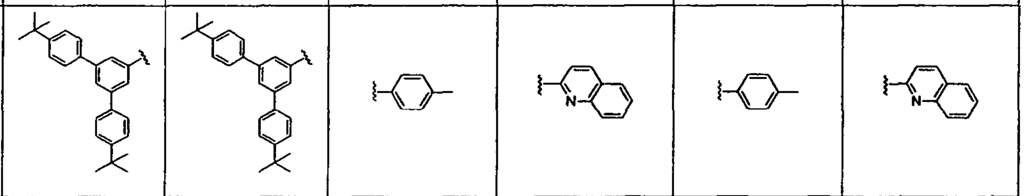
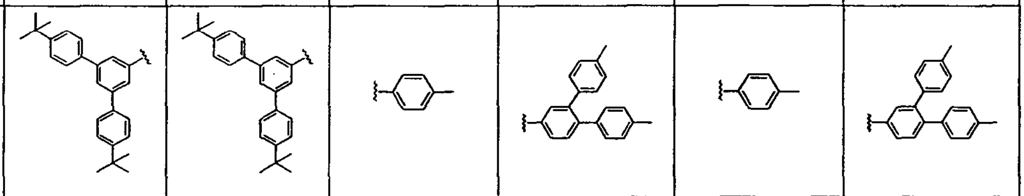
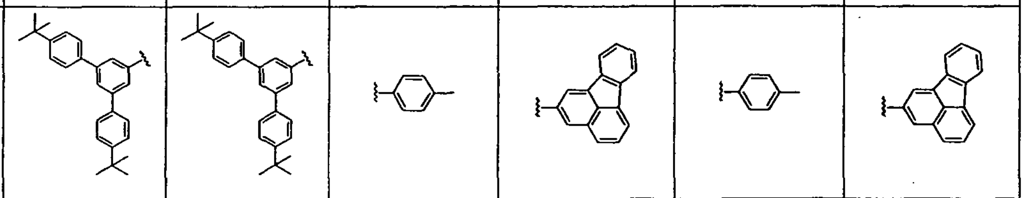
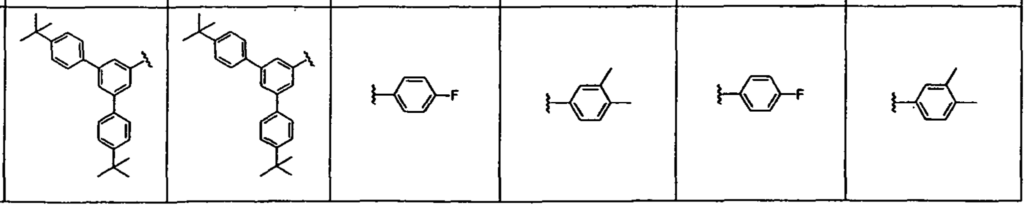
914	
915	
916	
917	
918	
919	
920	
921	

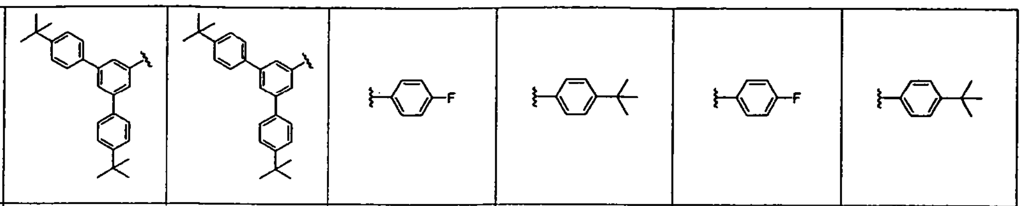
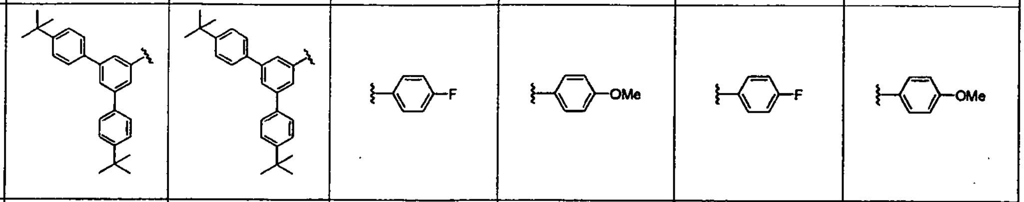
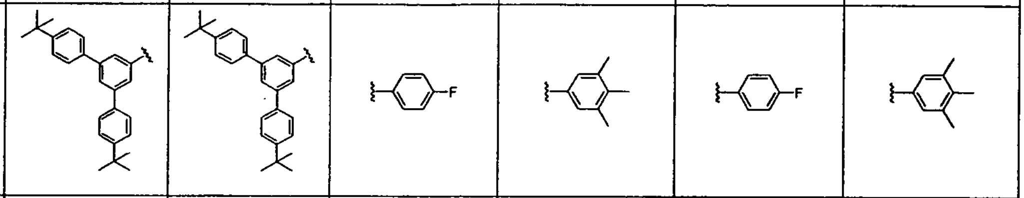
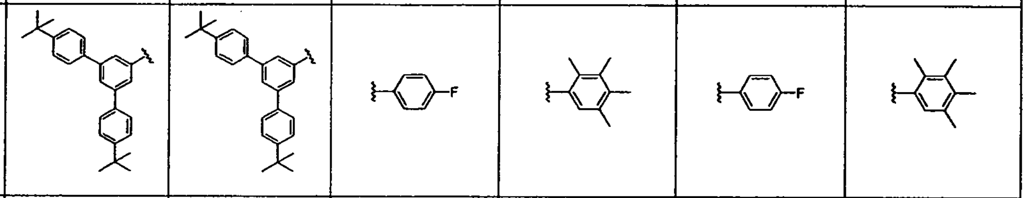
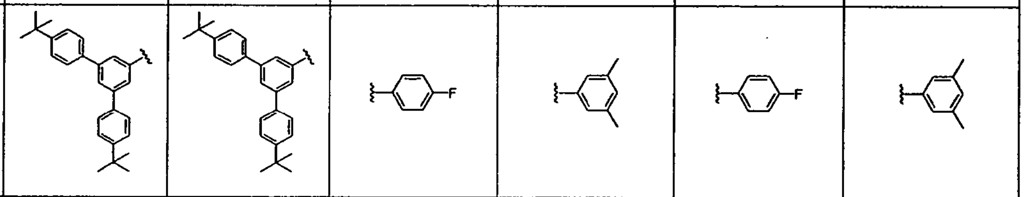
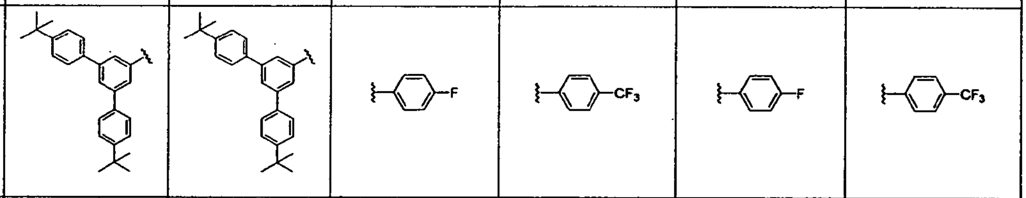
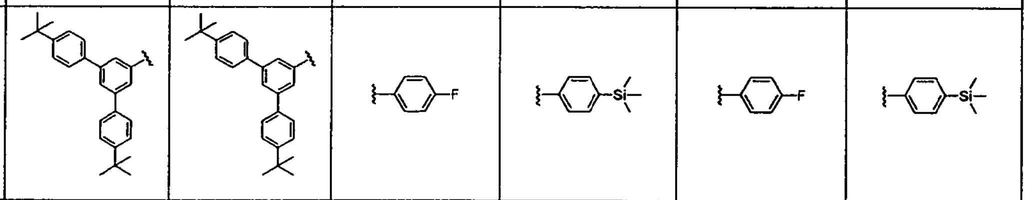
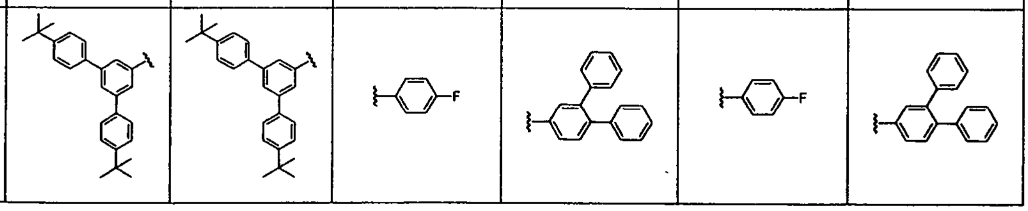
922	
923	
924	
925	
926	
927	
928	
929	

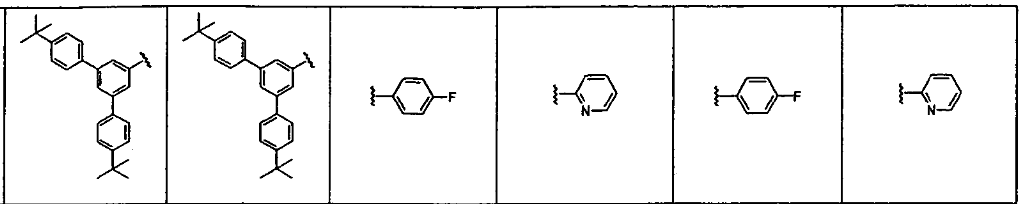
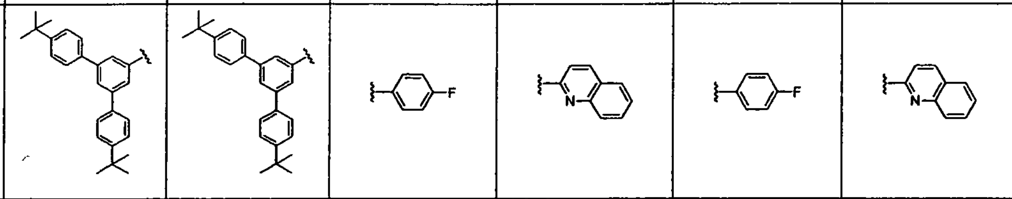
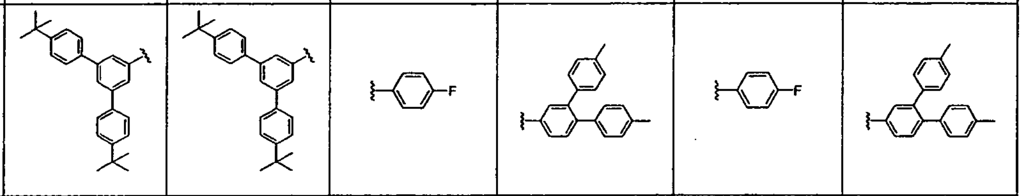
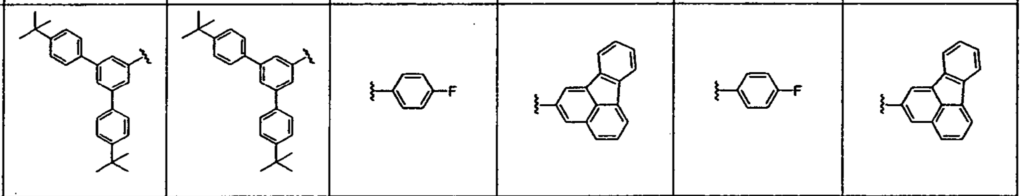
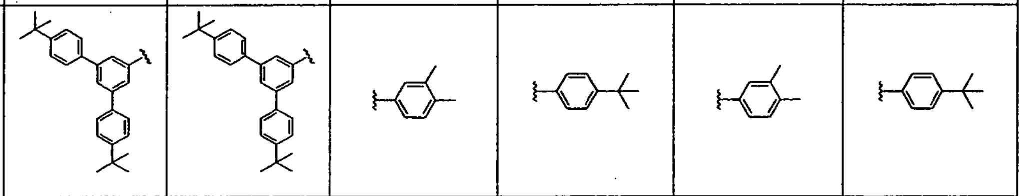
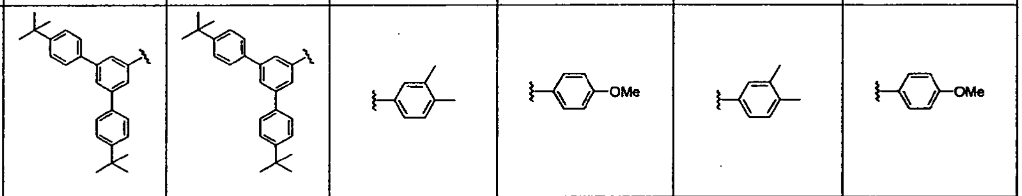
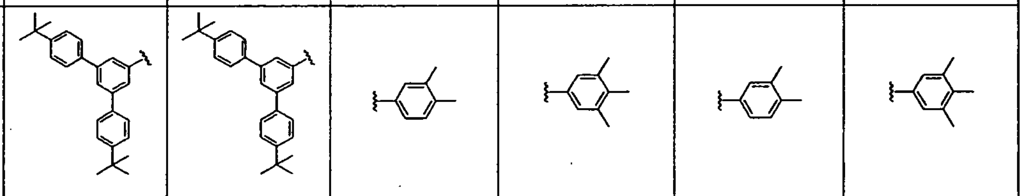
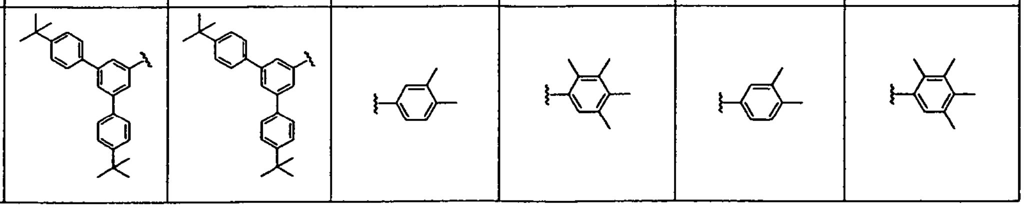
930			
931			
932			
933			
934			
935			
936			
937			

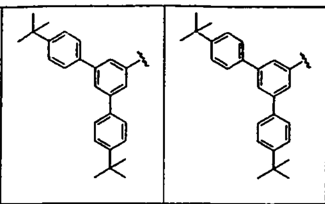
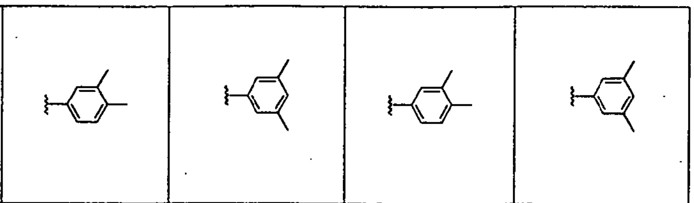
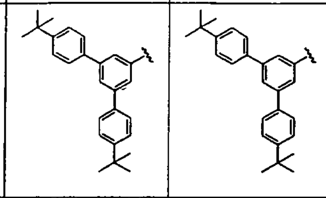
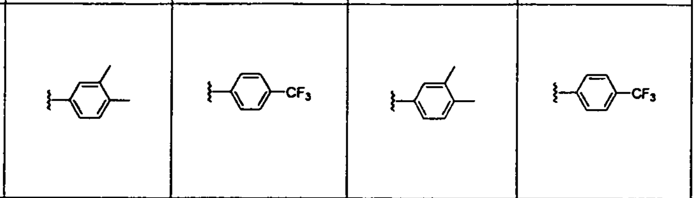
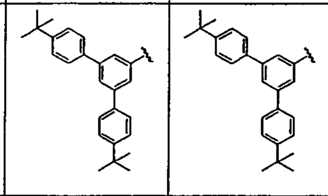
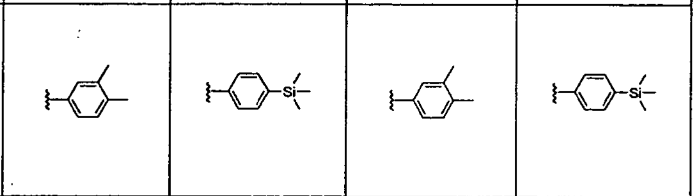
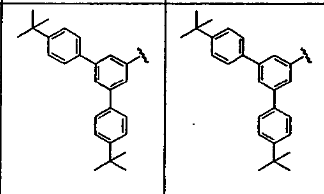
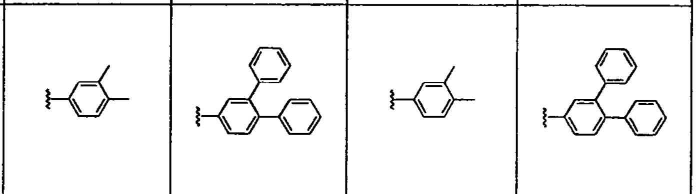
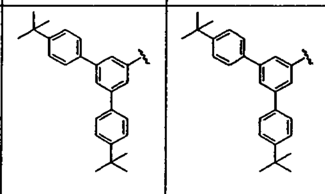
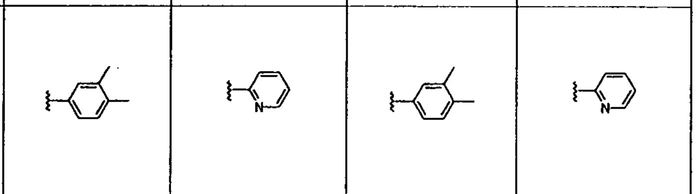
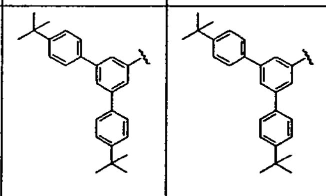
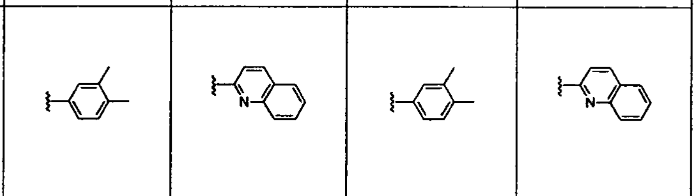
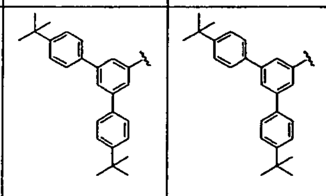
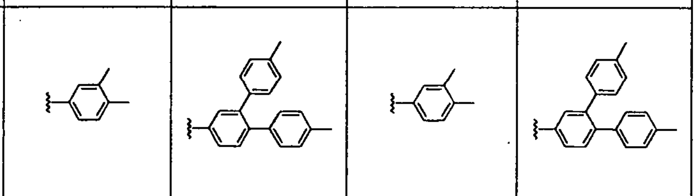
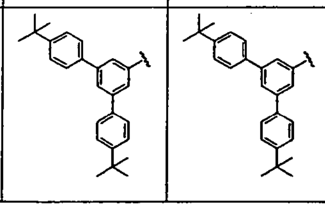
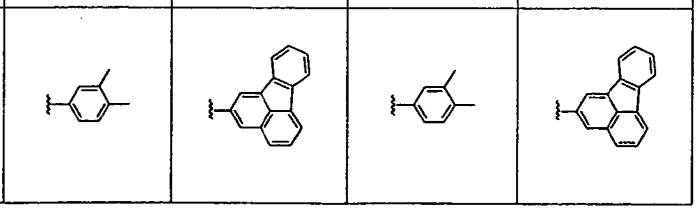
938	
939	
940	
941	
942	
943	
944	
945	

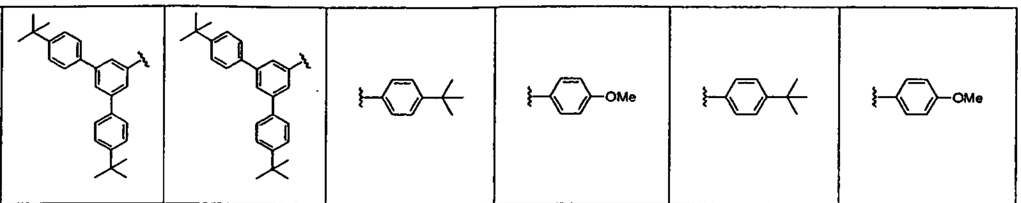
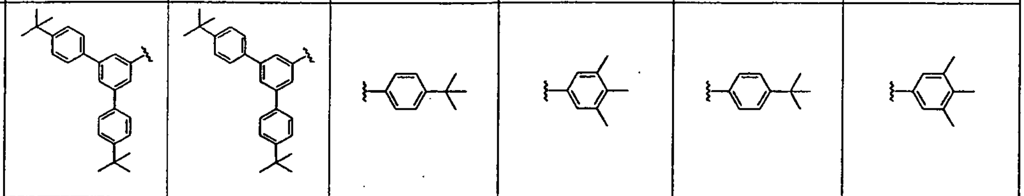
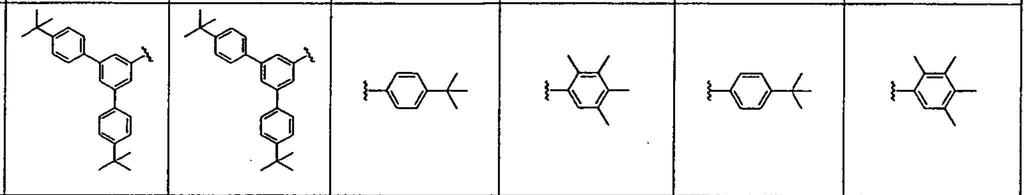
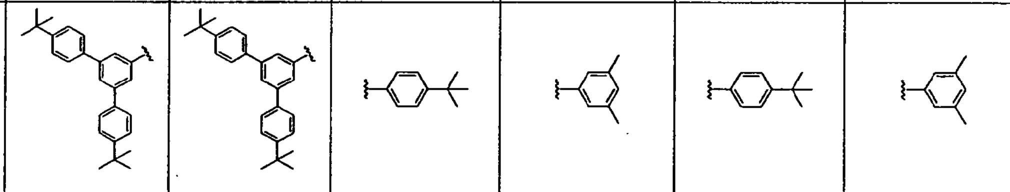
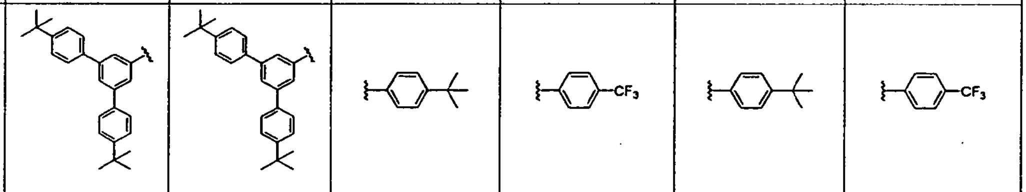
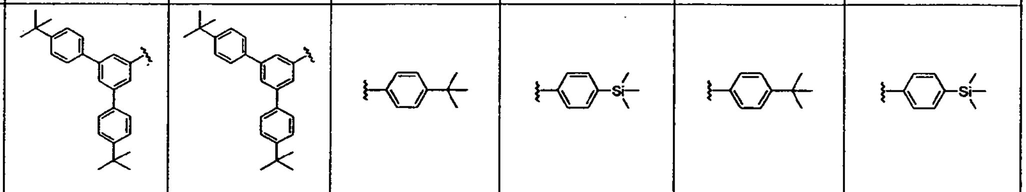
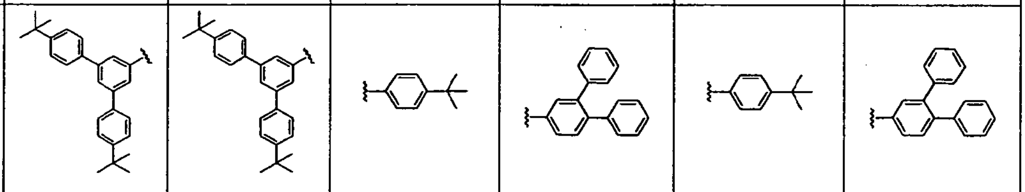
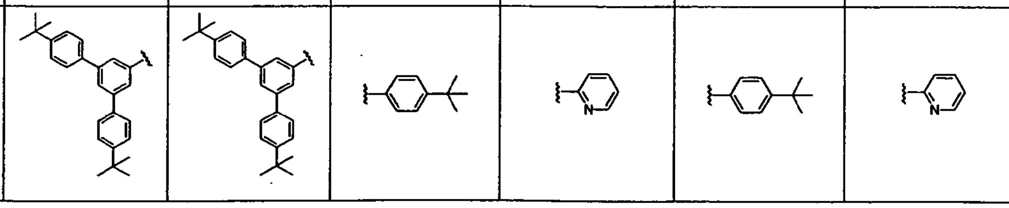
946	
947	
948	
949	
950	
951	
952	
953	

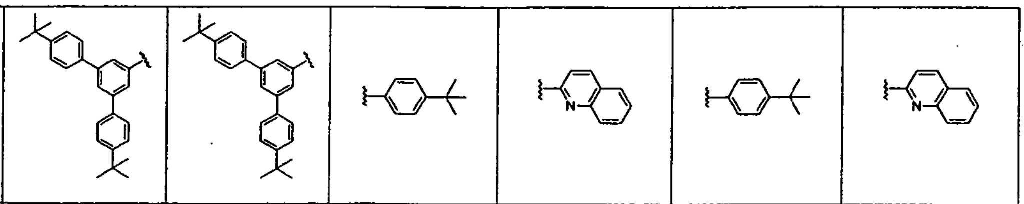
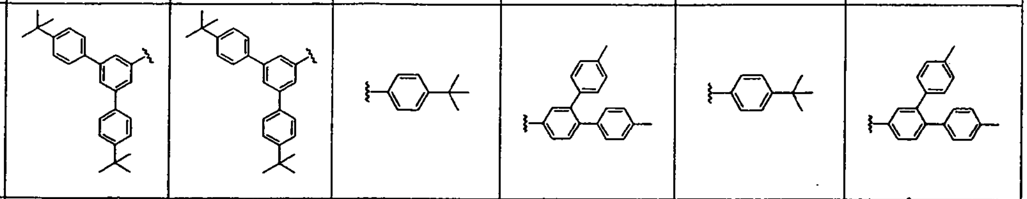
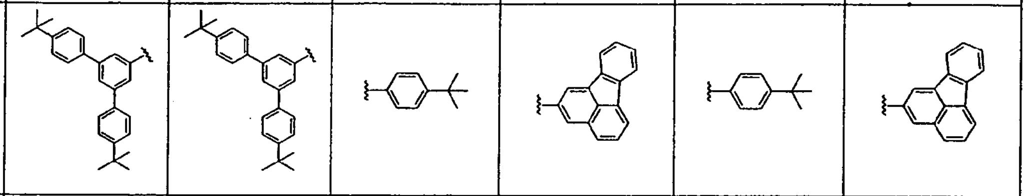
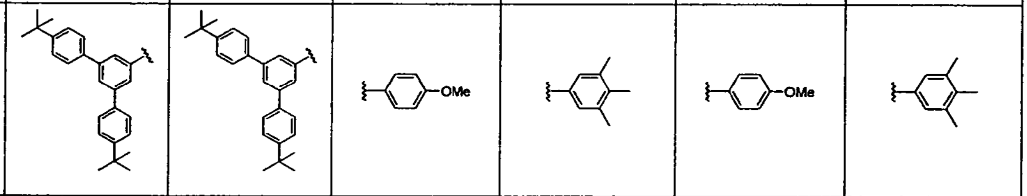
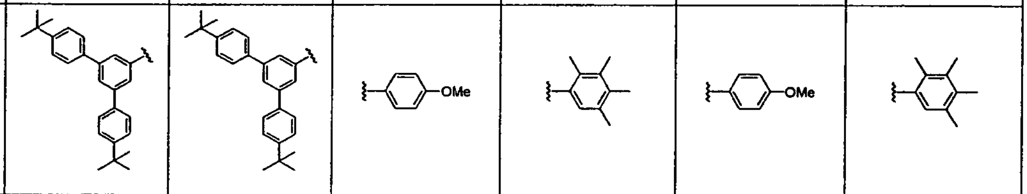
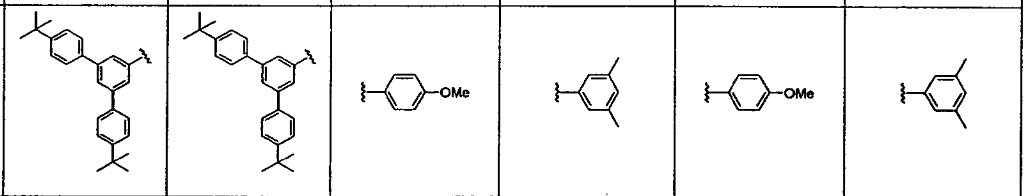
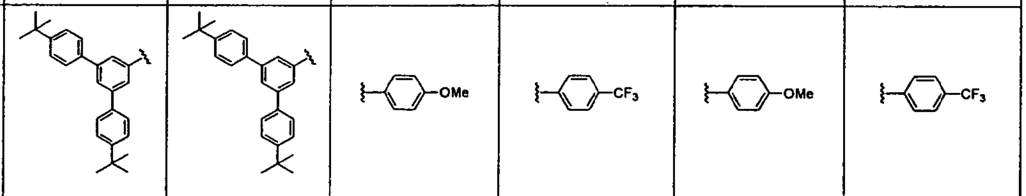
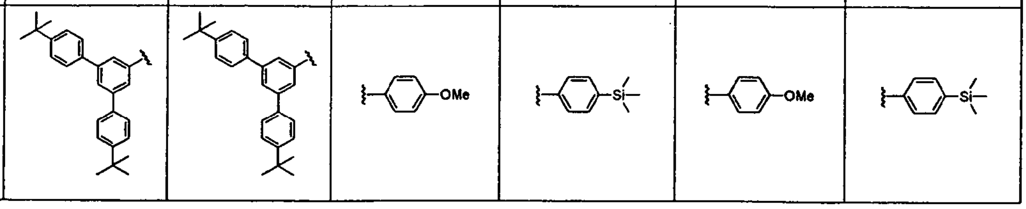
954	
955	
956	
957	
958	
959	
960	
961	

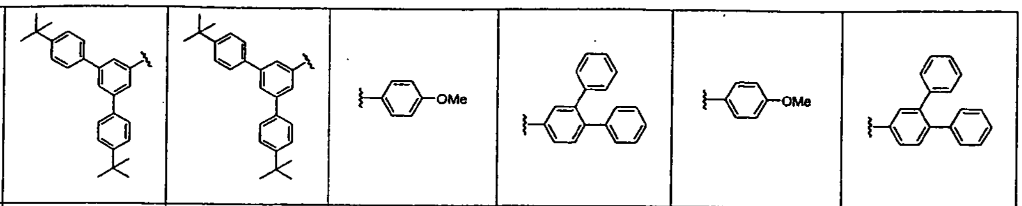
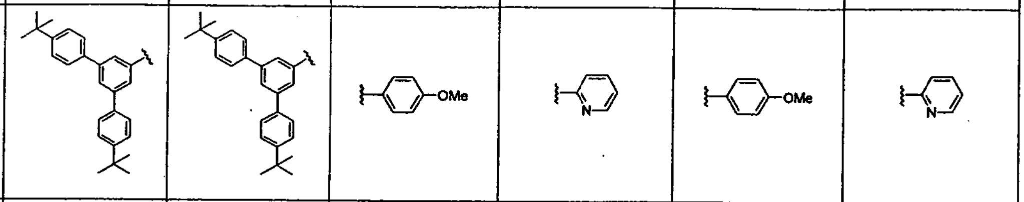
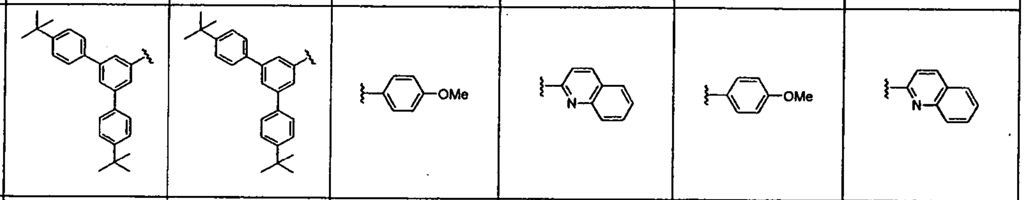
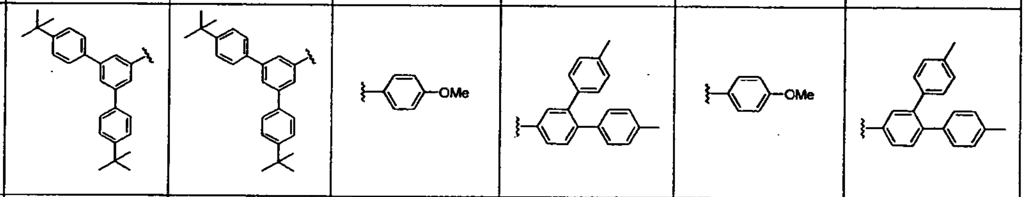
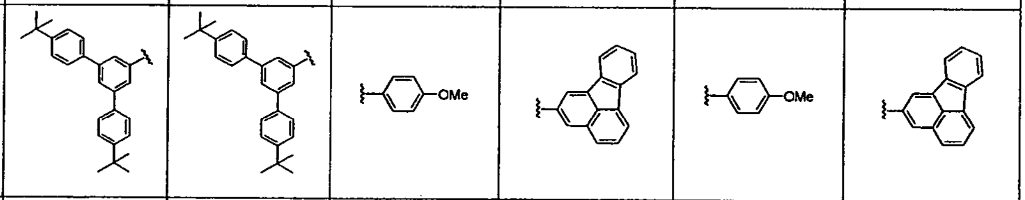
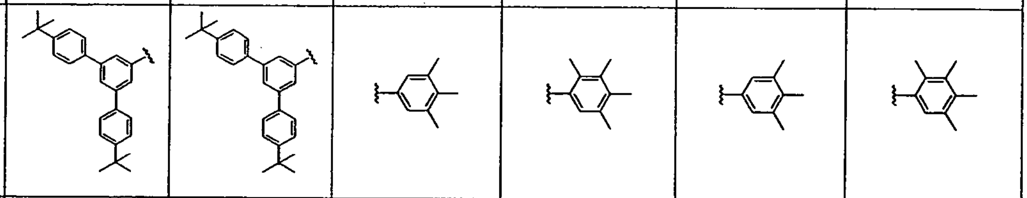
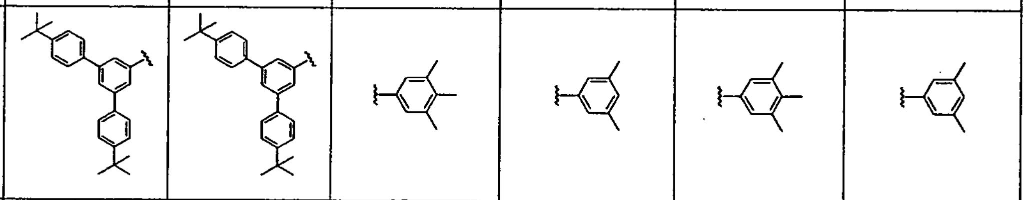
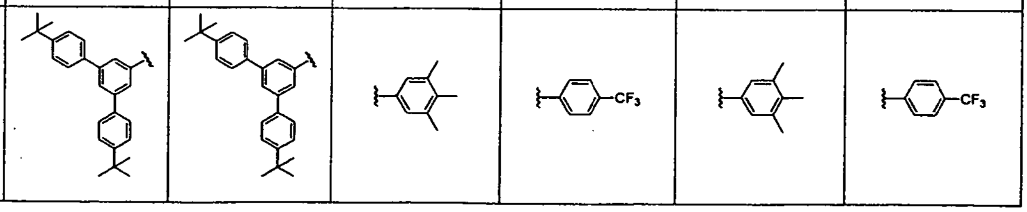
962	
963	
964	
965	
966	
967	
968	
969	

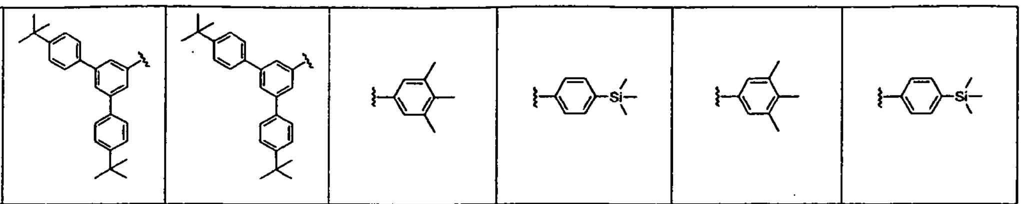
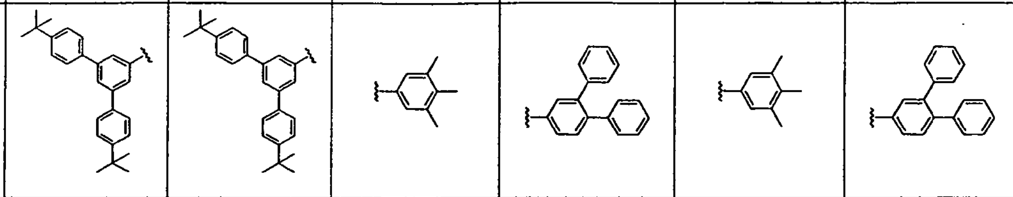
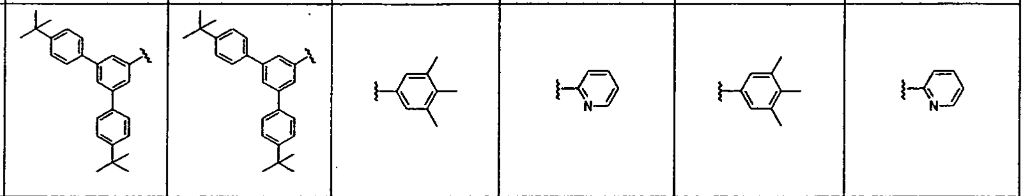
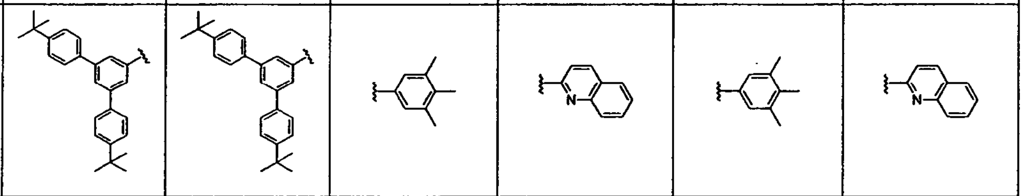
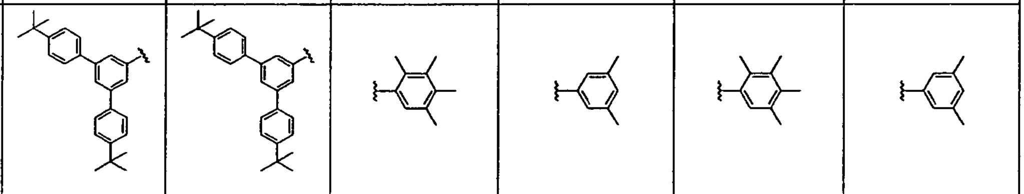
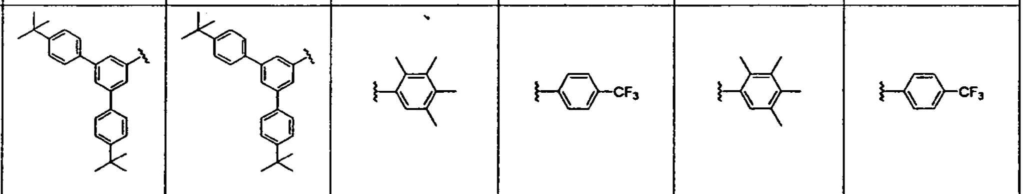
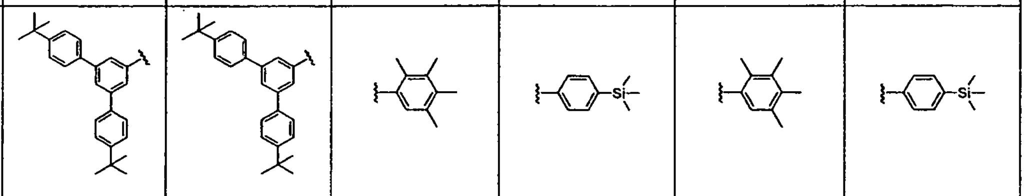
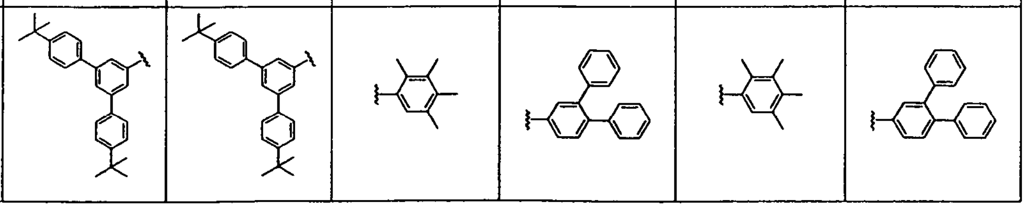
970	
971	
972	
973	
974	
975	
976	
977	

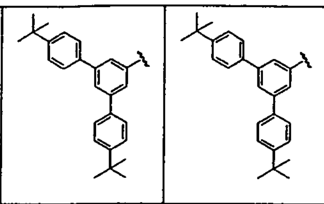
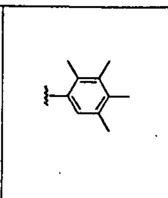
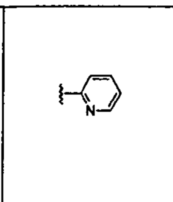
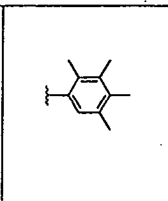
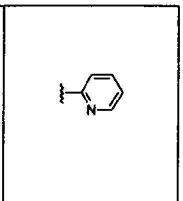
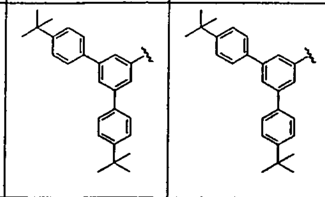
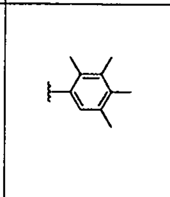
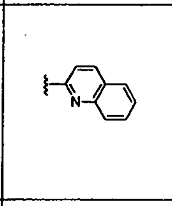
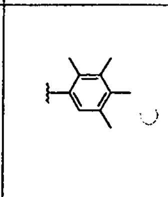
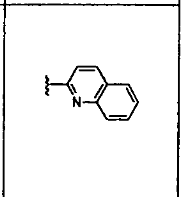
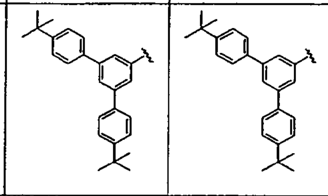
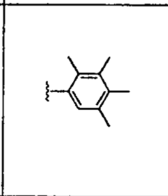
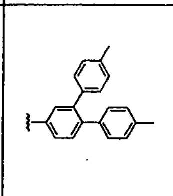
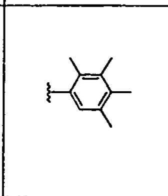
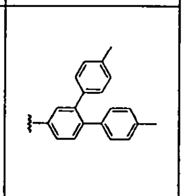
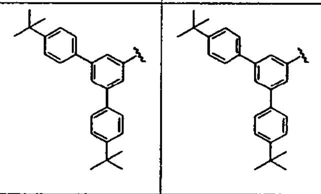
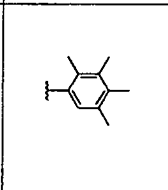
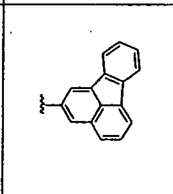
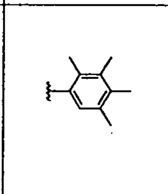
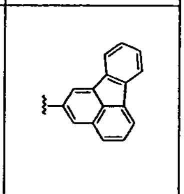
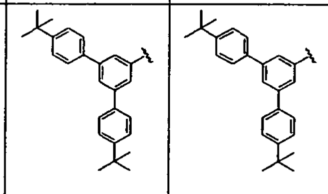
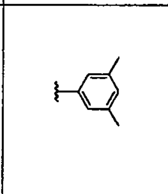
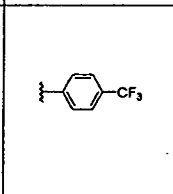
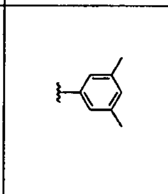
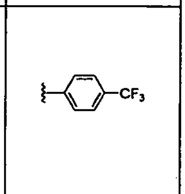
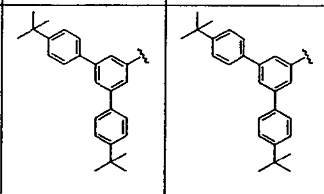
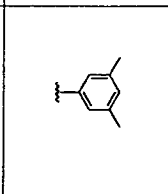
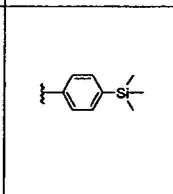
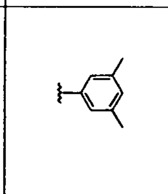
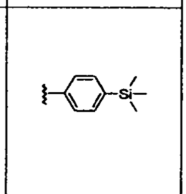
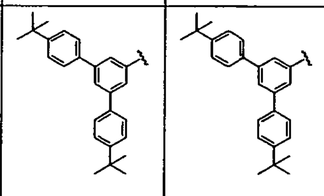
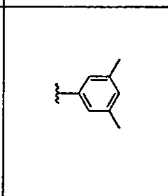
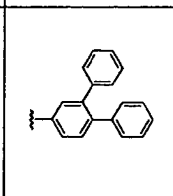
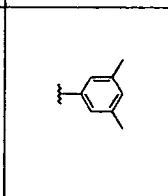
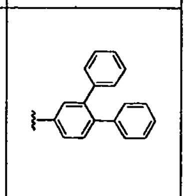
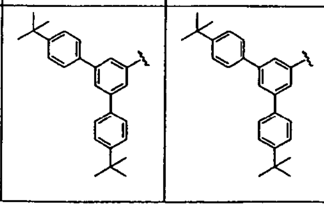
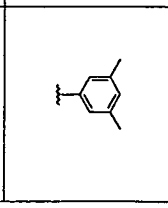
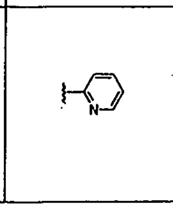
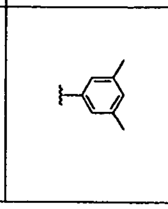
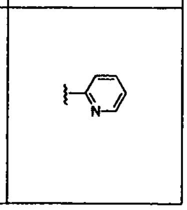
978		
979		
980		
981		
982		
983		
984		
985		

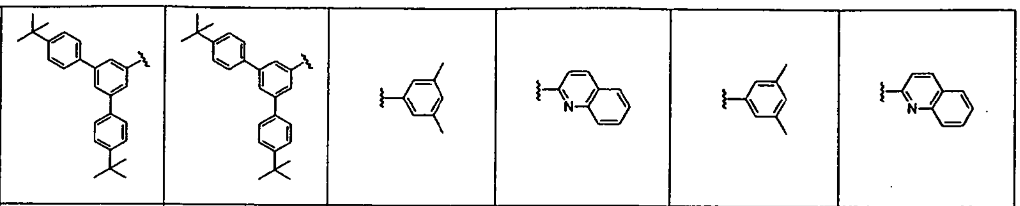
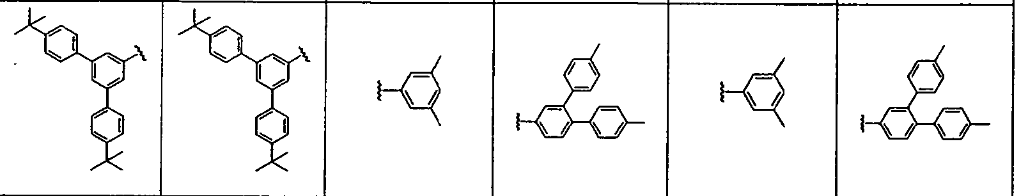
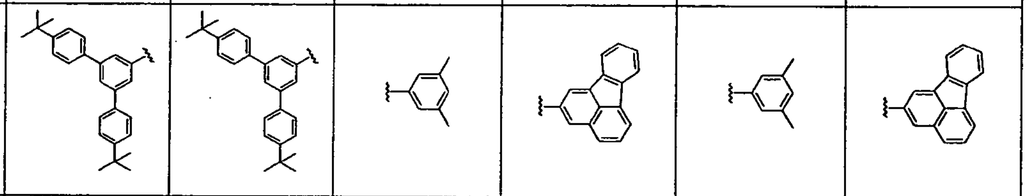
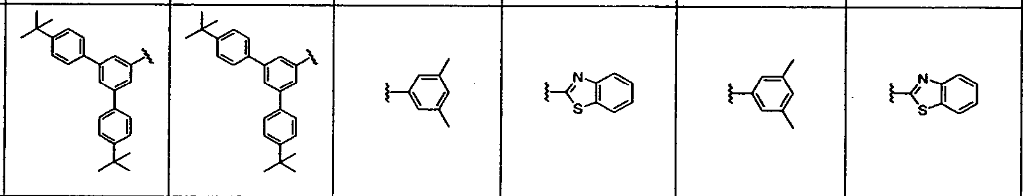
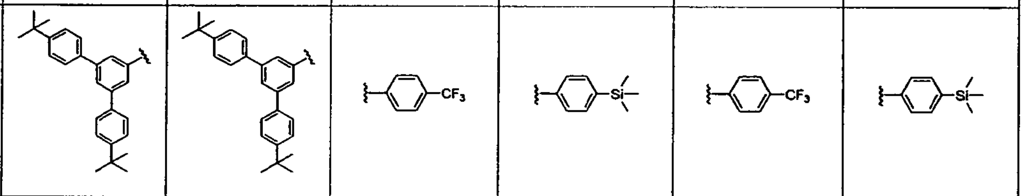
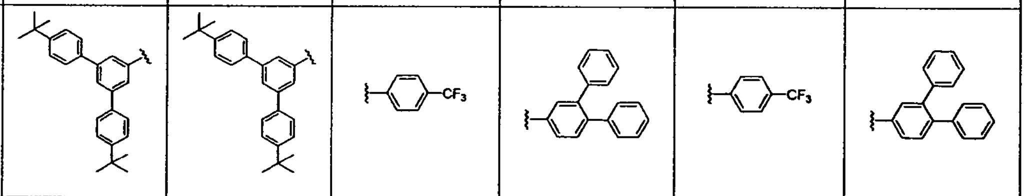
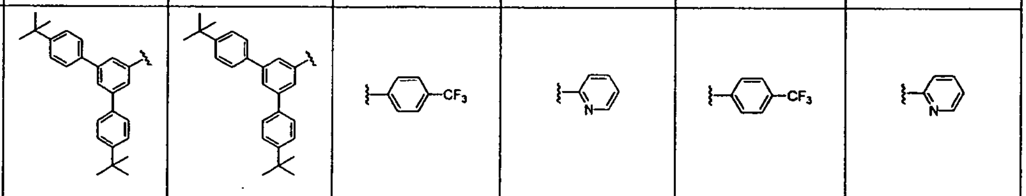
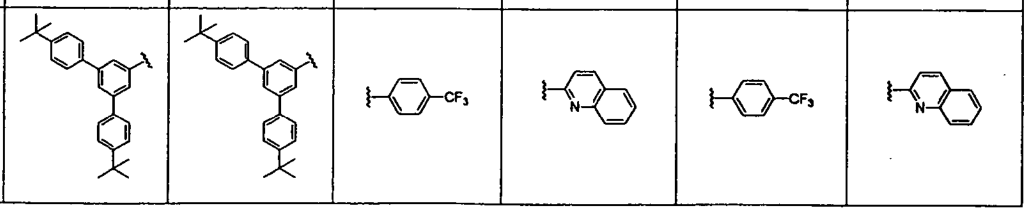
986	
987	
988	
989	
990	
991	
992	
993	

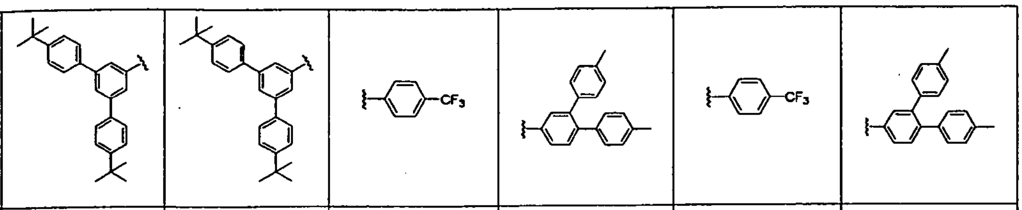
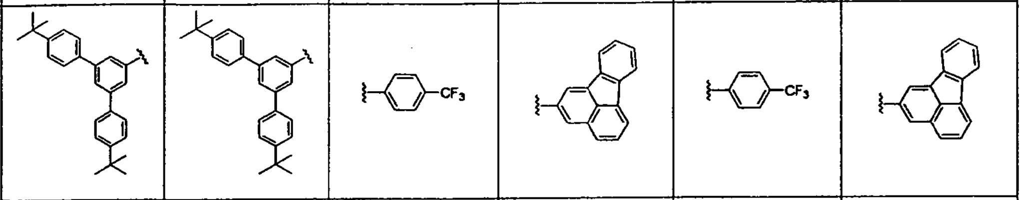
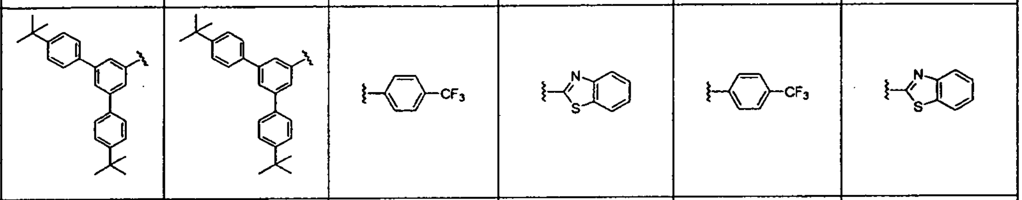
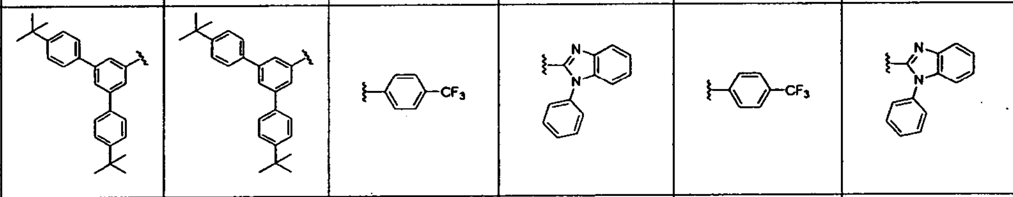
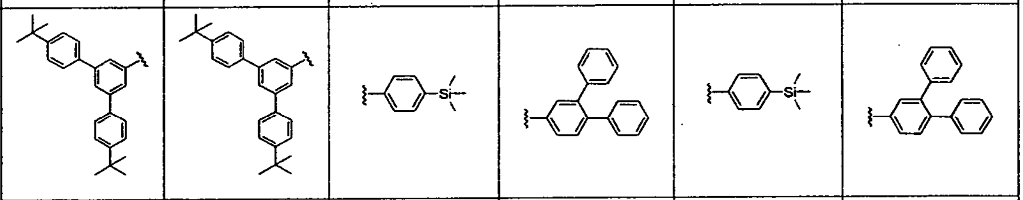
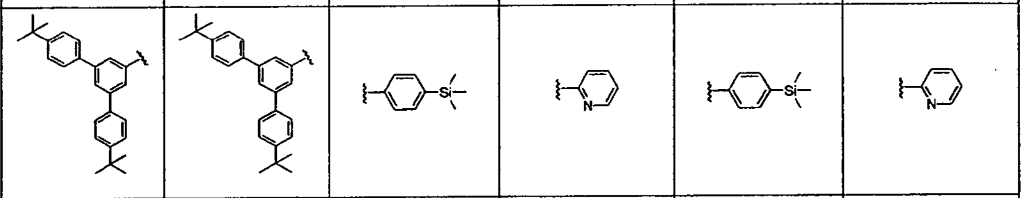
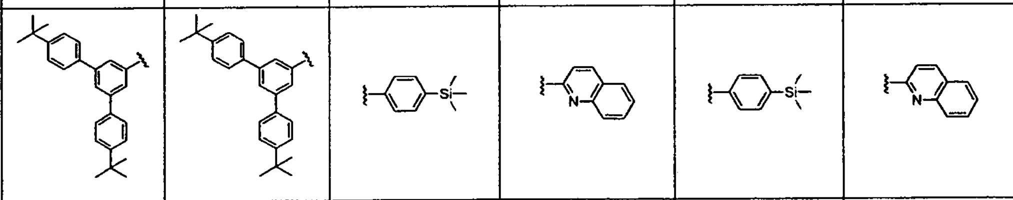
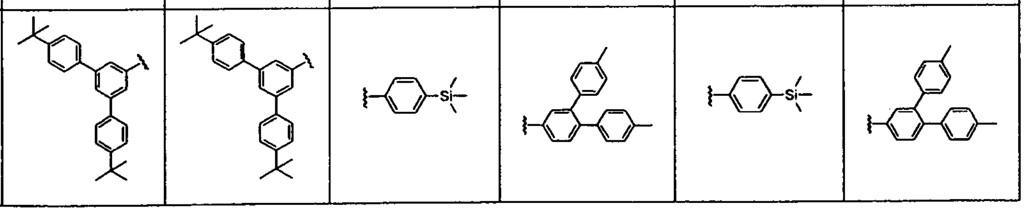
994	
995	
996	
997	
998	
999	
1000	
1001	

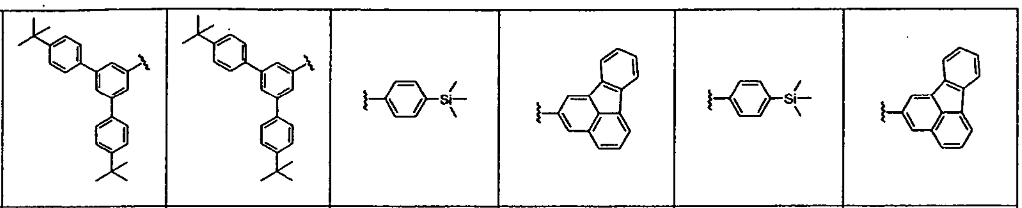
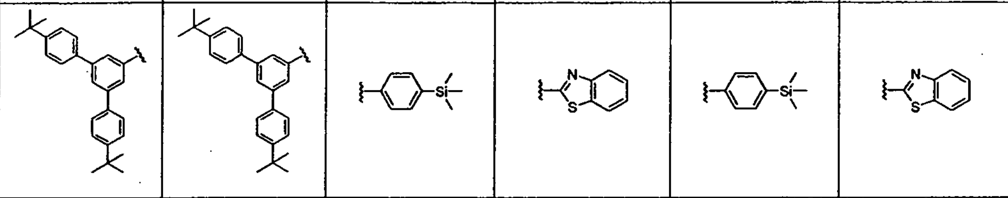
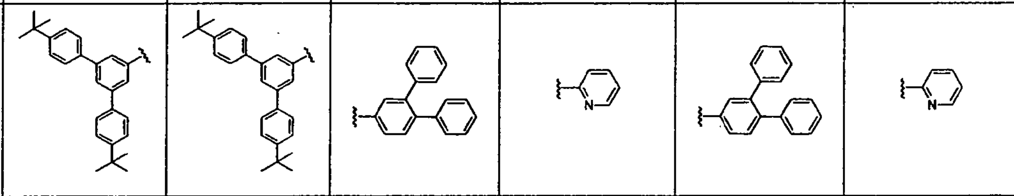
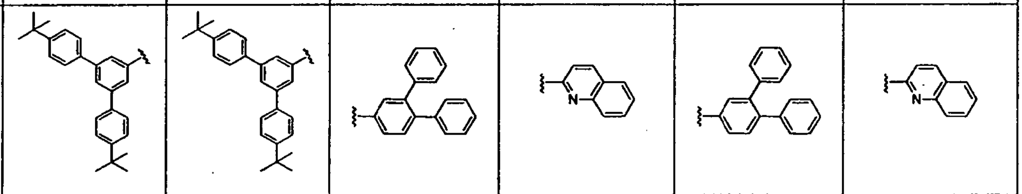
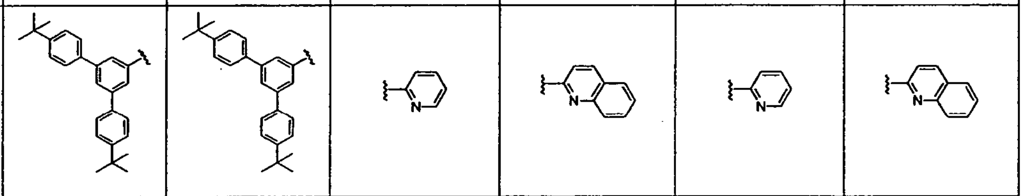
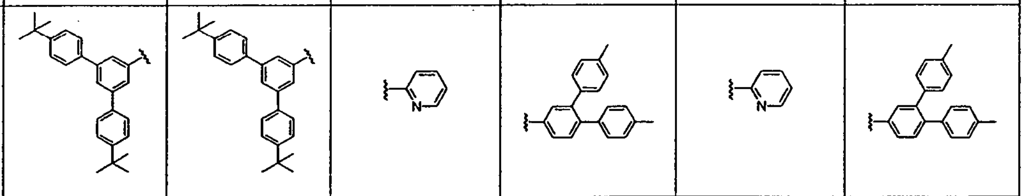
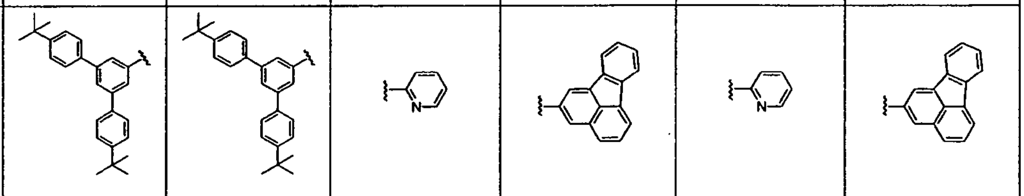
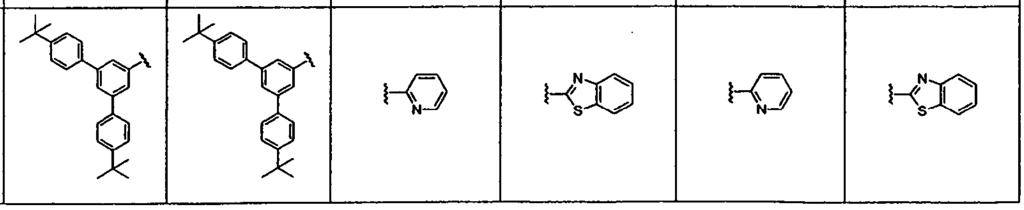
1002	
1003	
1004	
1005	
1006	
1007	
1008	
1009	

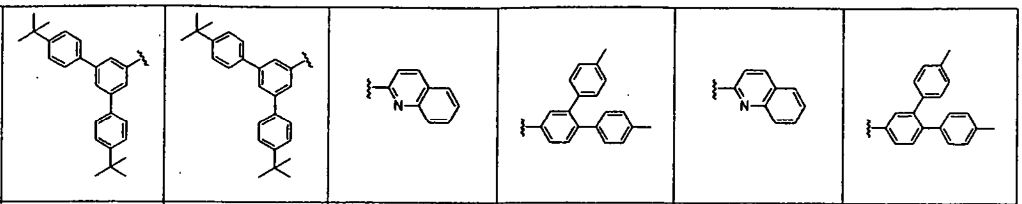
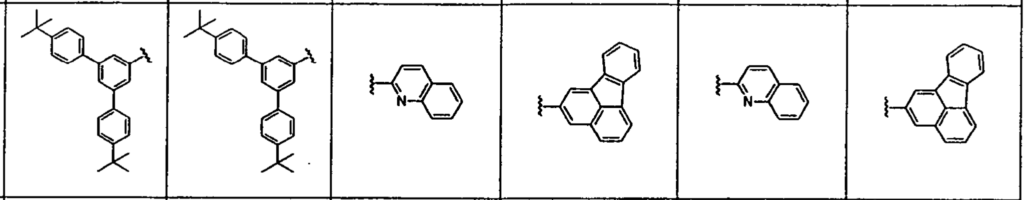
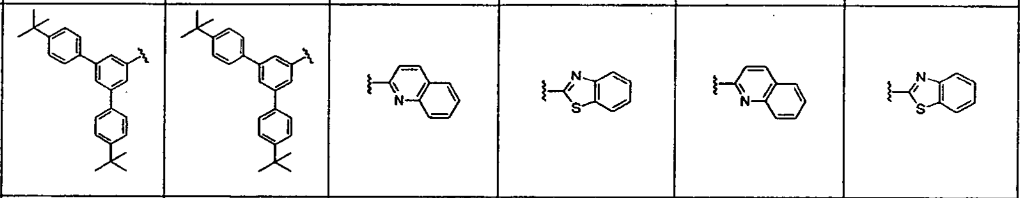
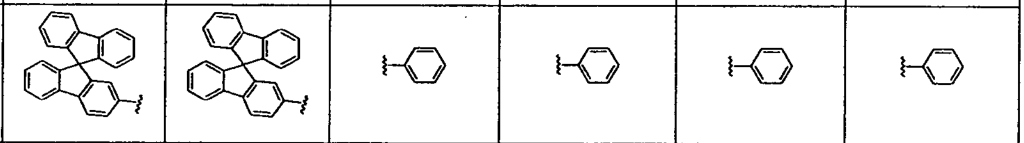
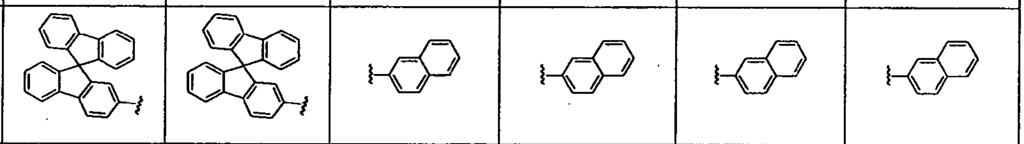
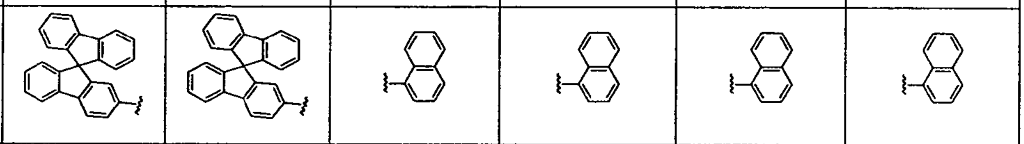
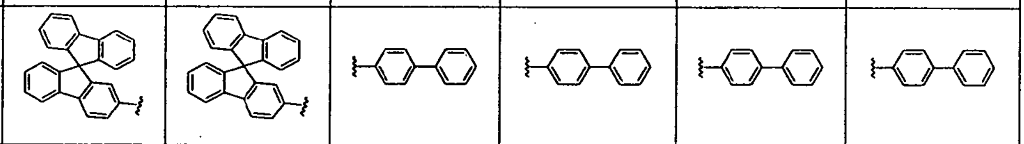
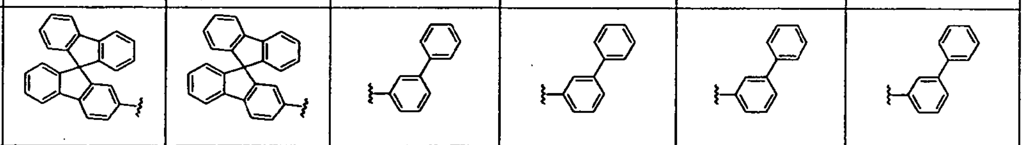
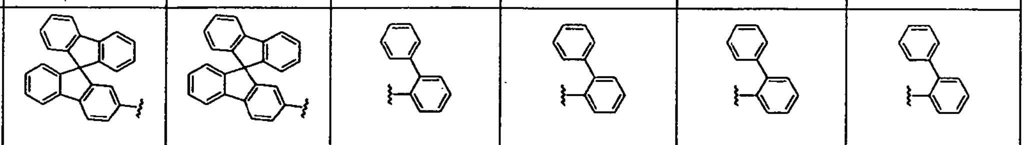
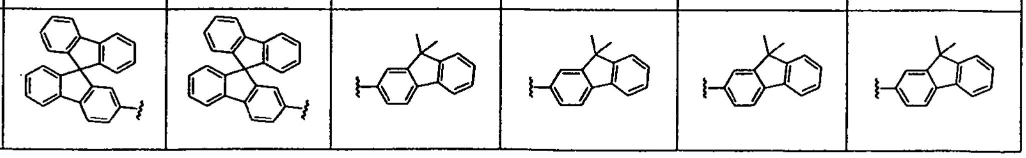
1010	
1011	
1012	
1013	
1014	
1015	
1016	
1017	

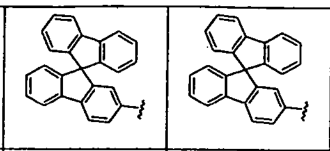
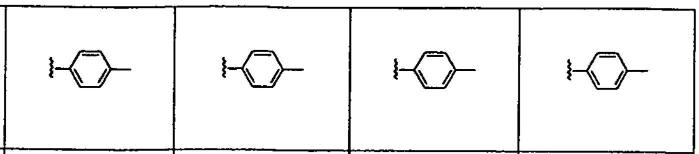
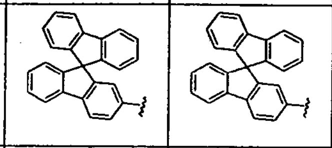
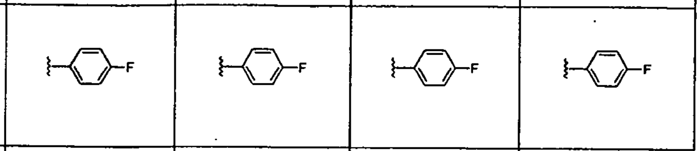
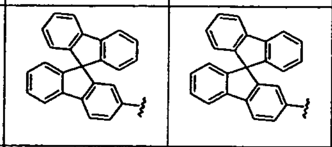
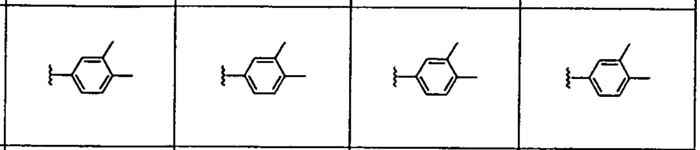
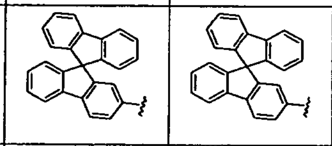
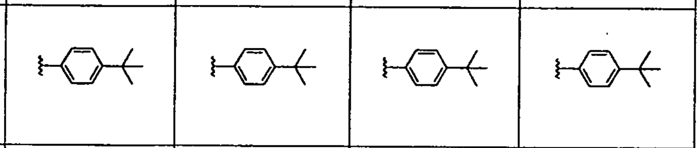
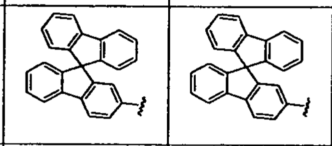
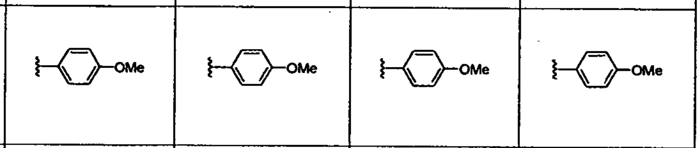
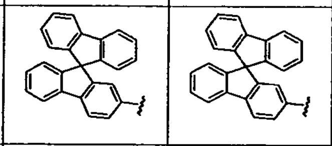
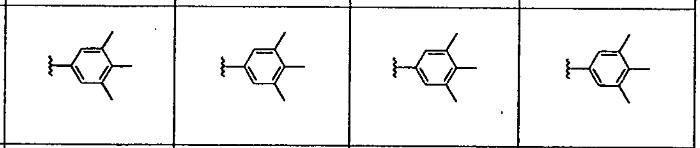
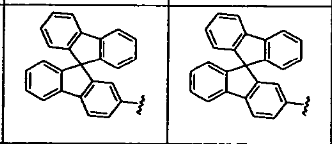
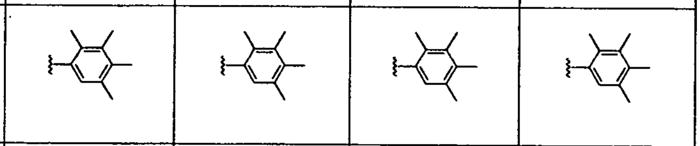
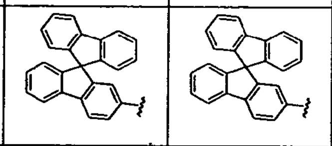
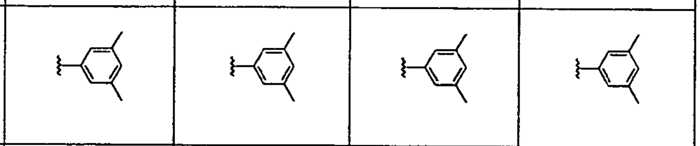
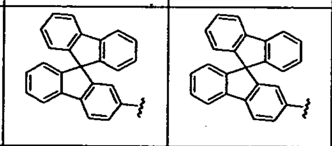
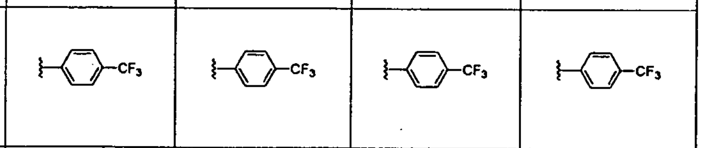
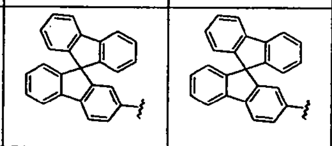
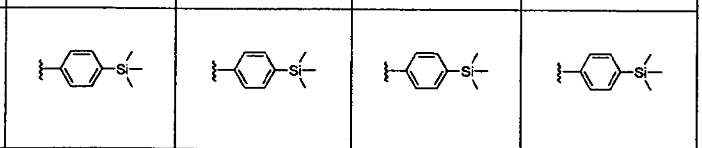
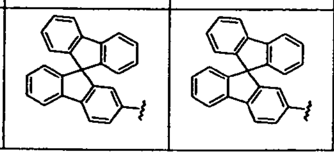
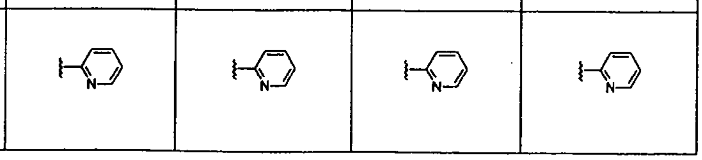
1018						
1019						
1020						
1021						
1022						
1023						
1024						
1025						

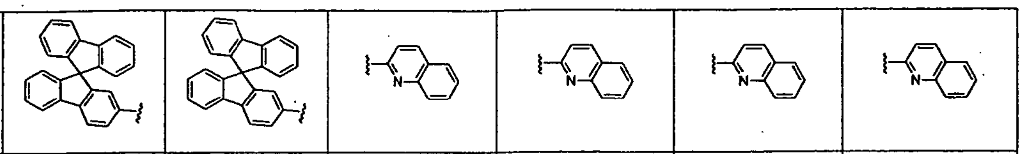
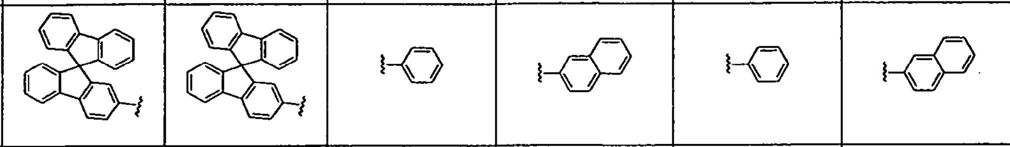
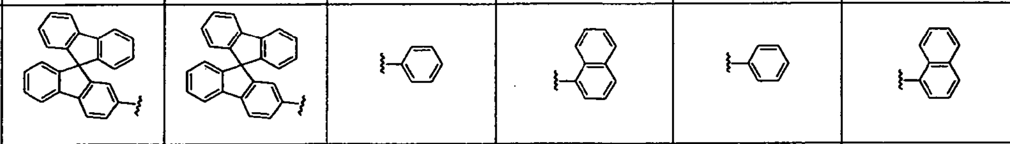
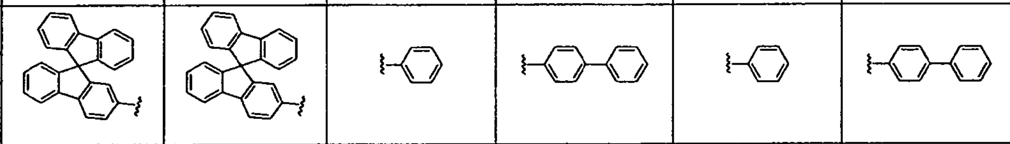
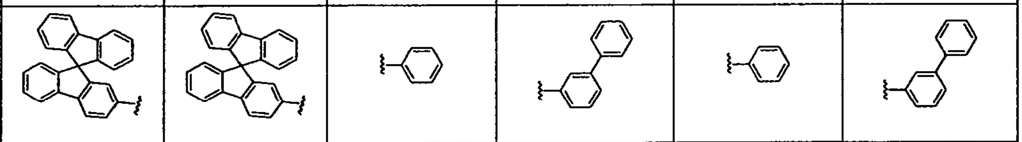
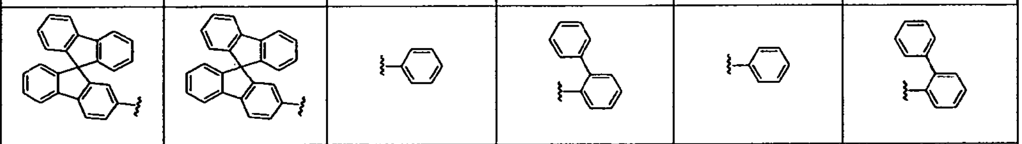
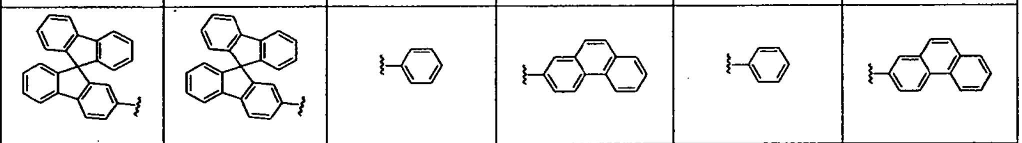
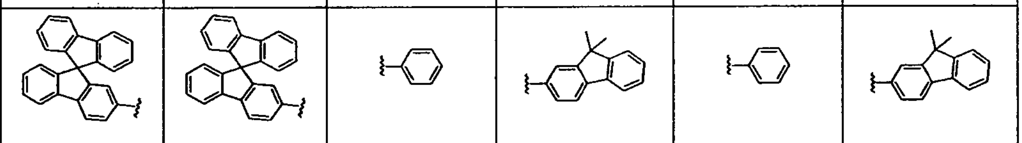
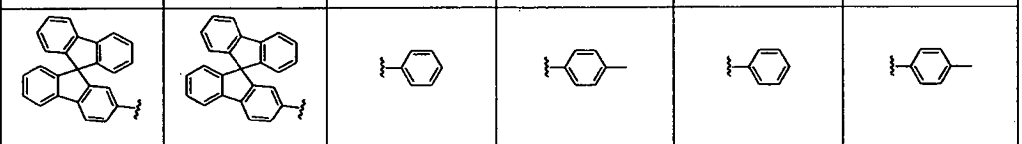
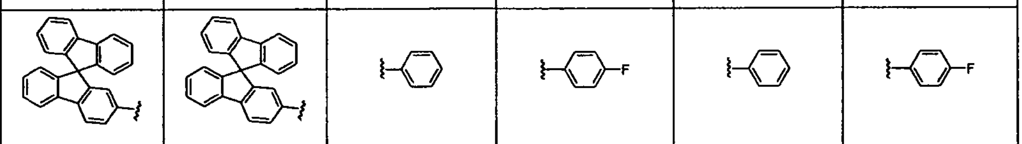
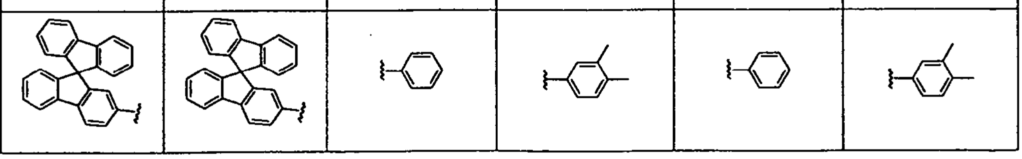
1026	
1027	
1028	
1029	
1030	
1031	
1032	
1033	

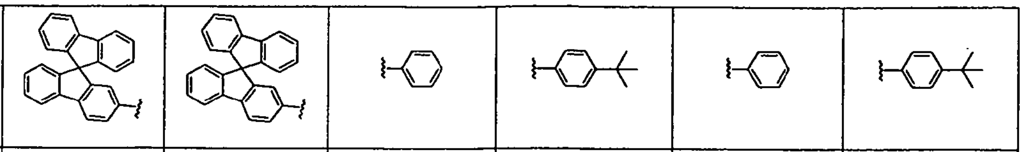
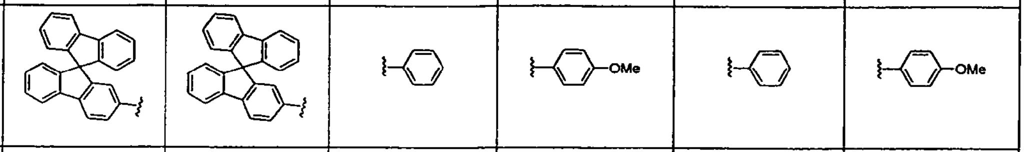
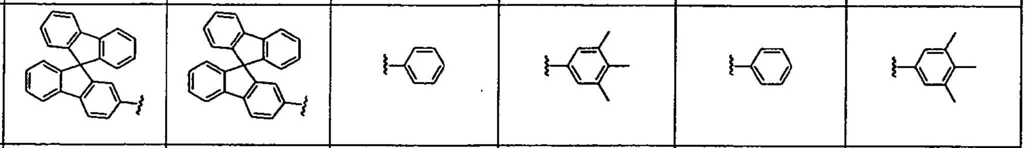
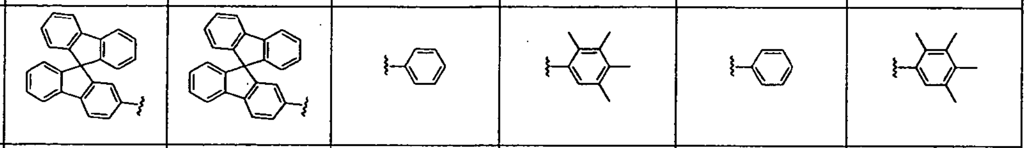
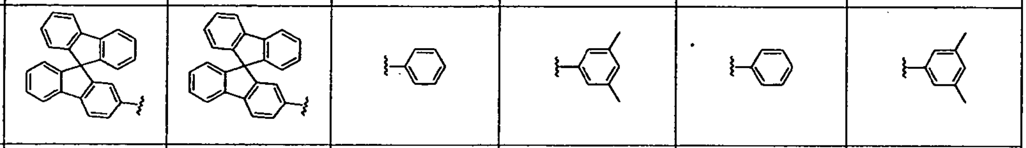
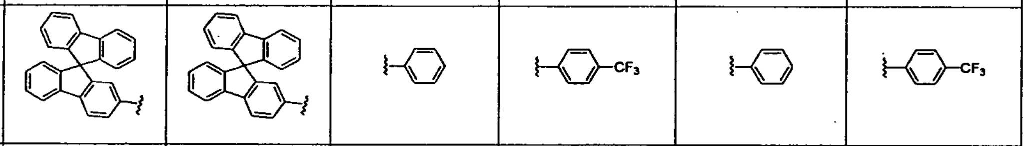
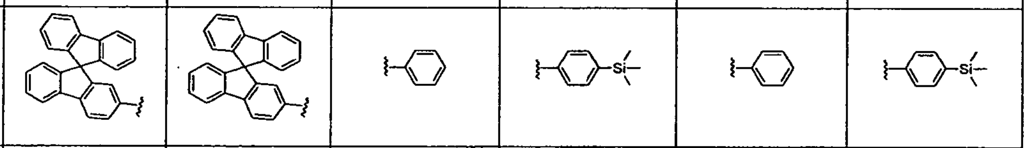
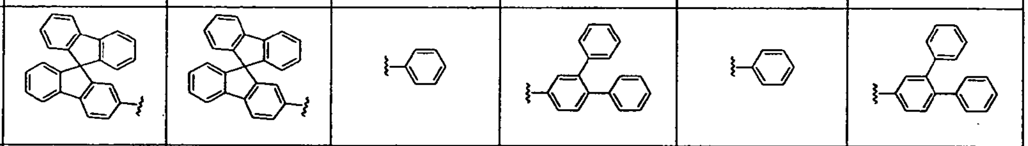
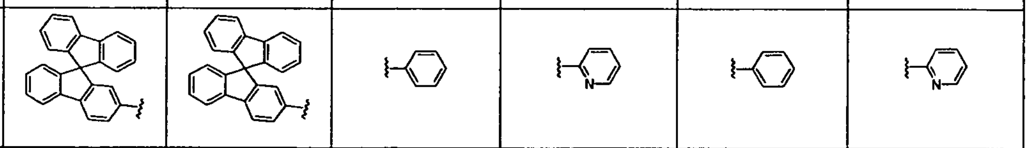
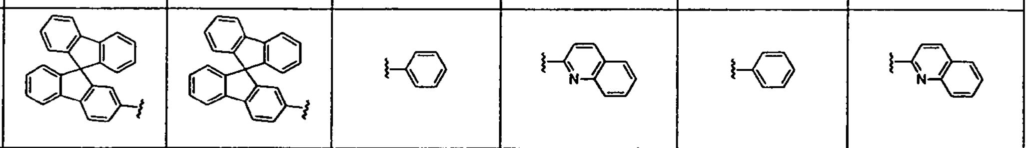
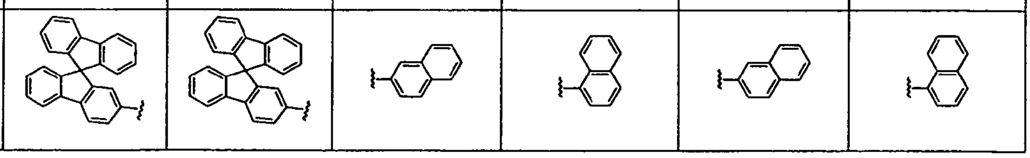
1034	
1035	
1036	
1037	
1038	
1039	
1040	
1041	

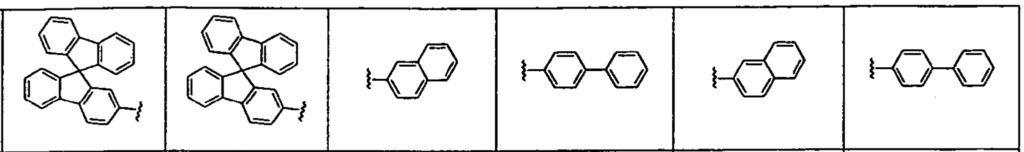
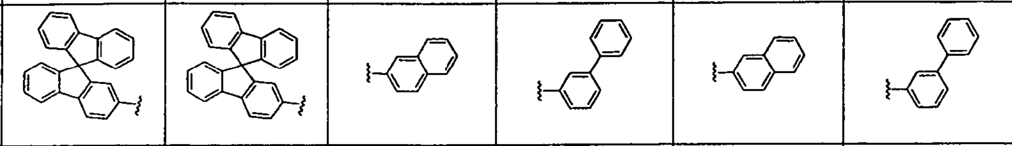
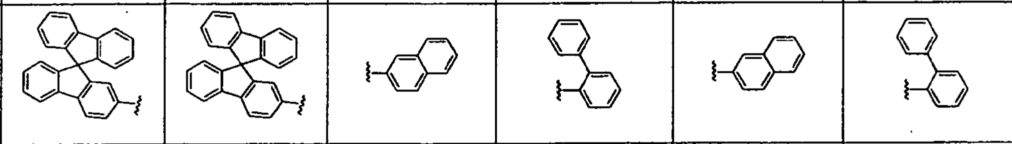
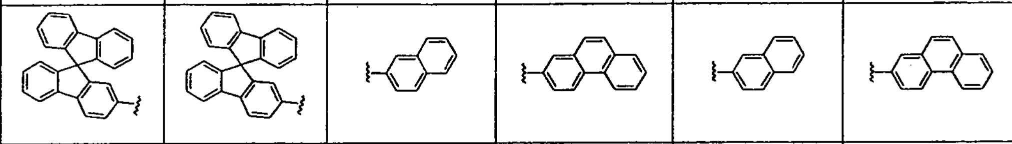
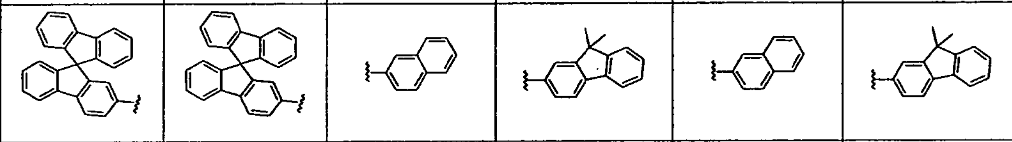
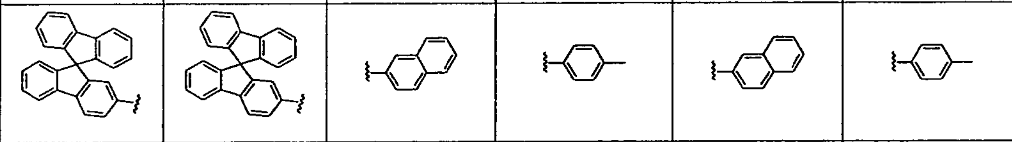
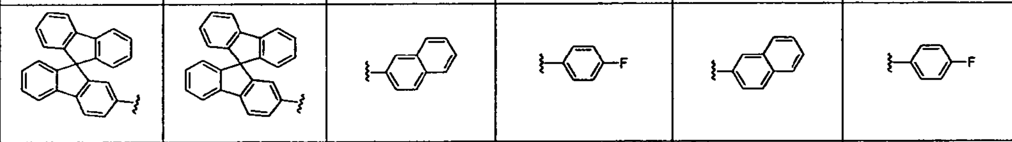
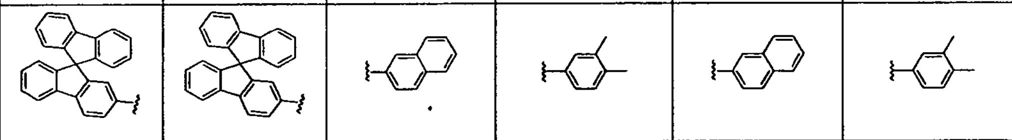
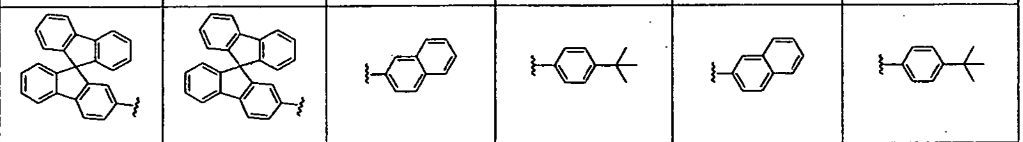
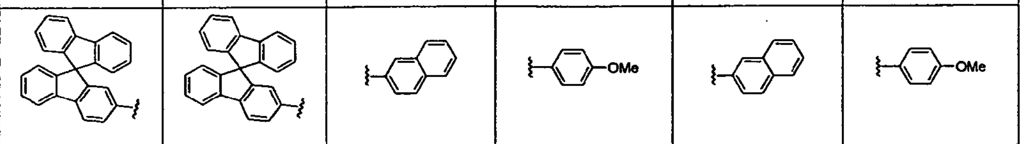
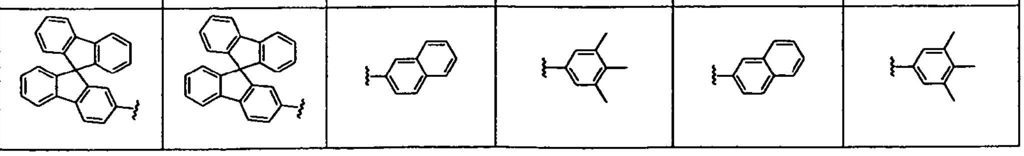
1042	
1043	
1044	
1045	
1046	
1047	
1048	
1049	

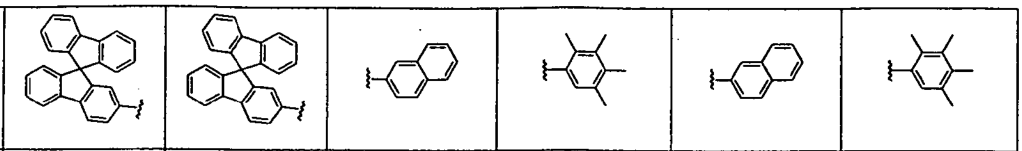
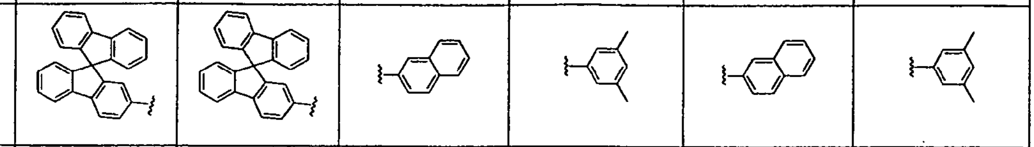
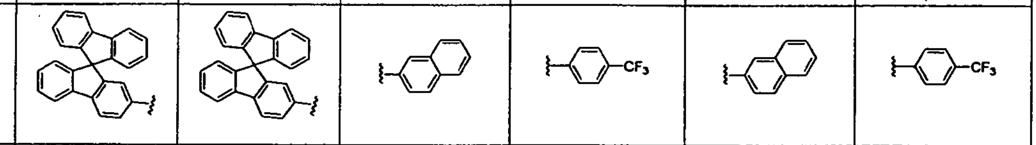
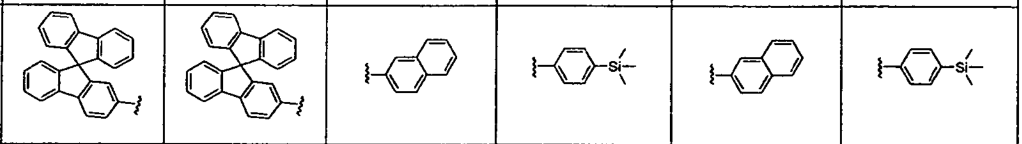
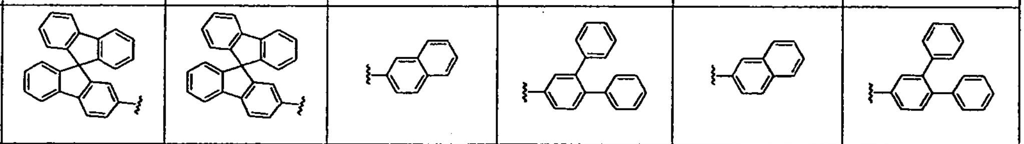
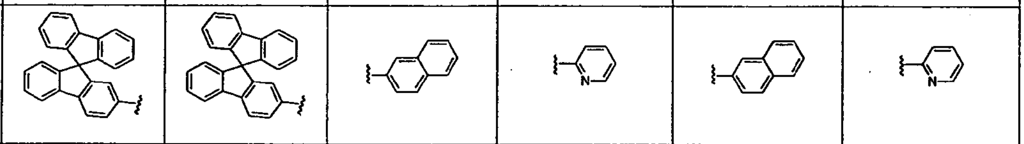
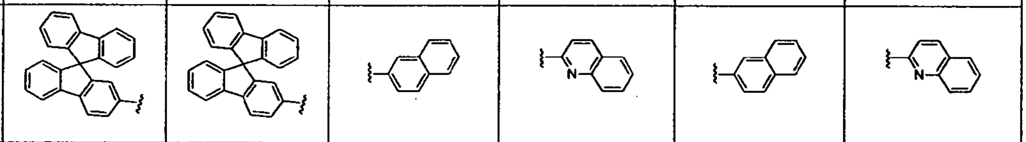
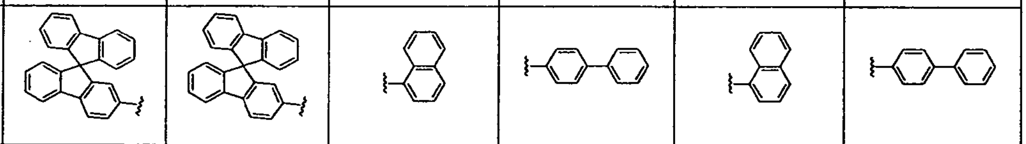
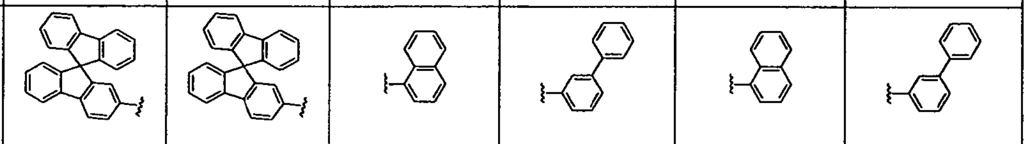
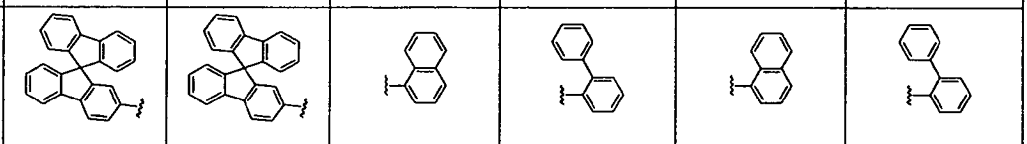
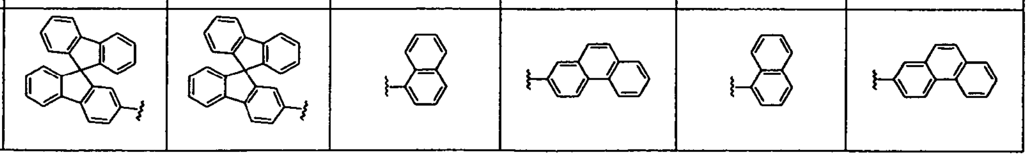
1050	
1051	
1052	
1053	
1054	
1055	
1056	
1057	
1058	
1059	

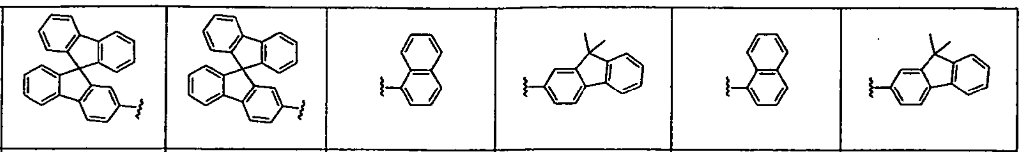
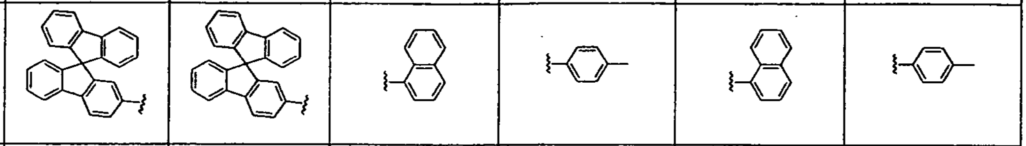
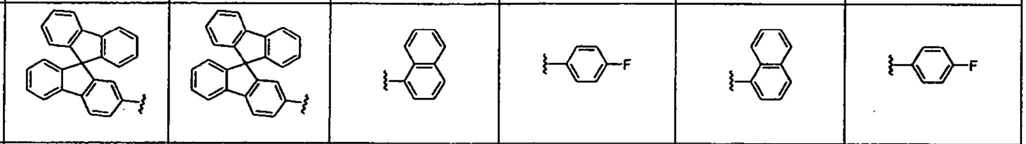
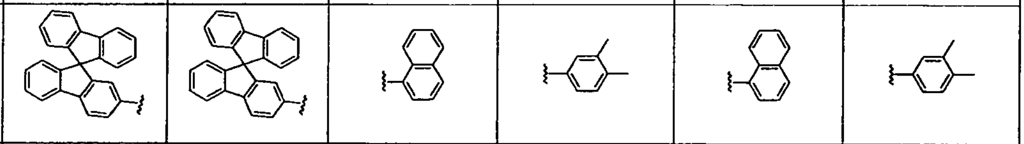
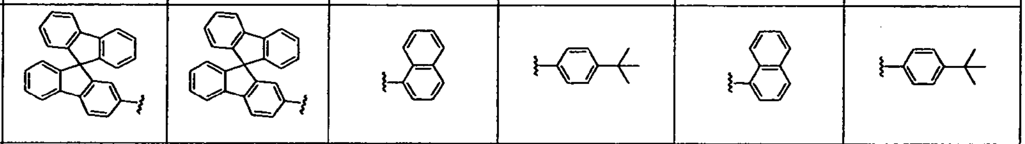
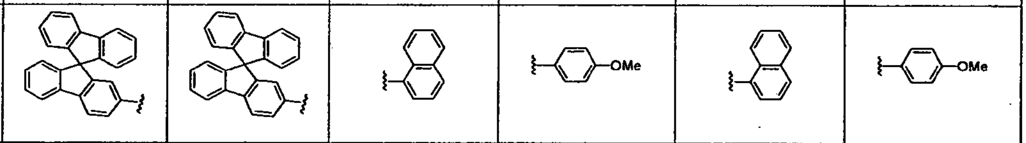
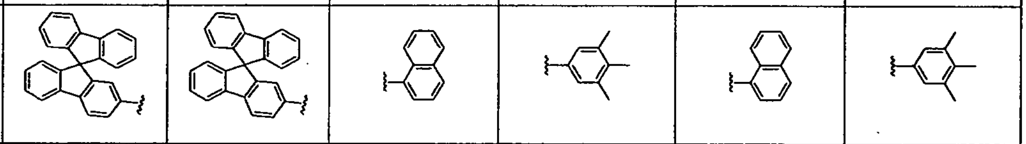
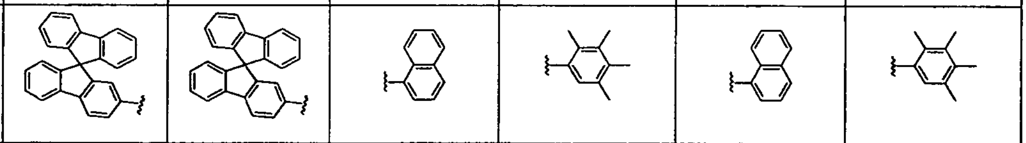
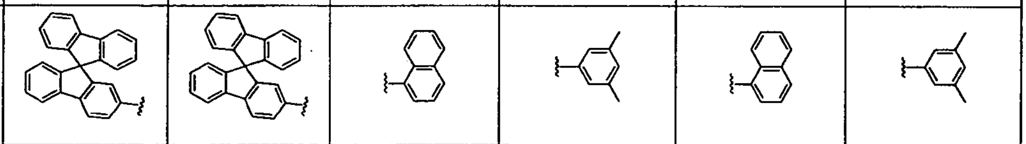
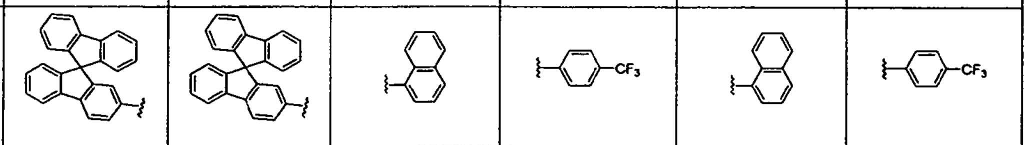
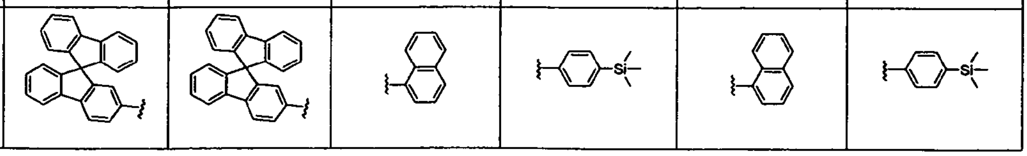
1060		
1061		
1062		
1063		
1064		
1065		
1066		
1067		
1068		
1069		
1070		

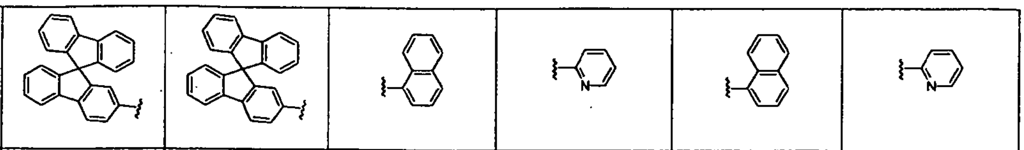
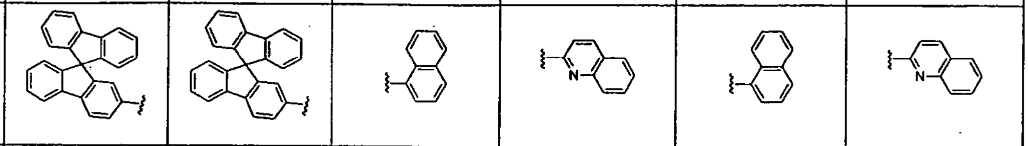
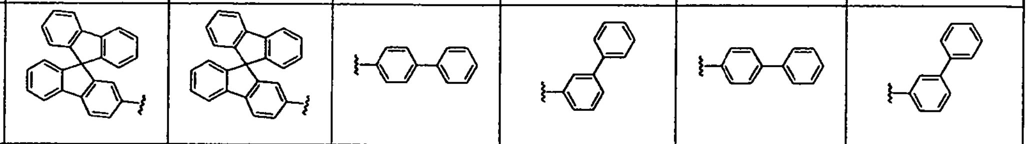
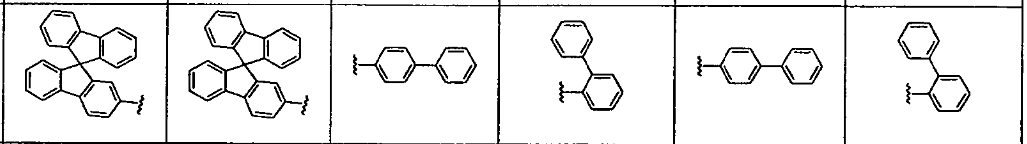
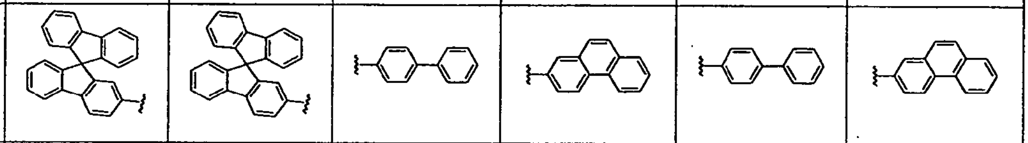
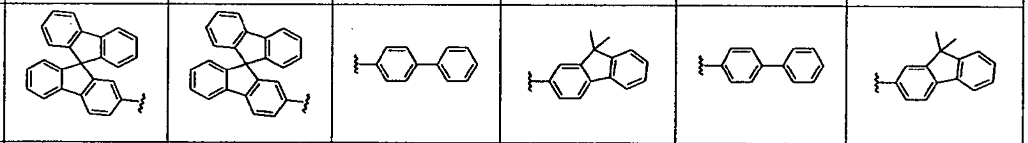
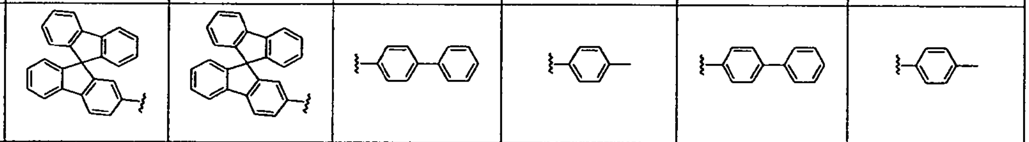
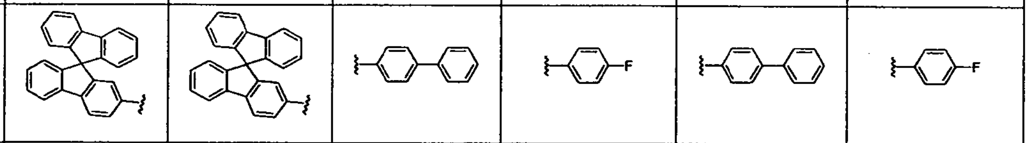
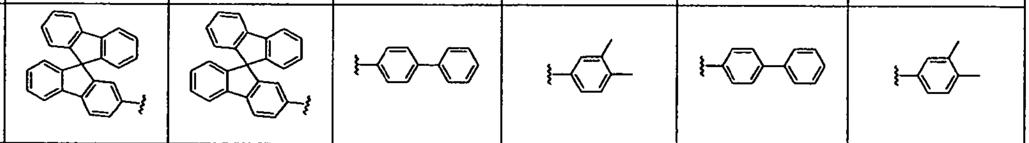
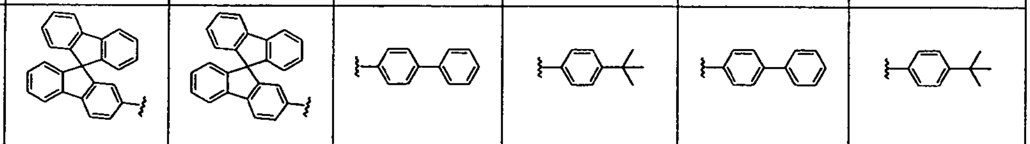
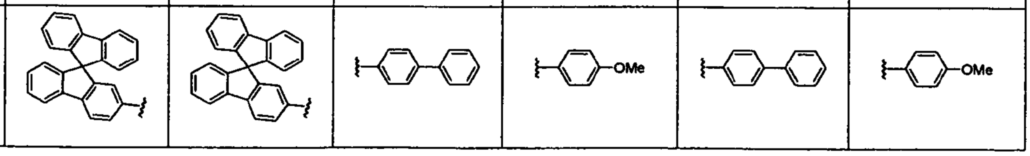
1071	
1072	
1073	
1074	
1075	
1076	
1077	
1078	
1079	
1080	
1081	

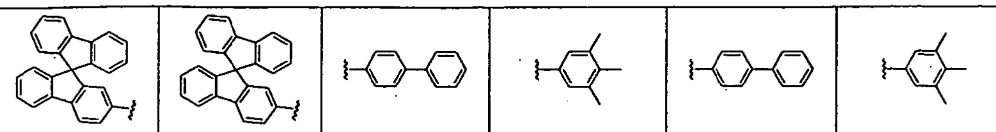
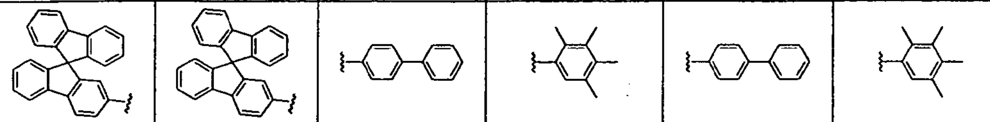
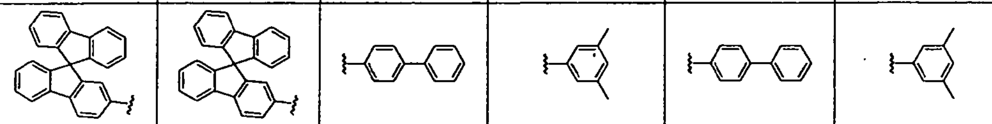
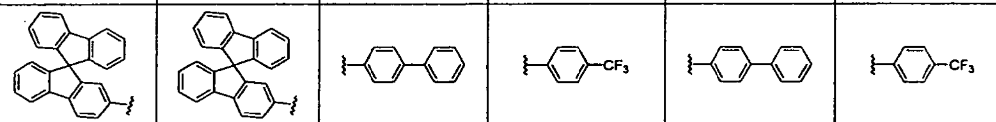
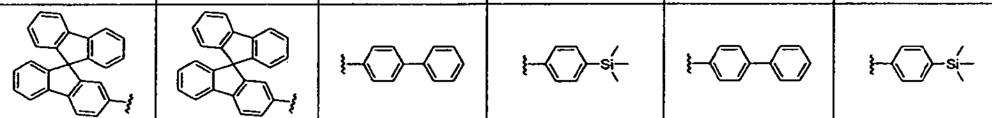
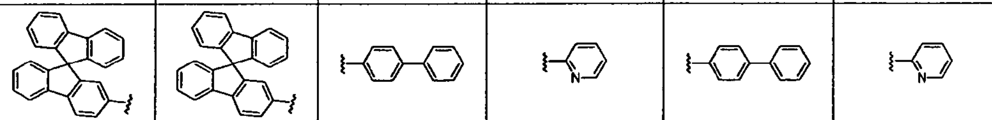
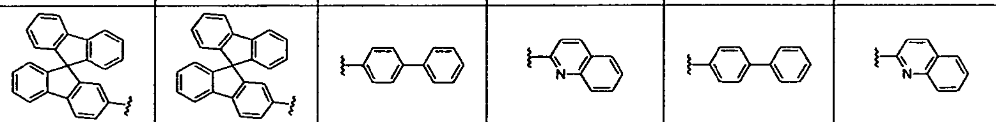
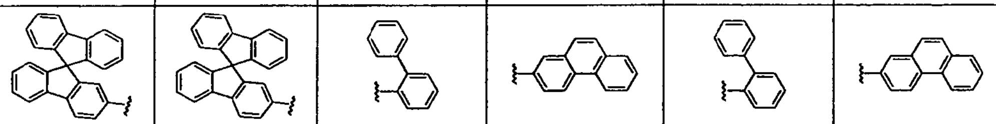
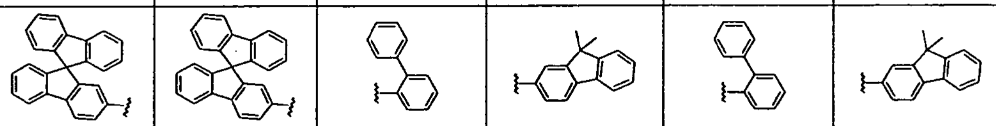
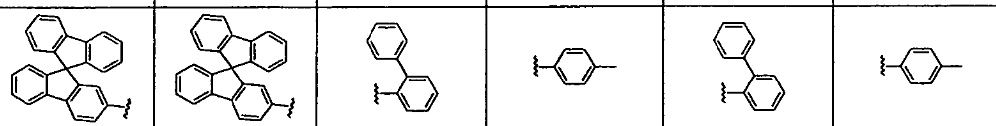
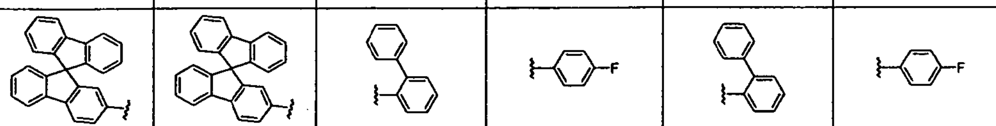
1082	
1083	
1084	
1085	
1086	
1087	
1088	
1089	
1090	
1091	
1092	

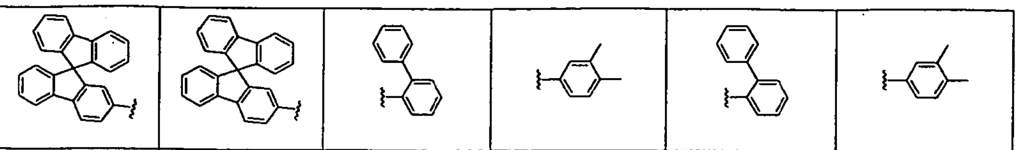
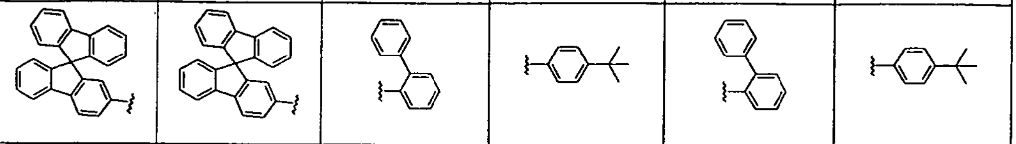
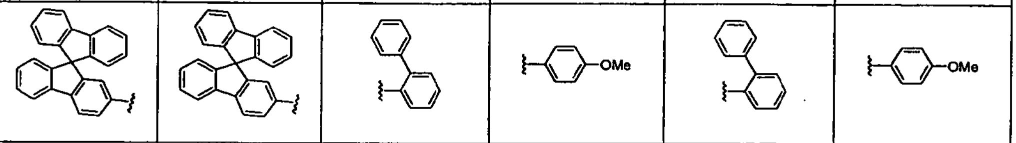
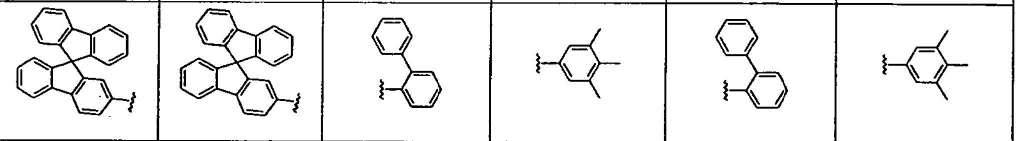
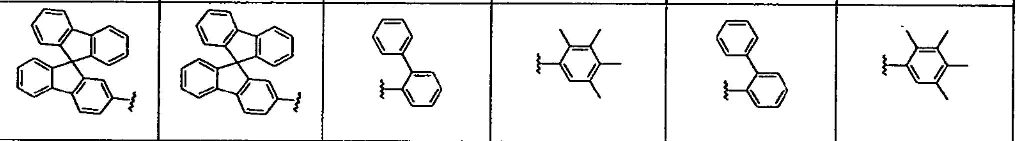
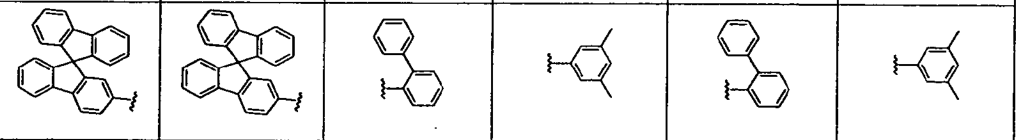
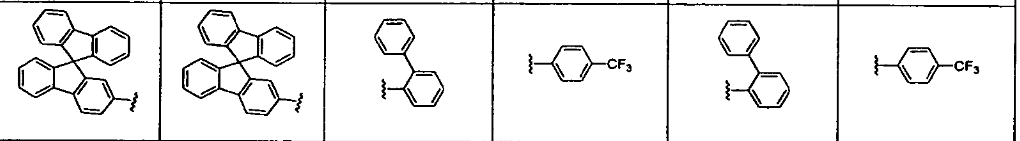
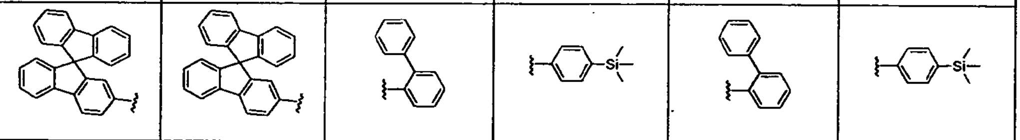
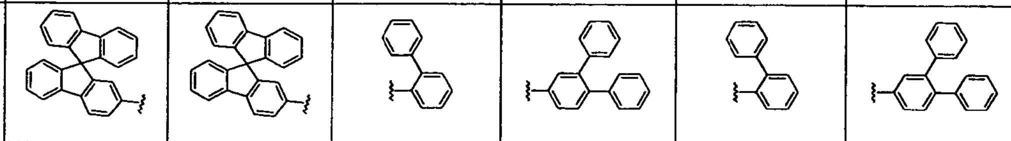
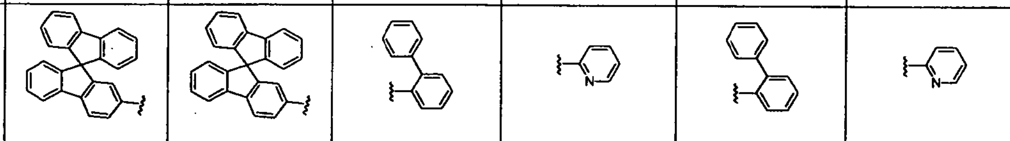
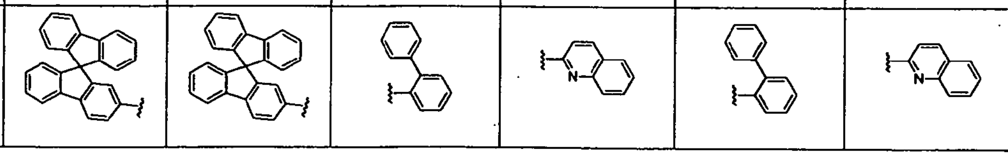
1093	
1094	
1095	
1096	
1097	
1098	
1099	
1100	
1101	
1102	
1103	

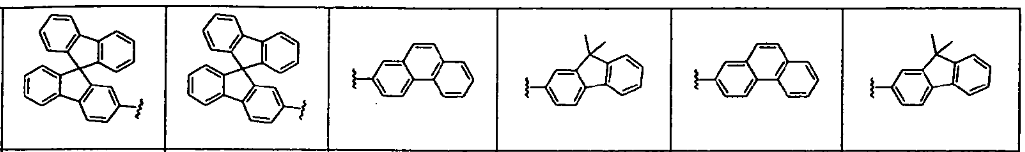
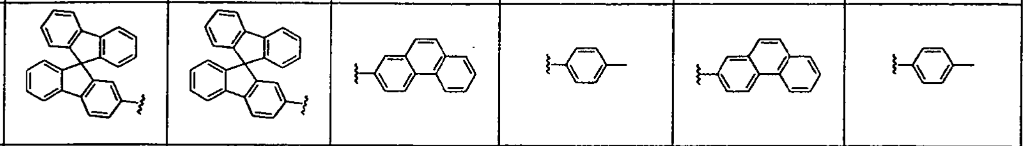
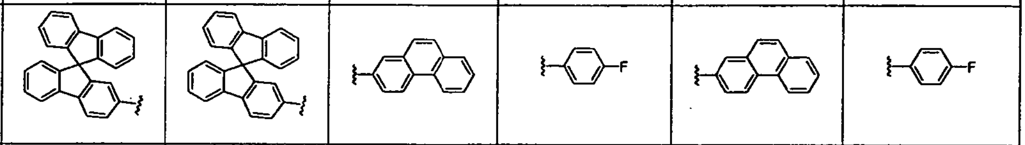
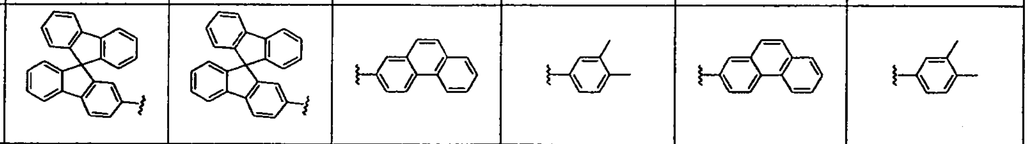
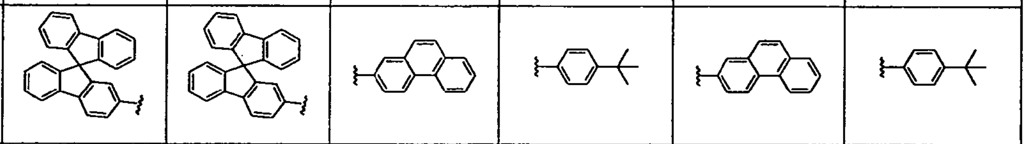
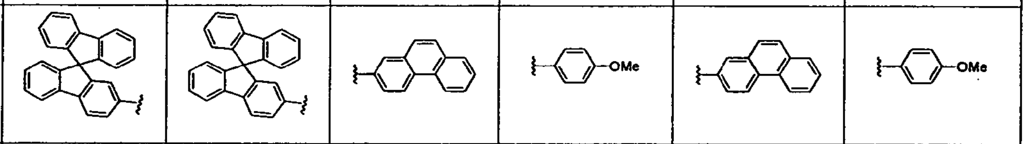
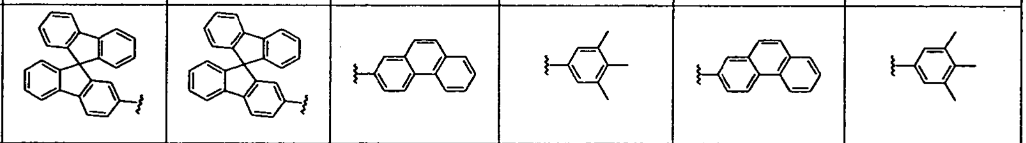
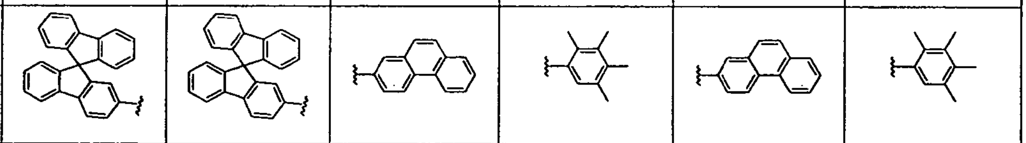
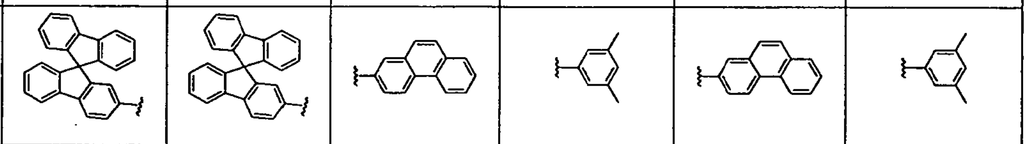
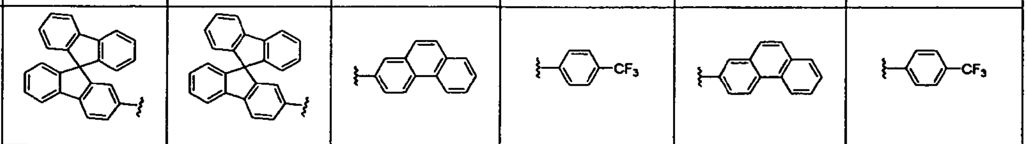
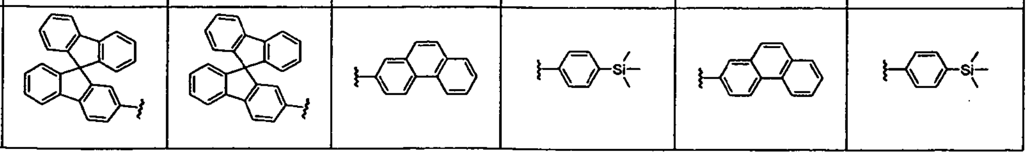
1104	
1105	
1106	
1107	
1108	
1109	
1110	
1111	
1112	
1113	
1114	

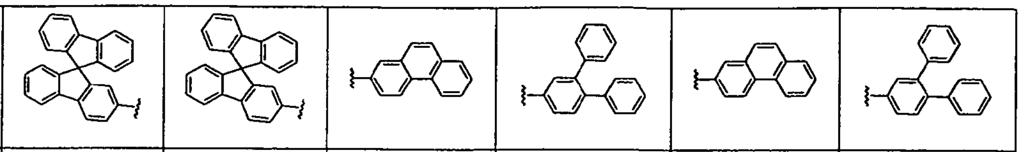
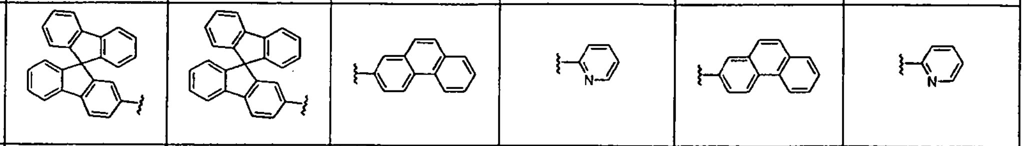
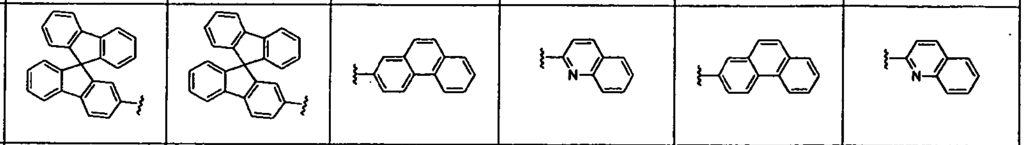
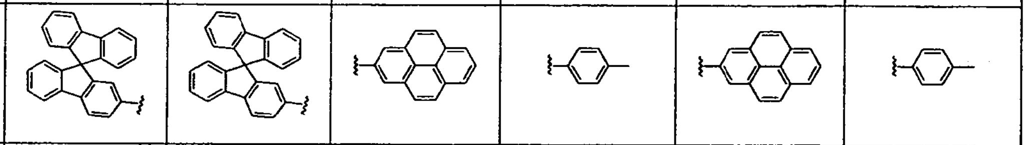
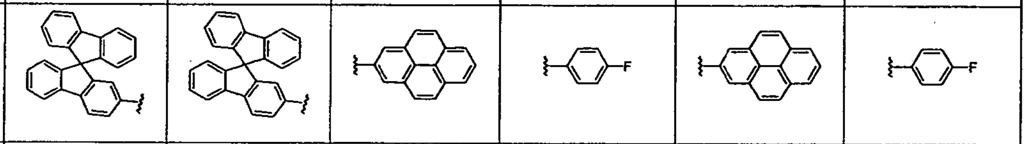
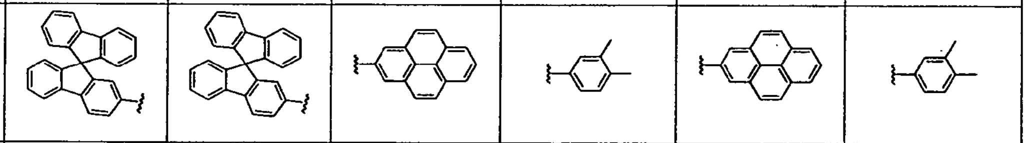
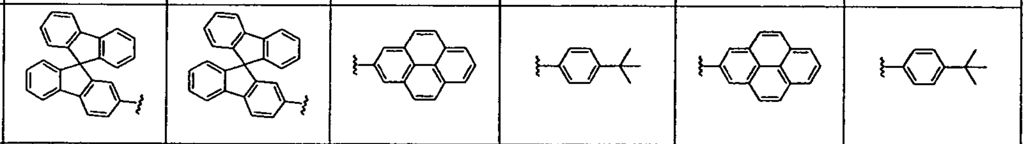
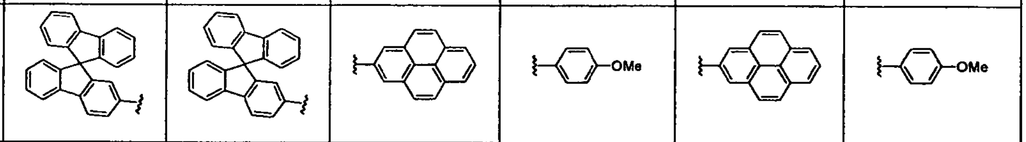
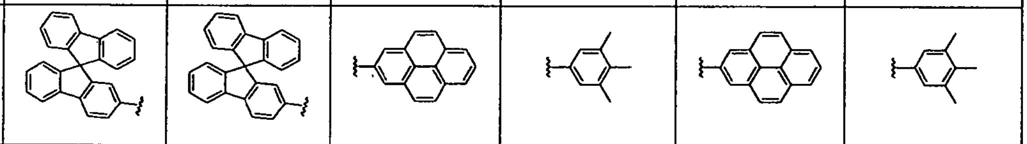
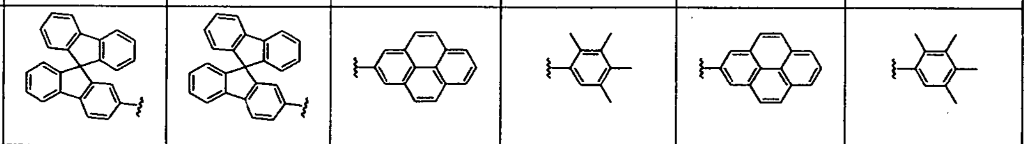
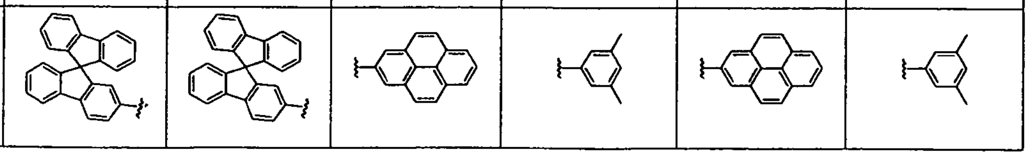
1115	
1116	
1117	
1118	
1119	
1120	
1121	
1122	
1123	
1124	
1125	

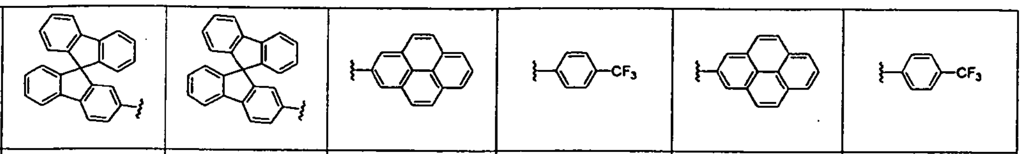
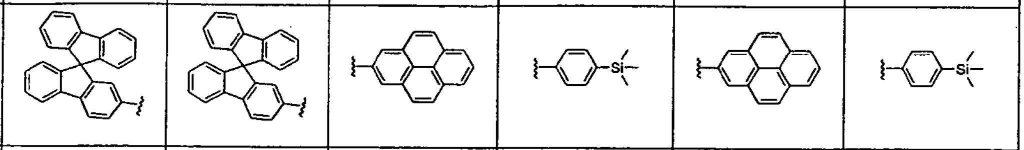
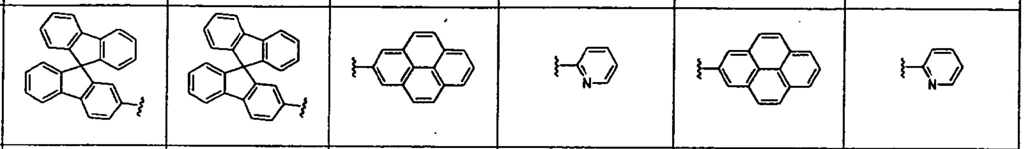
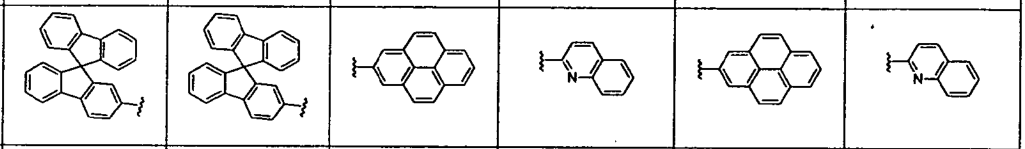
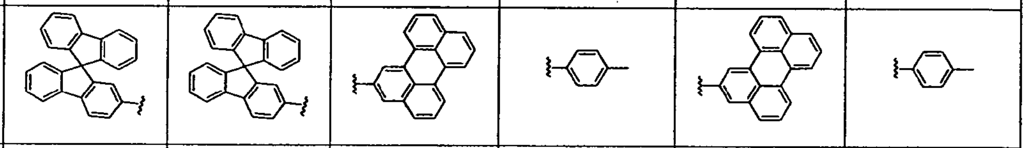
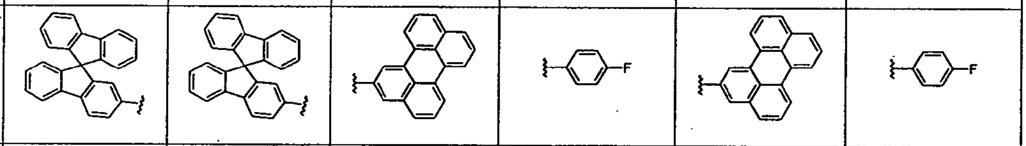
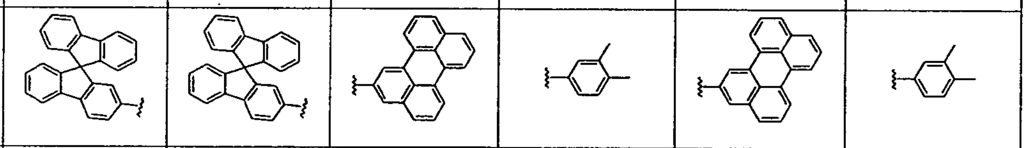
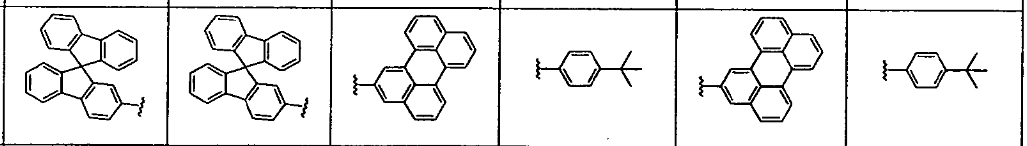
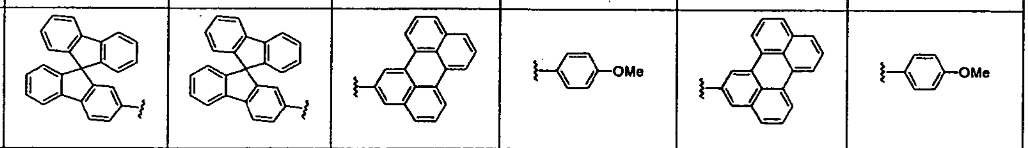
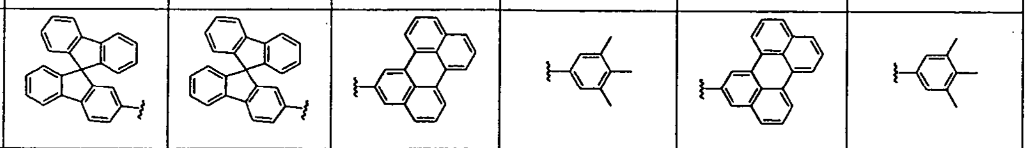
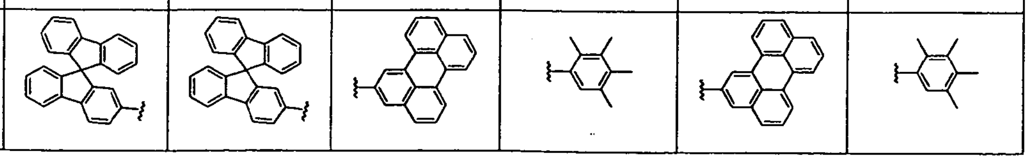
1126	
1127	
1128	
1129	
1130	
1131	
1132	
1133	
1134	
1135	
1136	

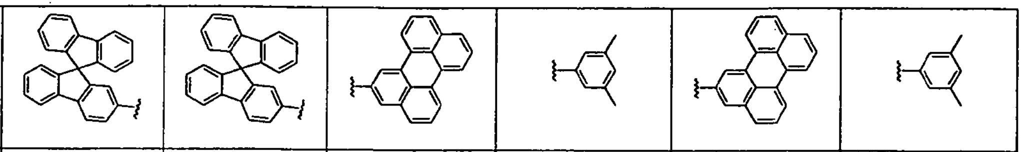
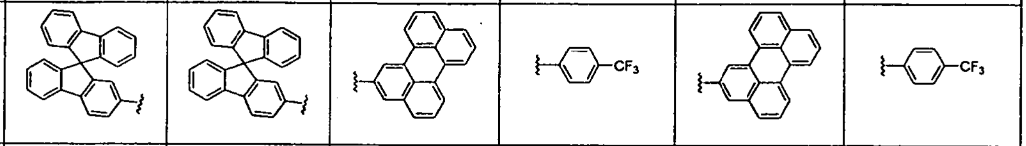
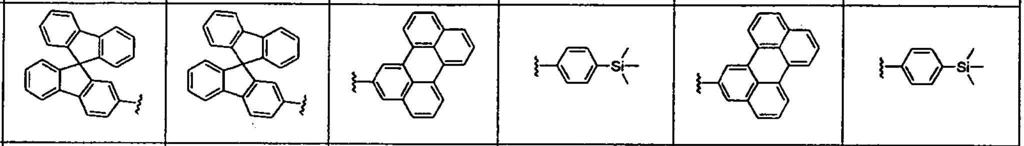
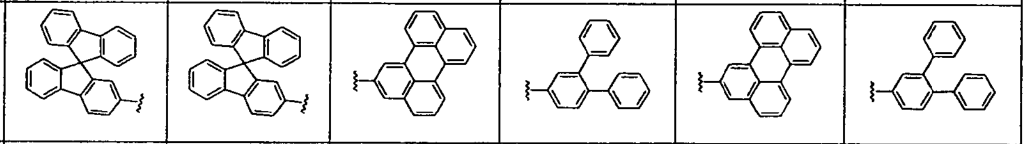
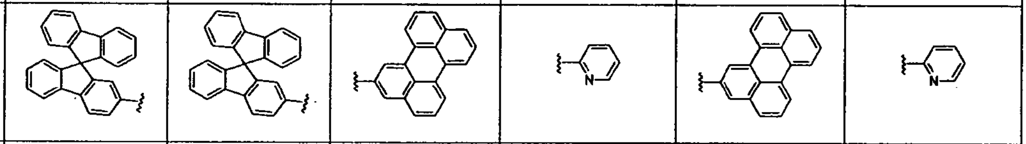
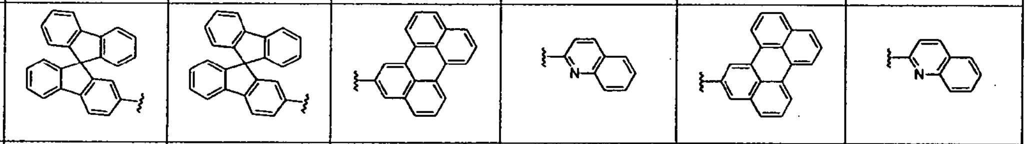
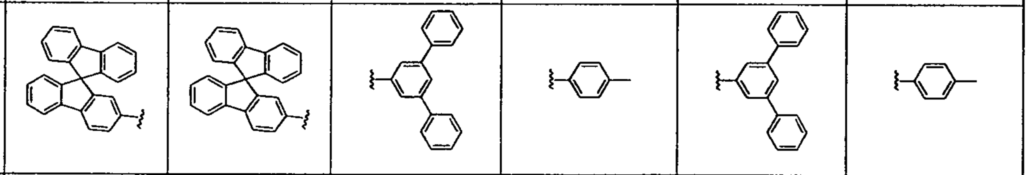
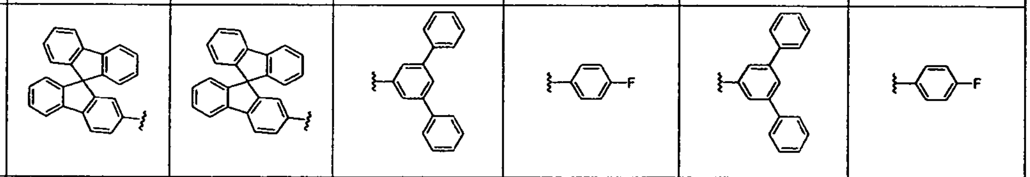
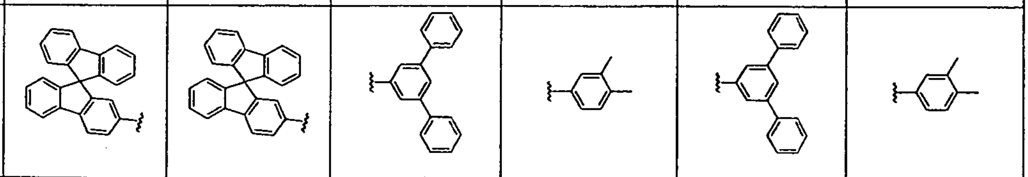
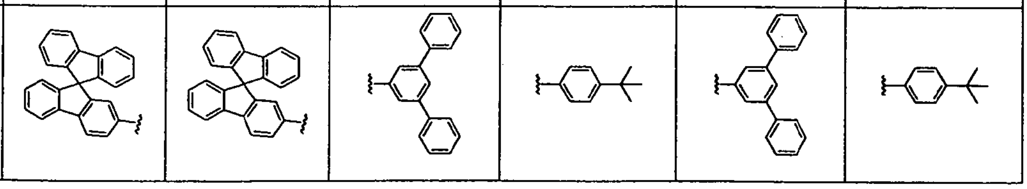
1137	
1138	
1139	
1140	
1141	
1142	
1143	
1144	
1145	
1146	
1147	

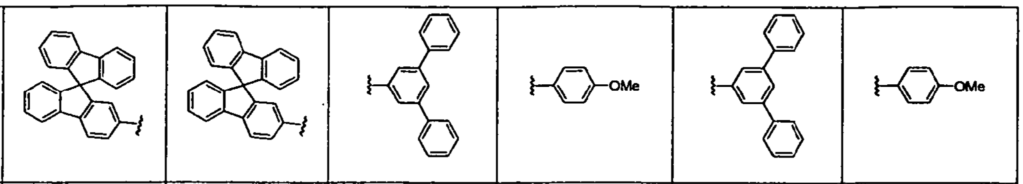
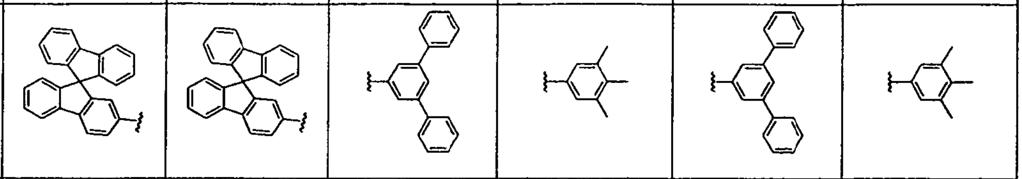
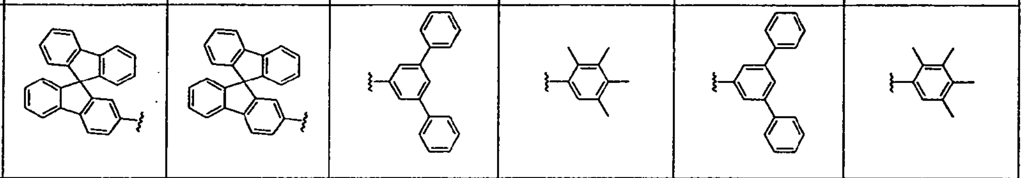
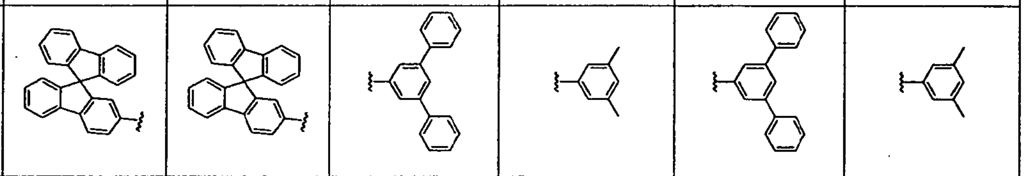
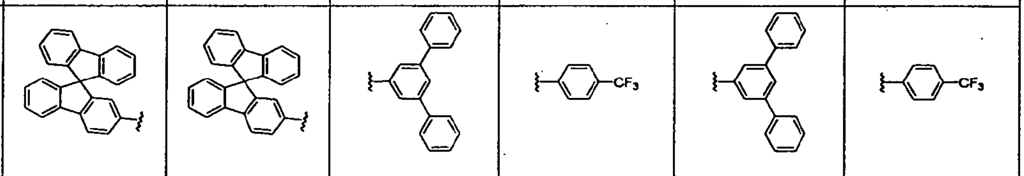
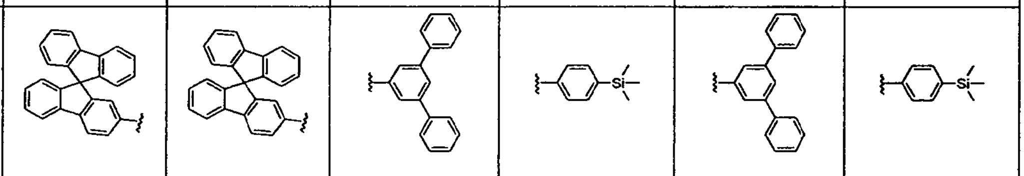
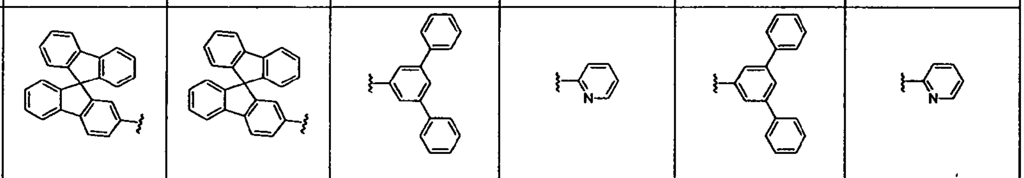
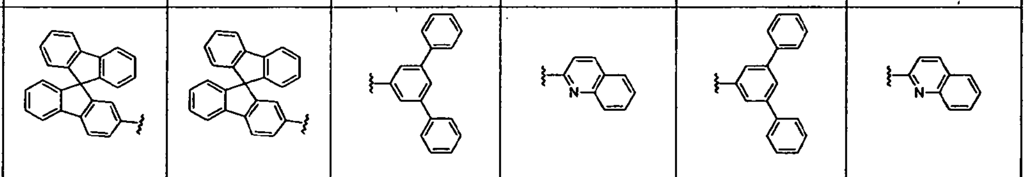
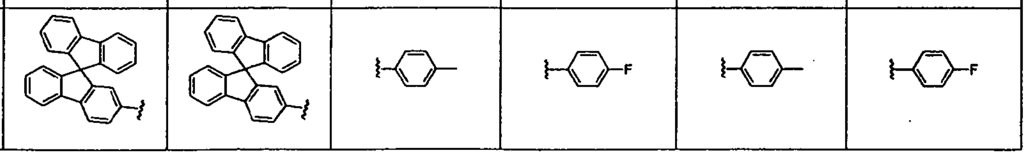
1148						
1149						
1150						
1151						
1152						
1153						
1154						
1155						
1156						
1157						
1158						

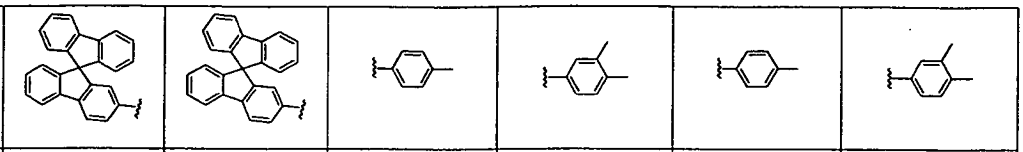
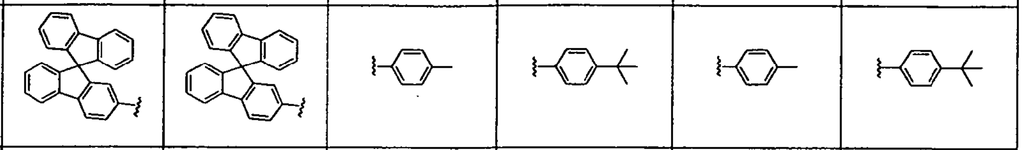
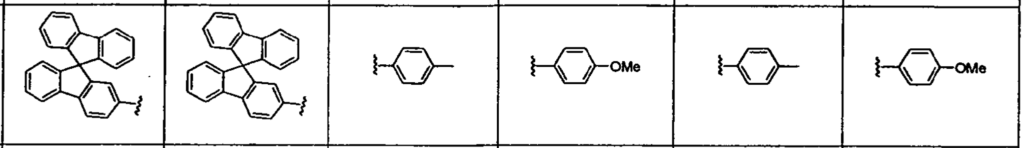
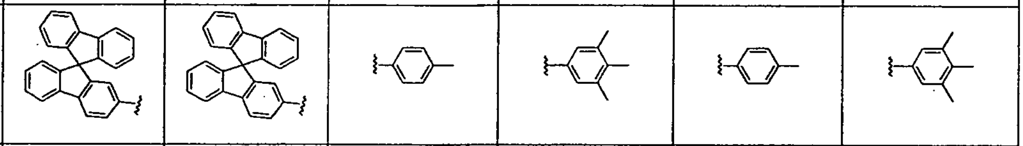
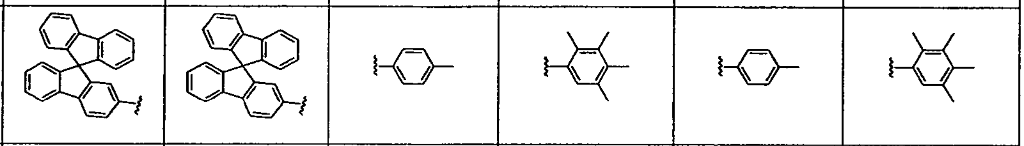
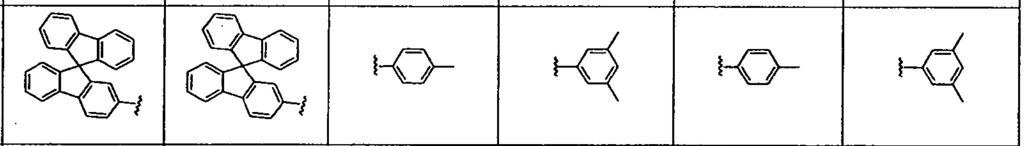
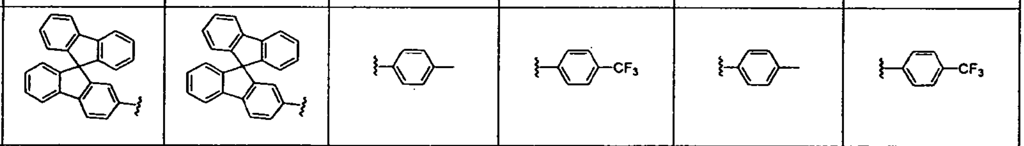
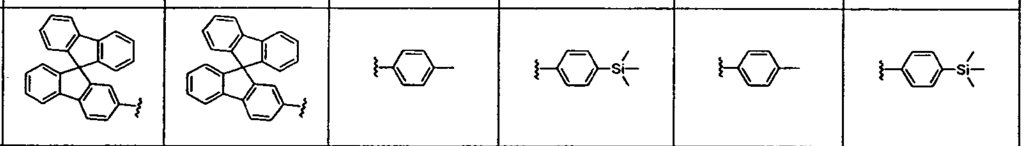
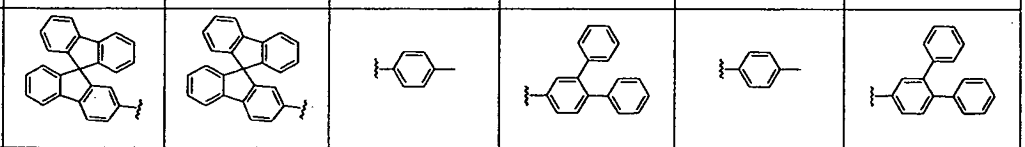
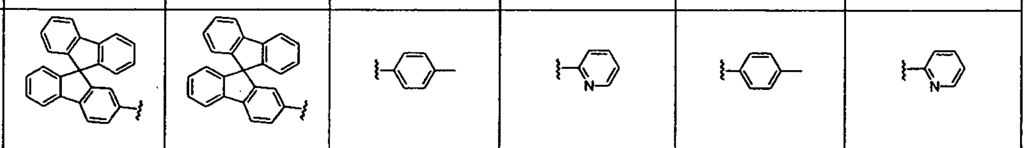
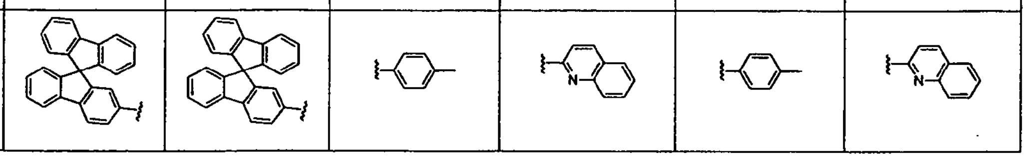
1159	
1160	
1161	
1162	
1163	
1164	
1165	
1166	
1167	
1168	
1169	

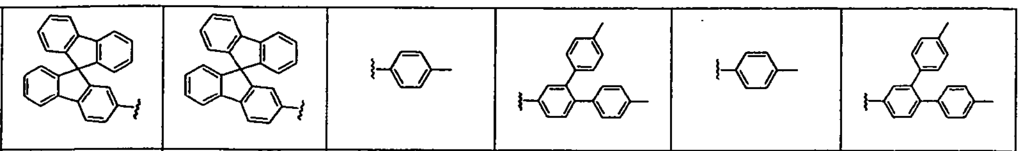
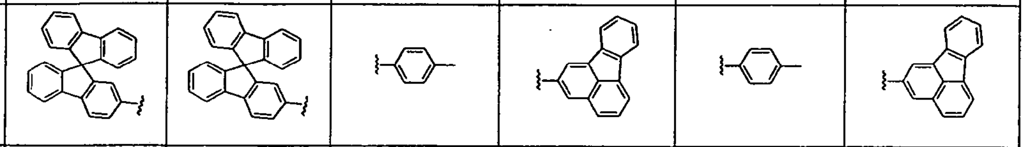
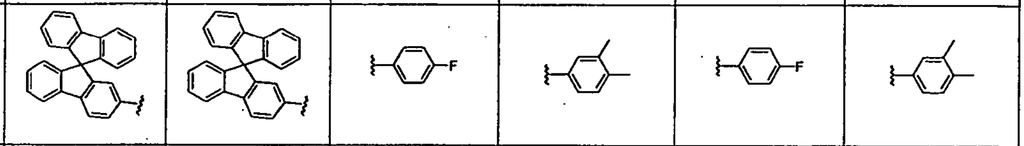
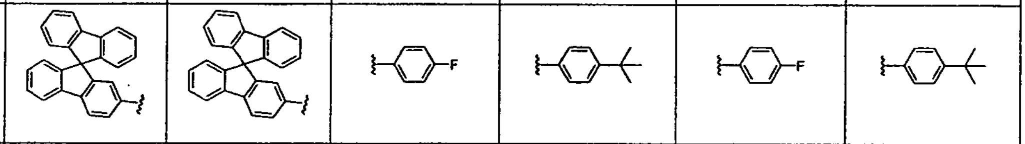
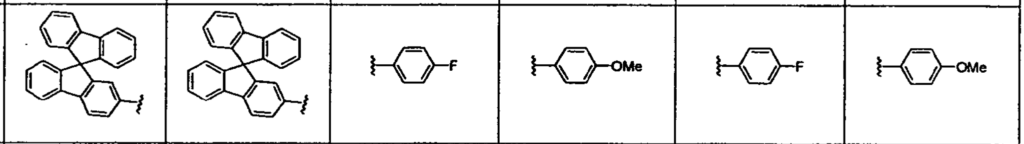
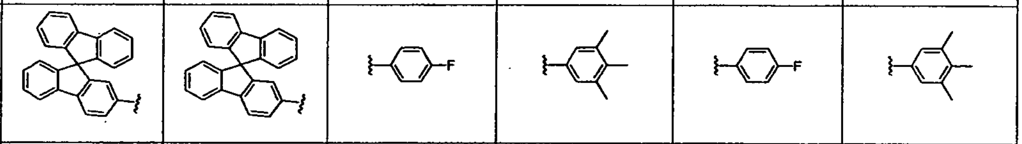
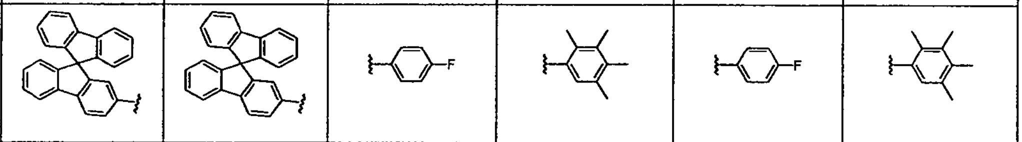
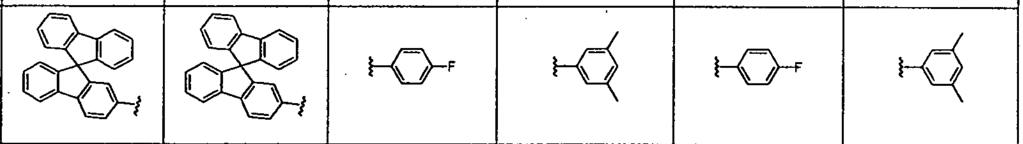
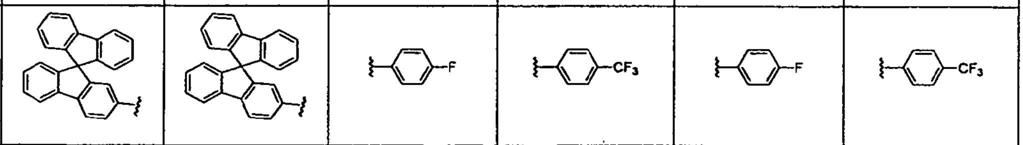
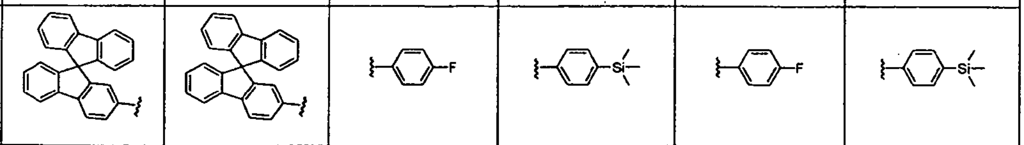
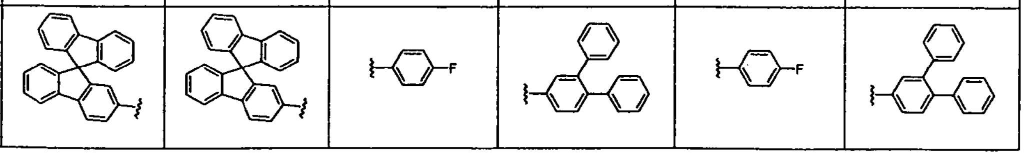
1170	
1171	
1172	
1173	
1174	
1175	
1176	
1177	
1178	
1179	
1180	

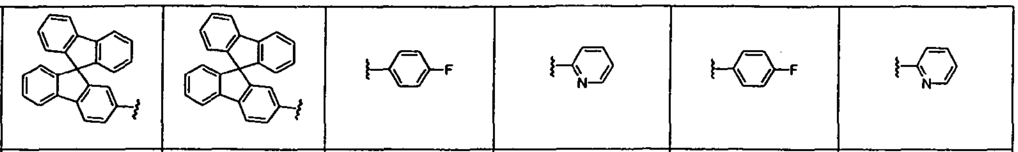
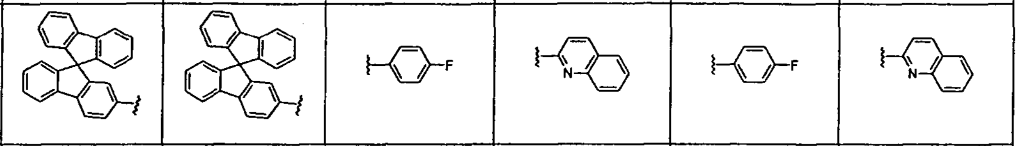
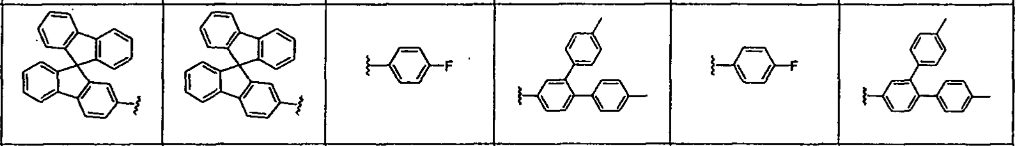
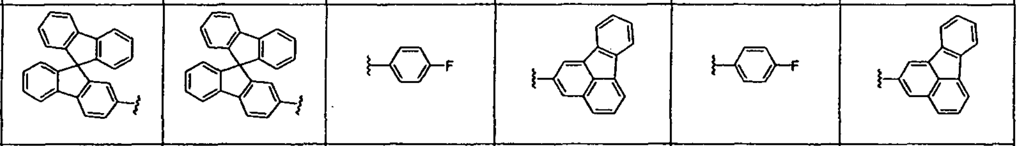
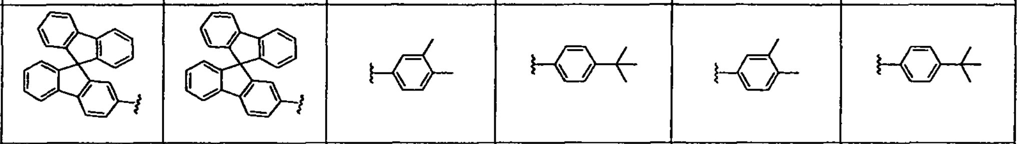
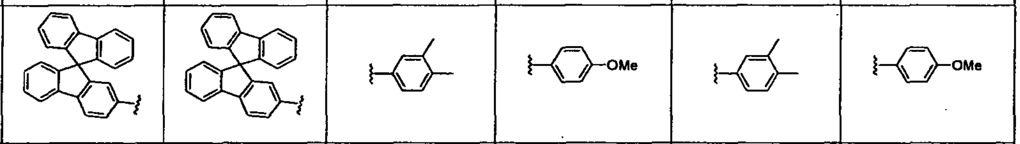
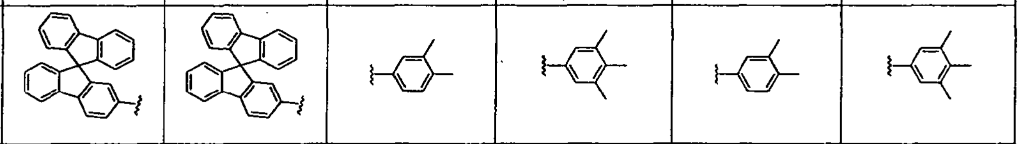
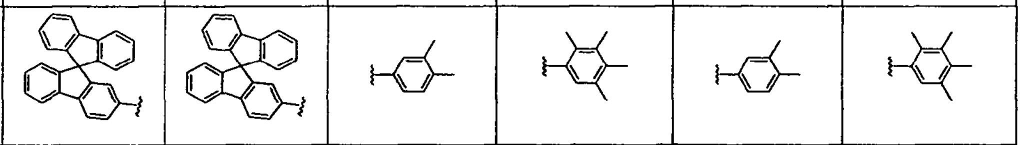
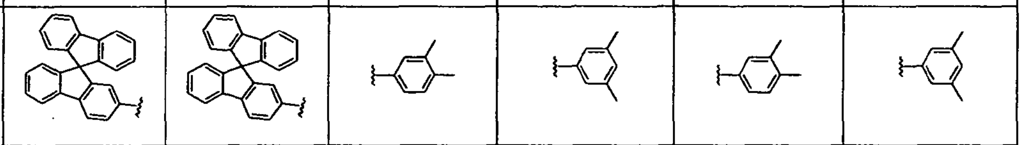
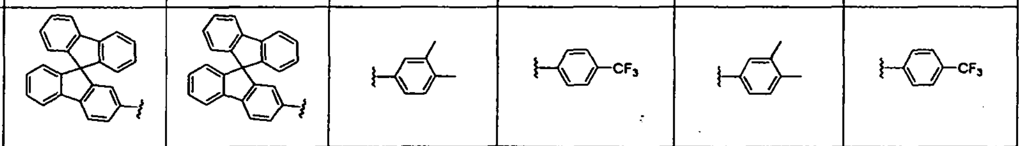
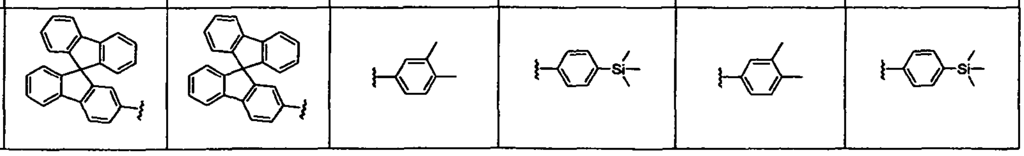
1181	
1182	
1183	
1184	
1185	
1186	
1187	
1188	
1189	
1190	
1191	

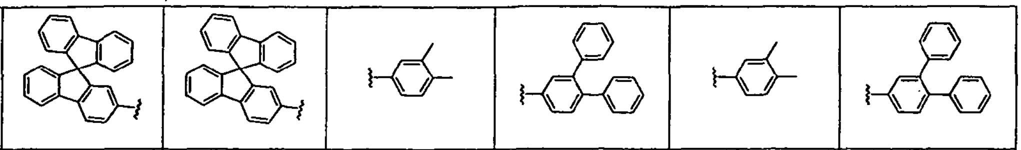
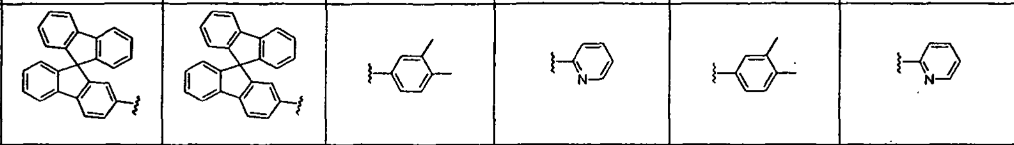
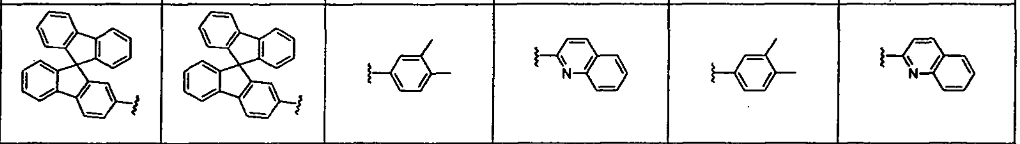
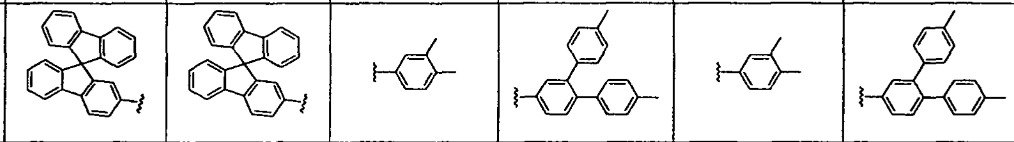
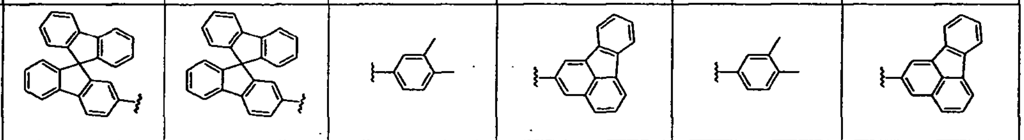
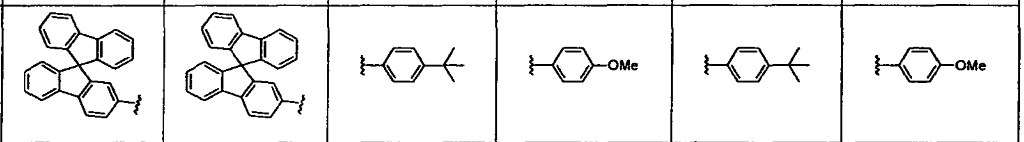
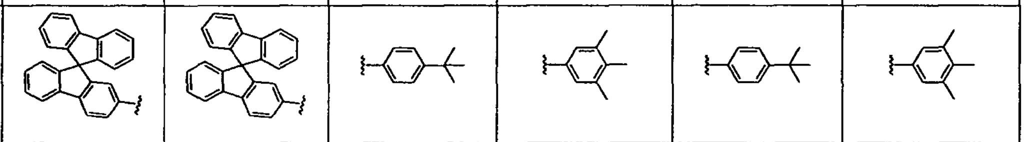
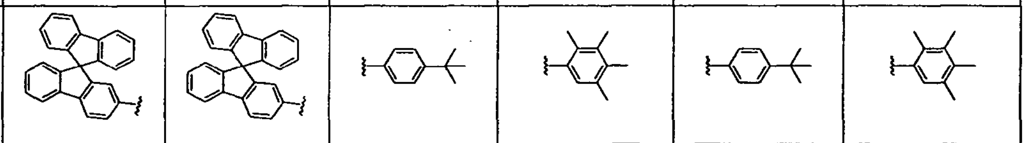
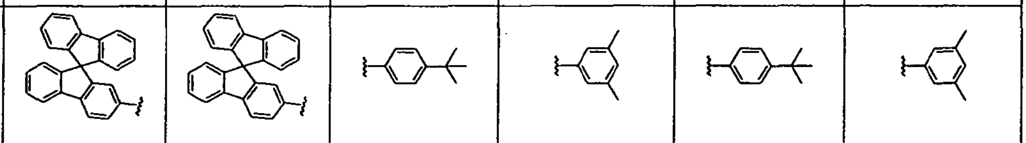
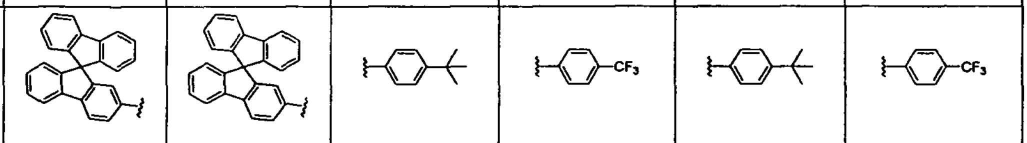
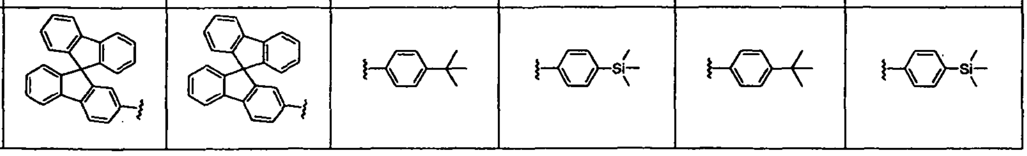
1192	
1193	
1194	
1195	
1196	
1197	
1198	
1199	
1200	
1201	

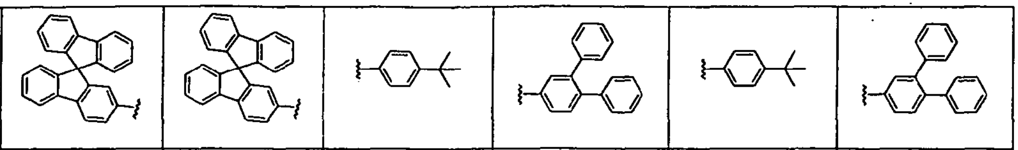
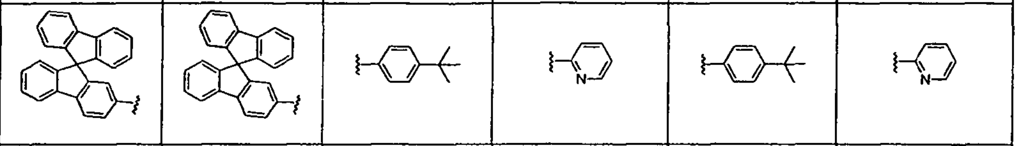
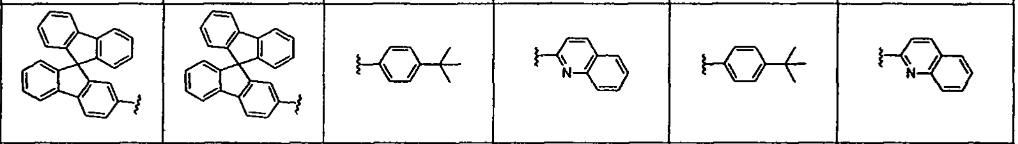
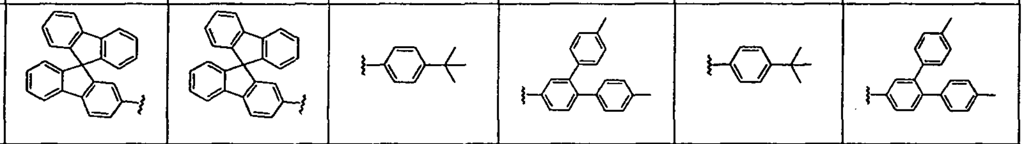
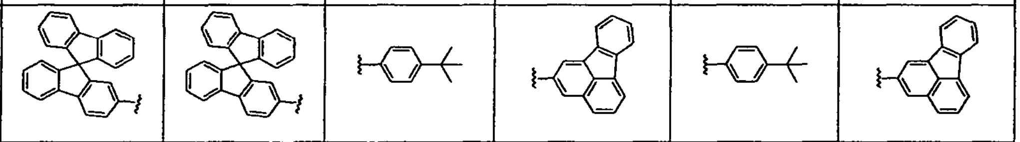
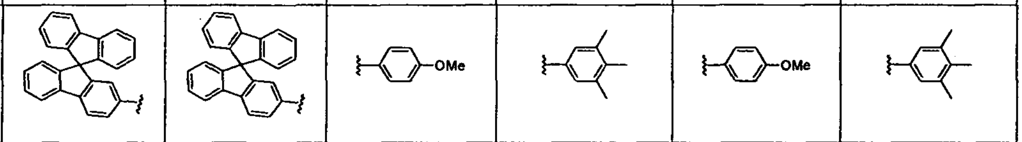
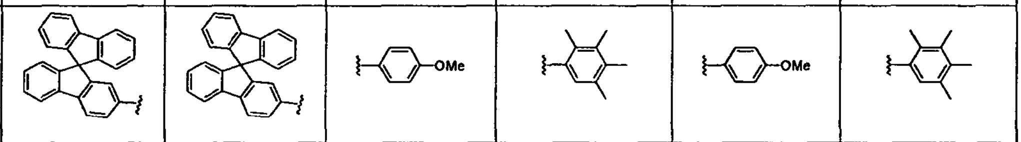
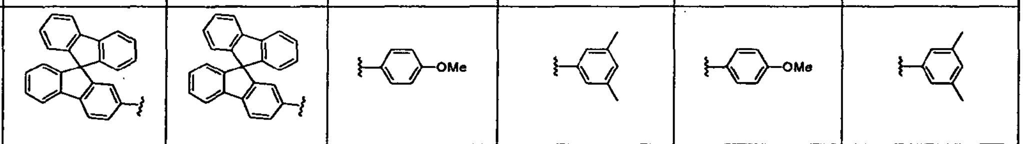
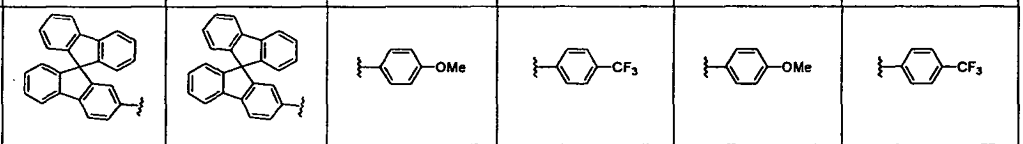
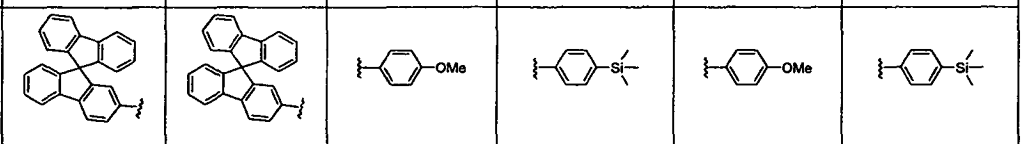
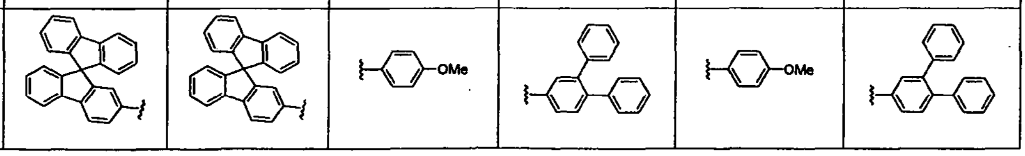
1202	
1203	
1204	
1205	
1206	
1207	
1208	
1209	
1210	

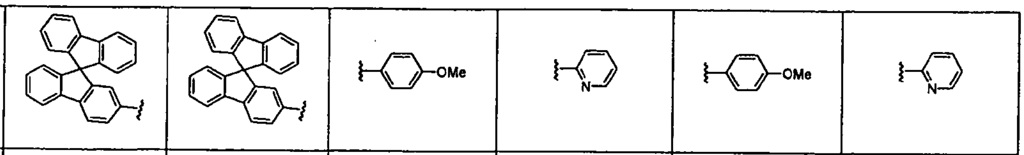
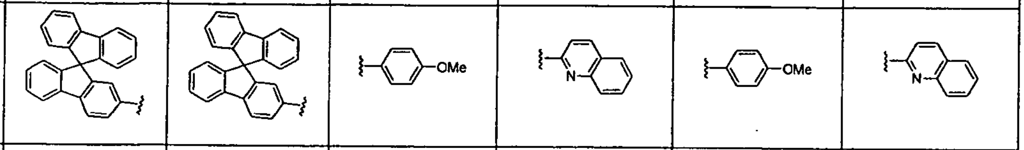
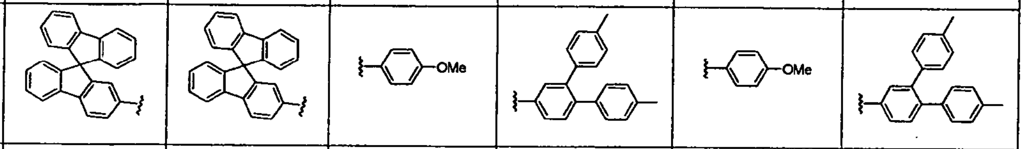
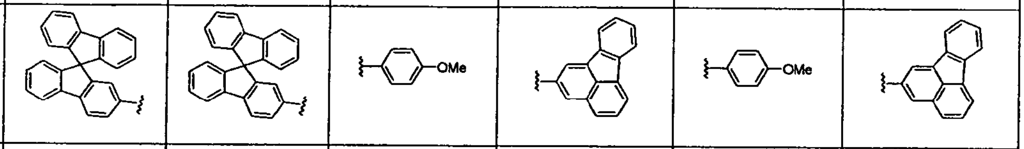
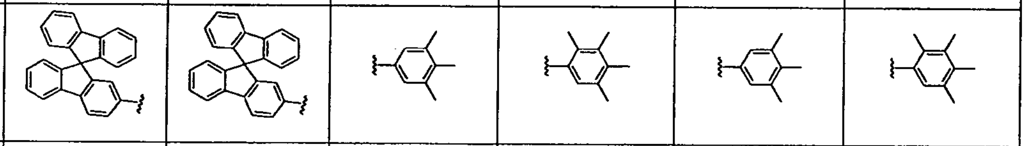
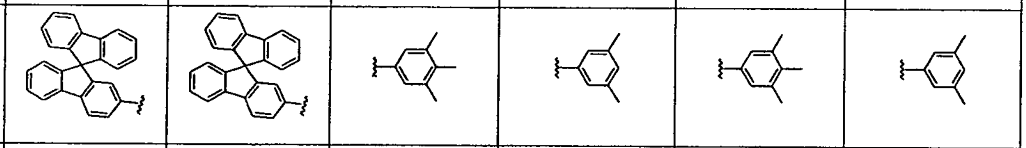
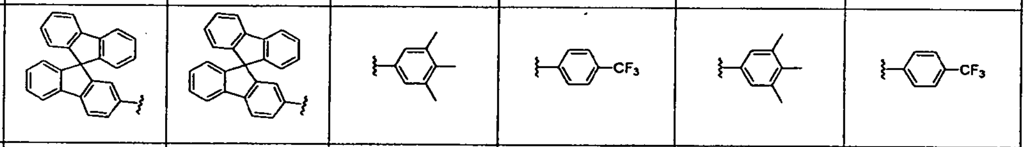
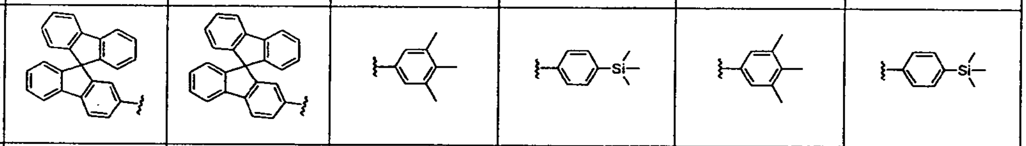
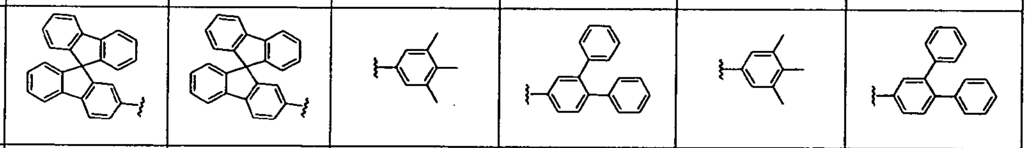
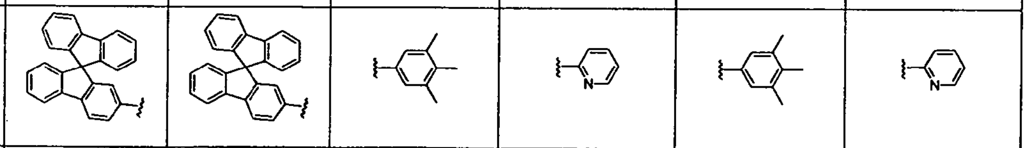
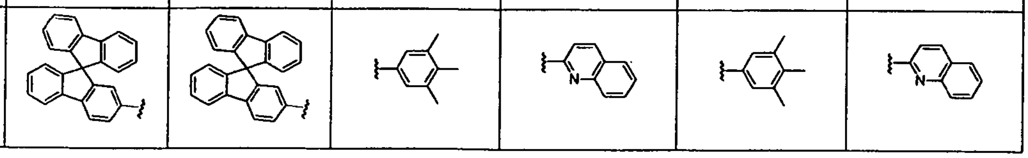
1211	
1212	
1213	
1214	
1215	
1216	
1217	
1218	
1219	
1220	
1221	

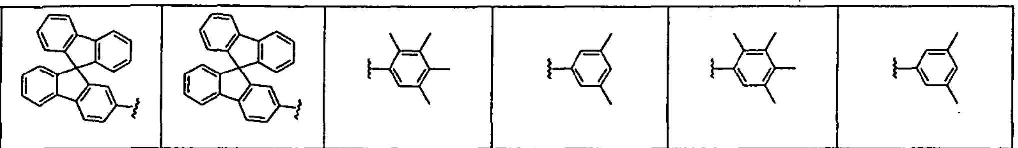
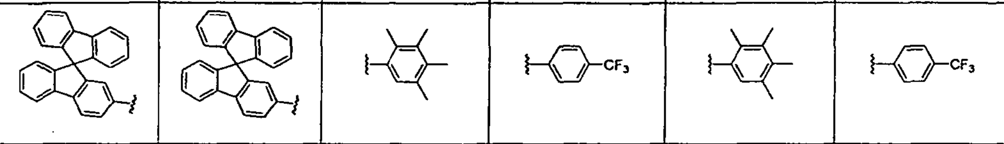
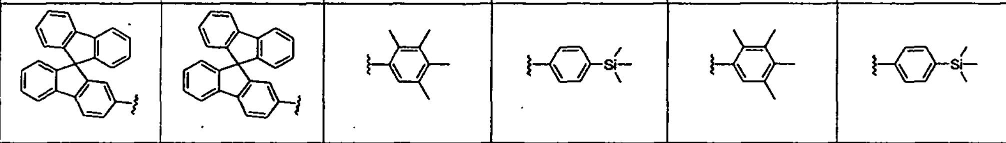
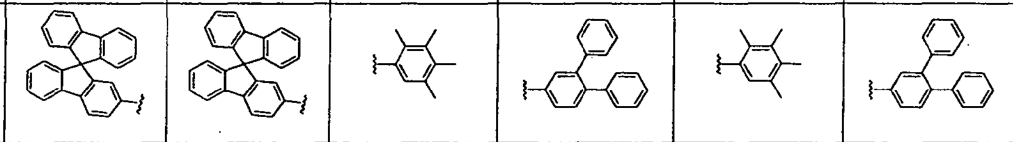
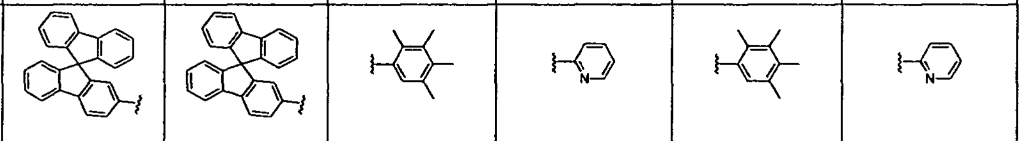
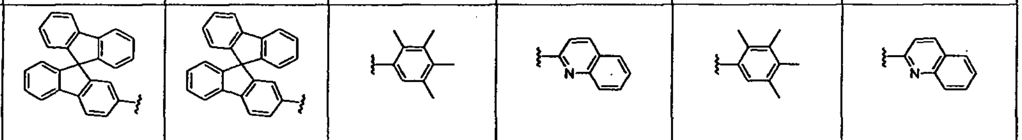
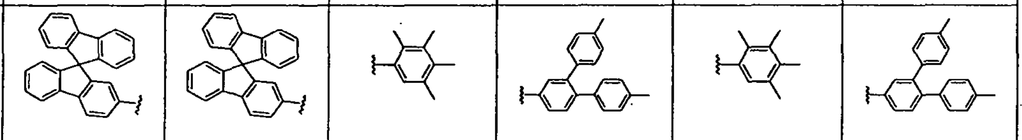
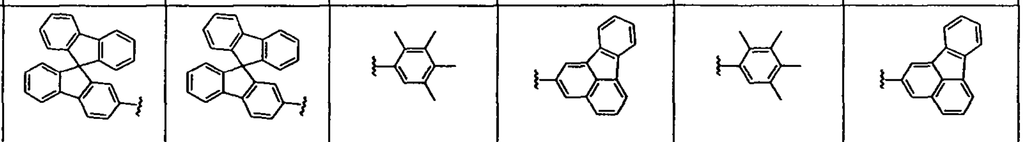
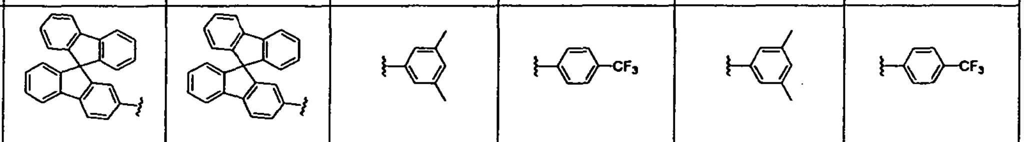
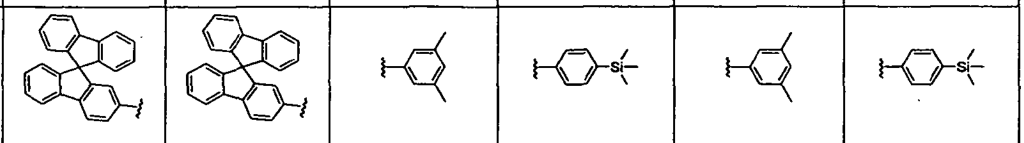
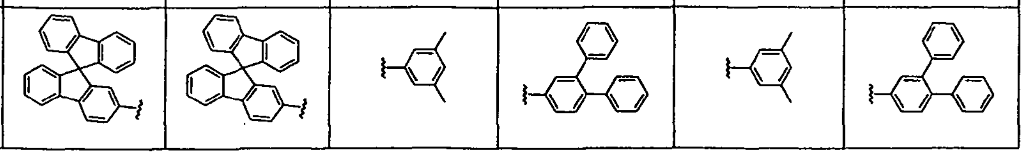
1222	
1223	
1224	
1225	
1226	
1227	
1228	
1229	
1230	
1231	
1232	

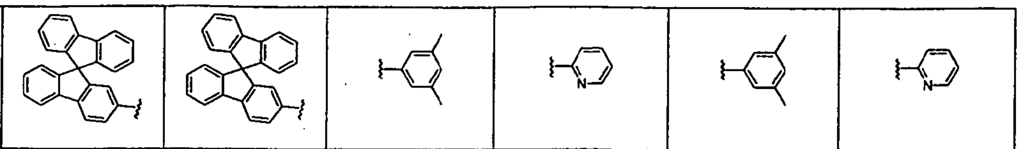
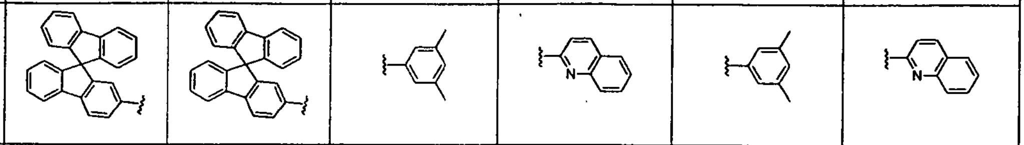
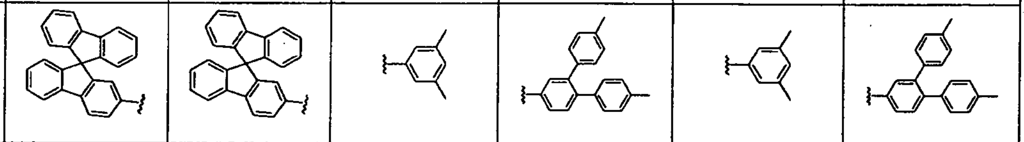
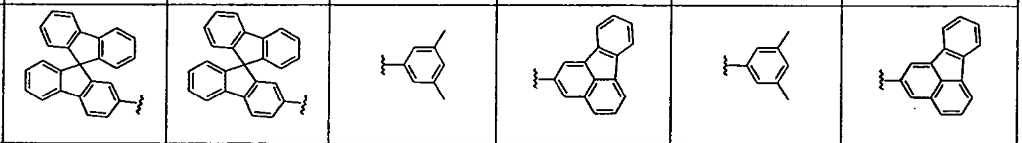
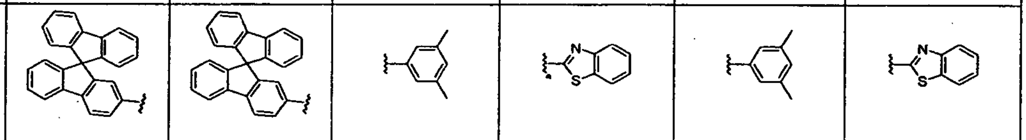
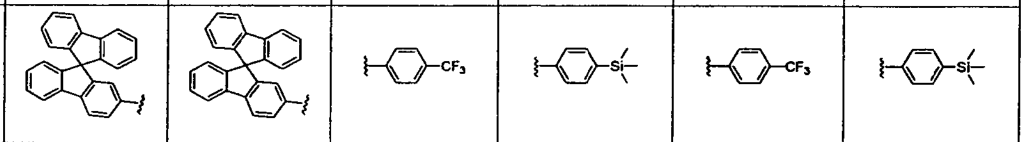
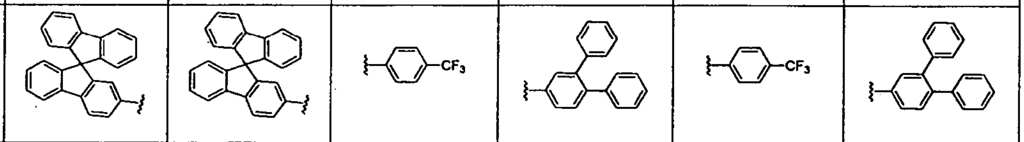
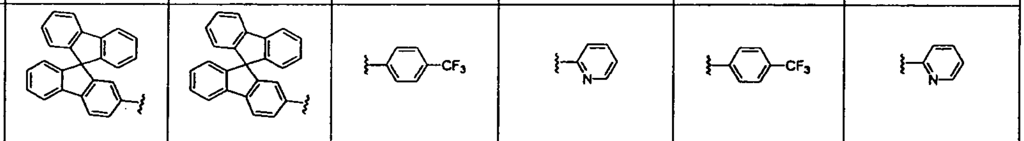
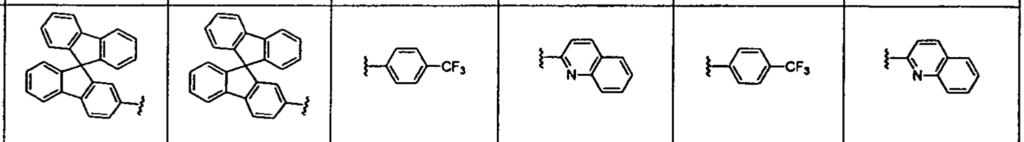
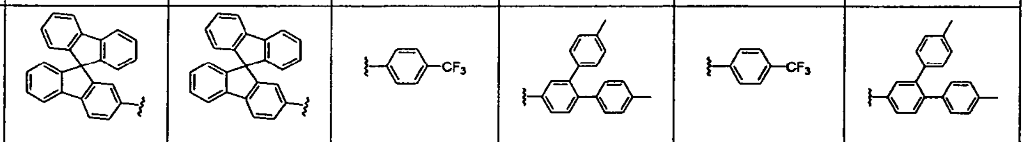
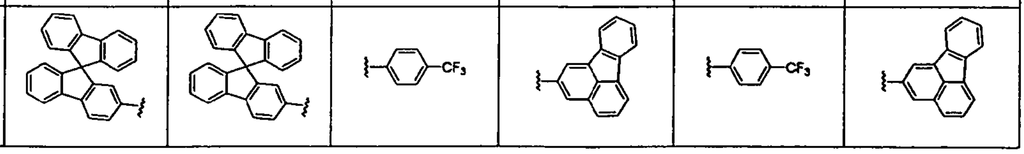
1233	
1234	
1235	
1236	
1237	
1238	
1239	
1240	
1241	
1242	
1243	

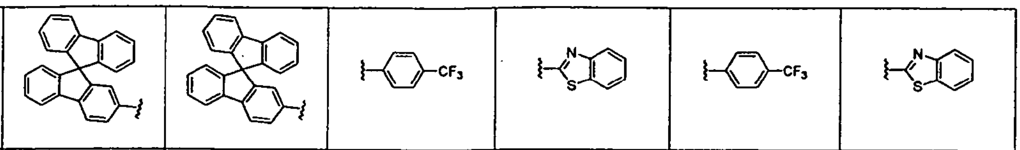
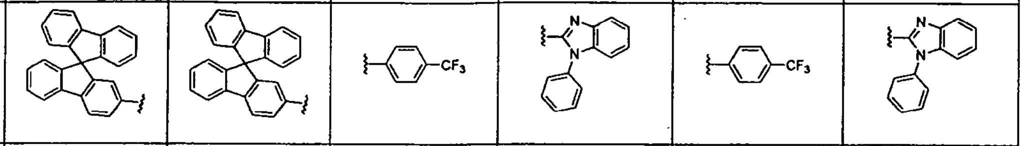
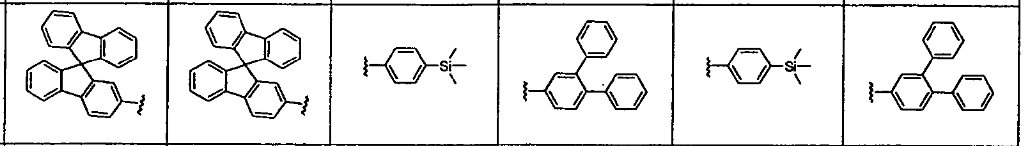
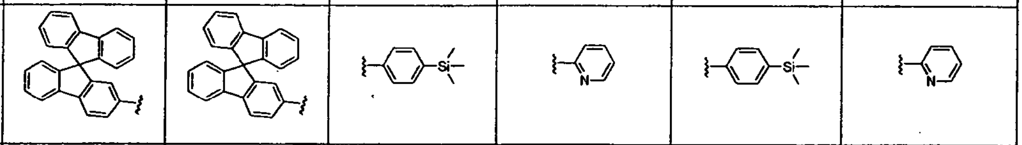
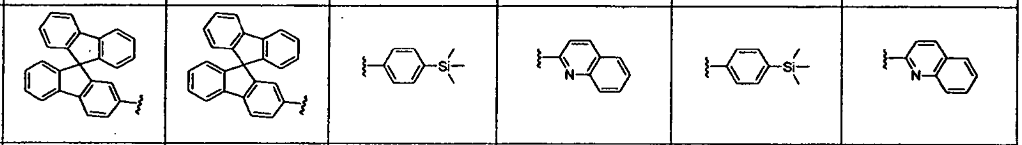
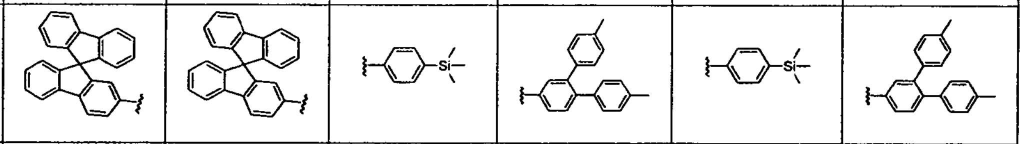
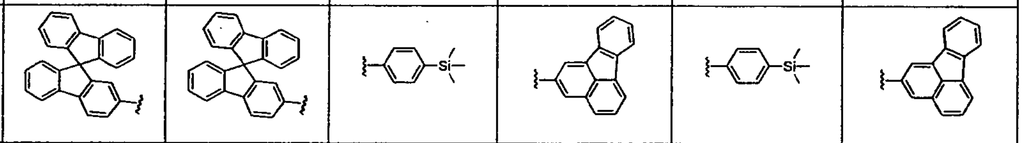
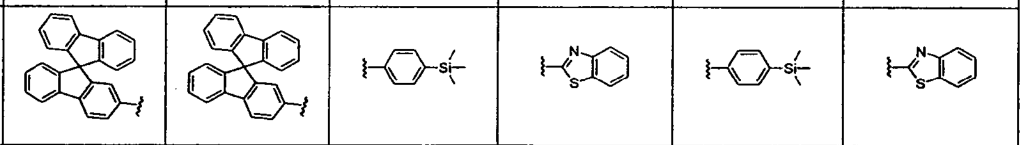
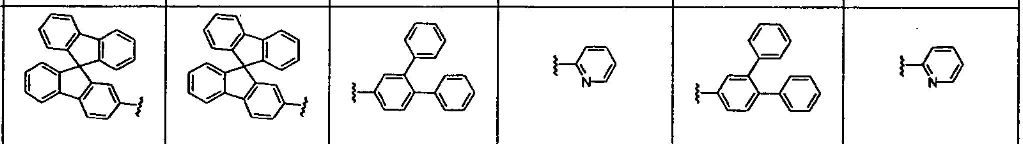
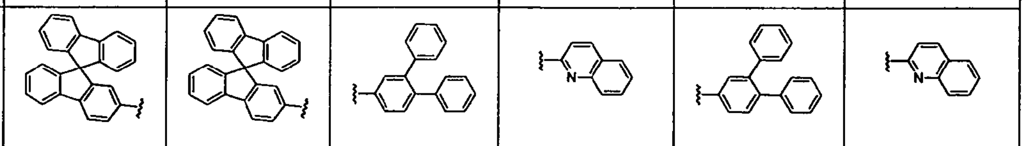
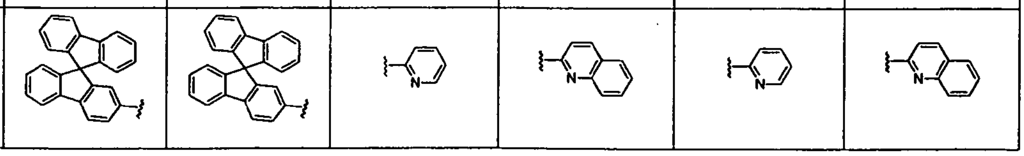
1244	
1245	
1246	
1247	
1248	
1249	
1250	
1251	
1252	
1253	
1254	

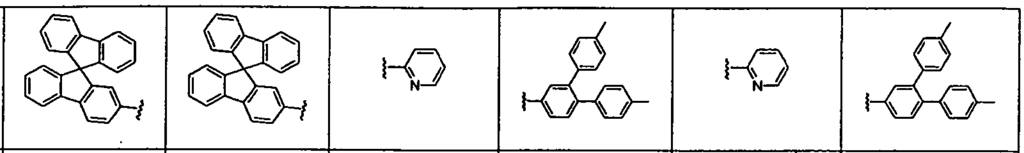
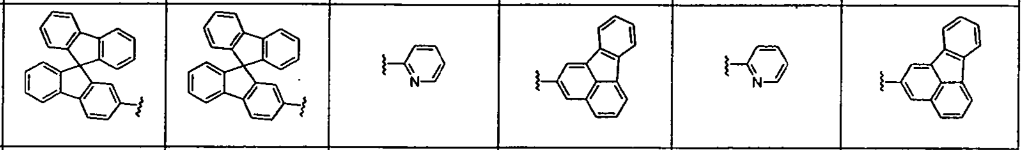
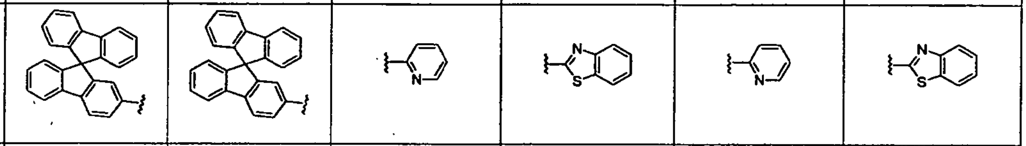
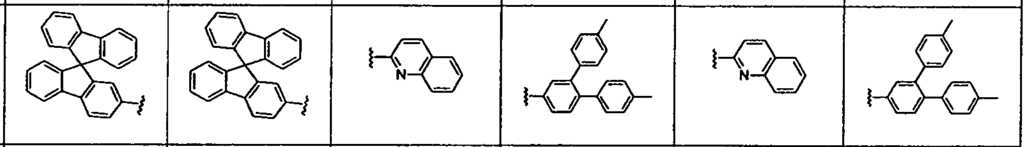
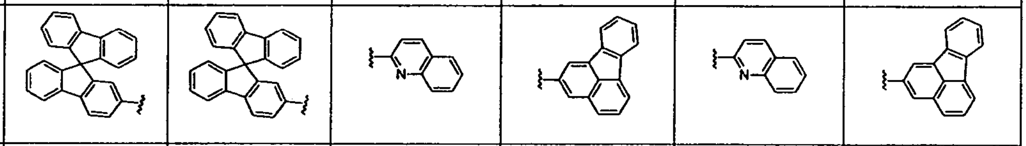
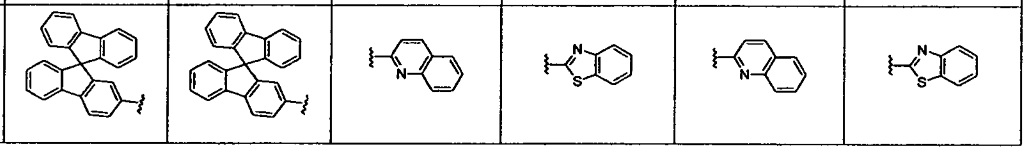
1255	
1256	
1257	
1258	
1259	
1260	
1261	
1262	
1263	
1264	
1265	

1266	
1267	
1268	
1269	
1270	
1271	
1272	
1273	
1274	
1275	
1276	

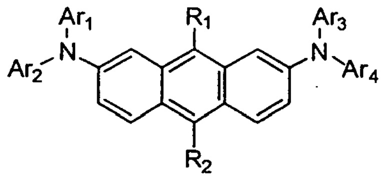
1277	
1278	
1279	
1280	
1281	
1282	
1283	
1284	
1285	
1286	
1287	

1288	
1289	
1290	
1291	
1292	
1293	
1294	
1295	
1296	
1297	
1298	

1299	
1300	
1301	
1302	
1303	
1304	
1305	
1306	
1307	
1308	
1309	

1310	
1311	
1312	
1313	
1314	
1315	

【Table 2】



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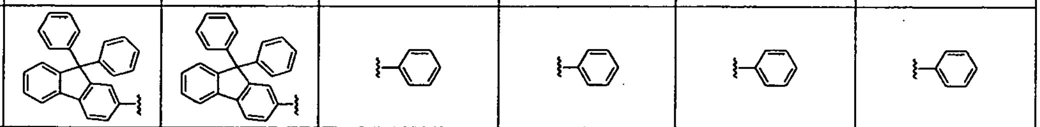
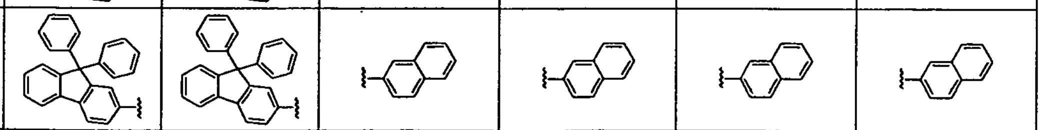
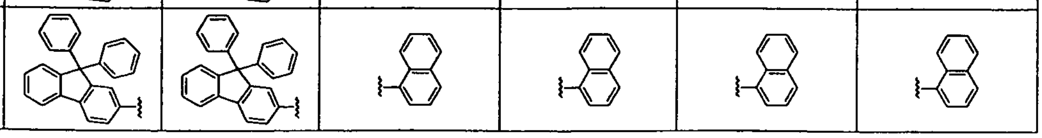
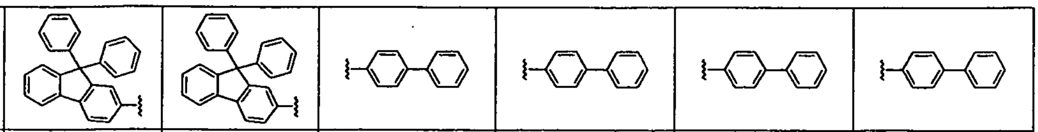
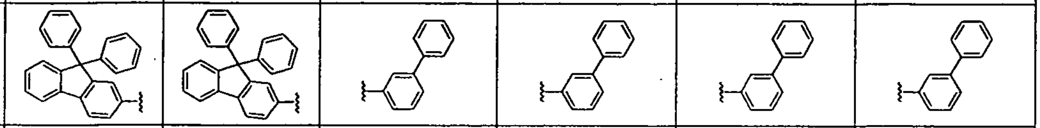
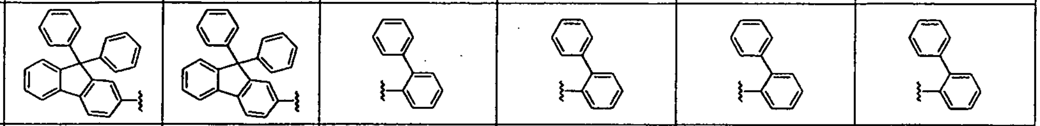
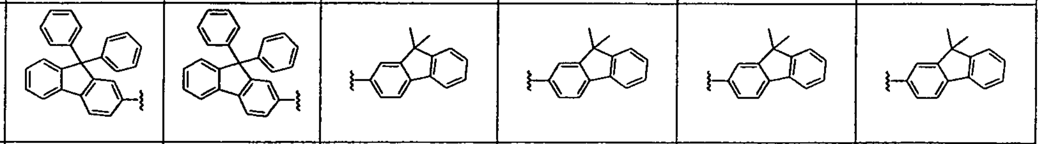
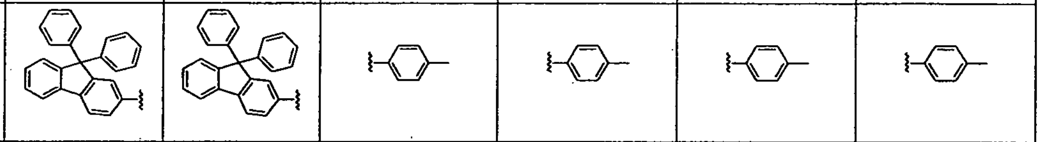
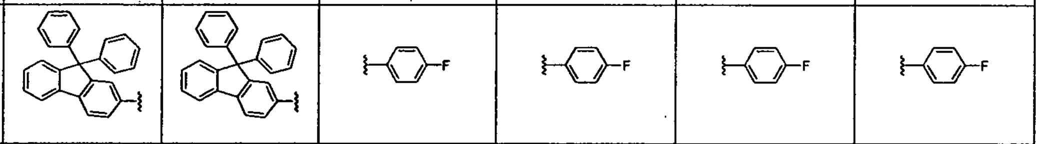
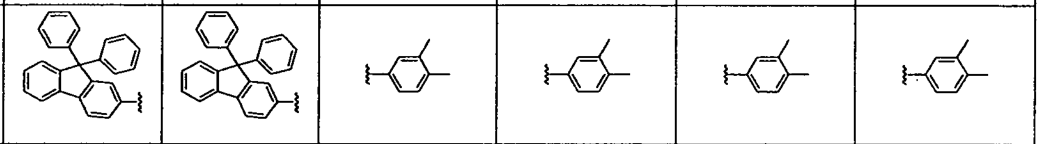
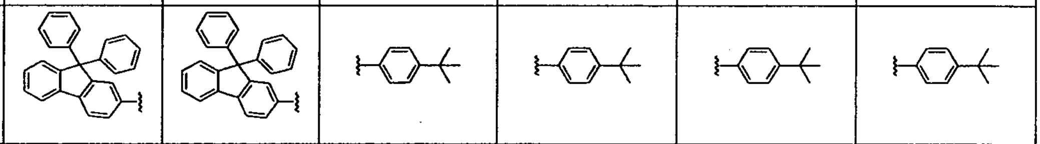
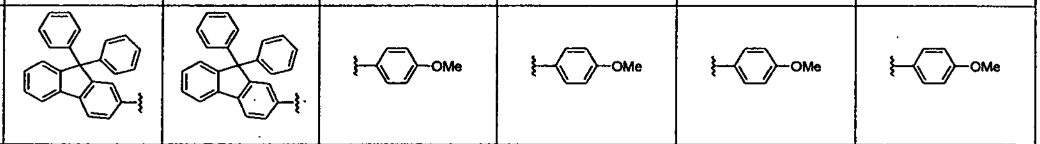
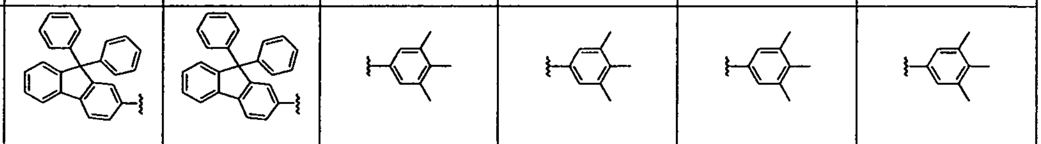
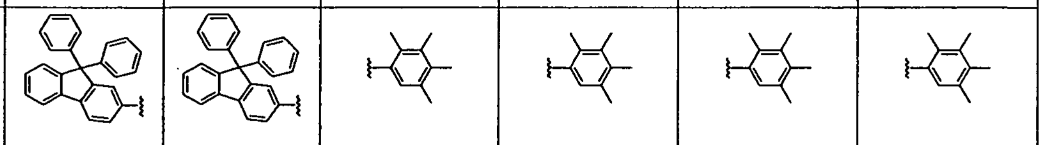
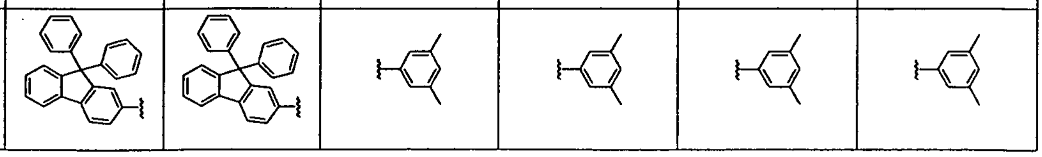
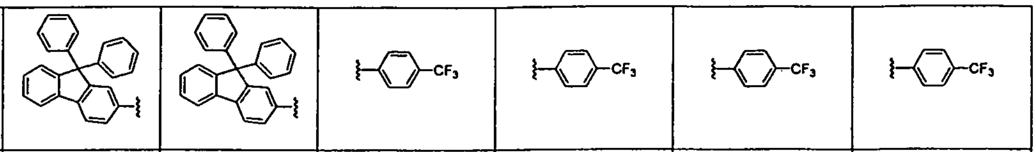
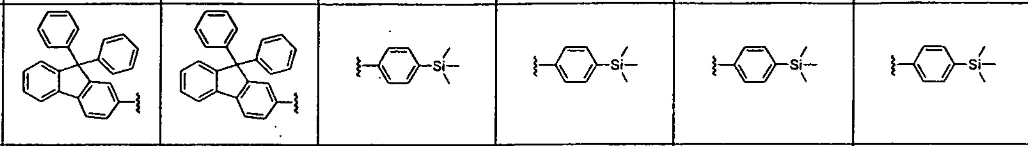
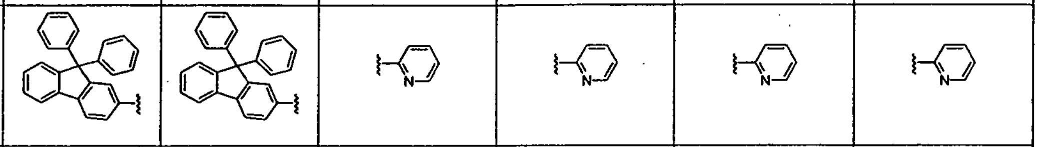
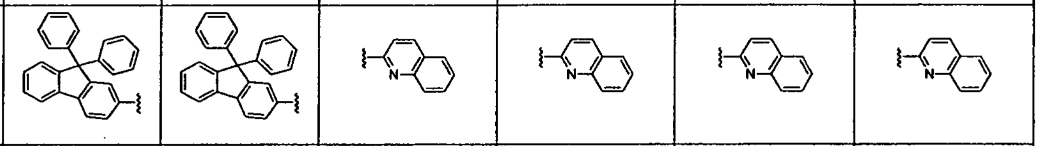
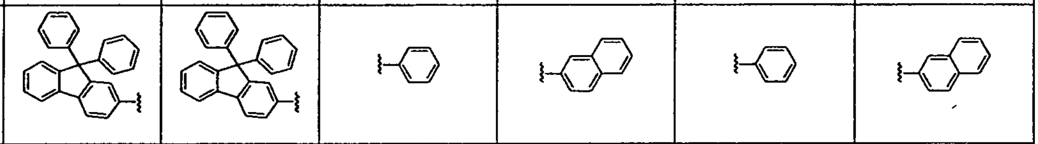
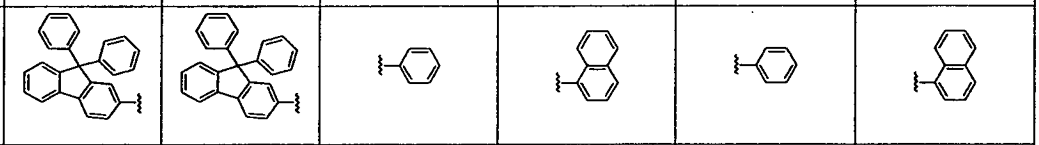
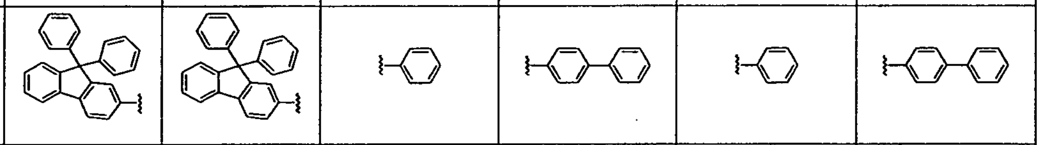
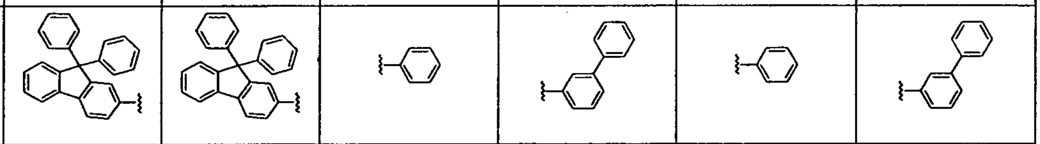
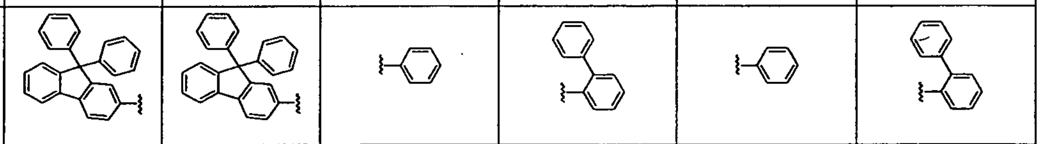
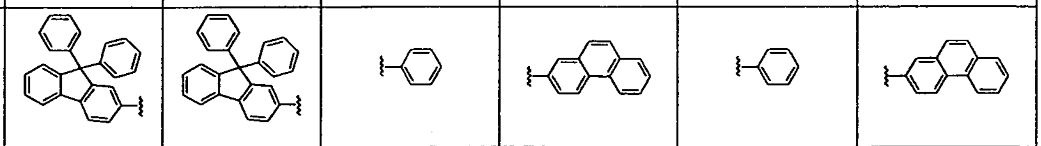
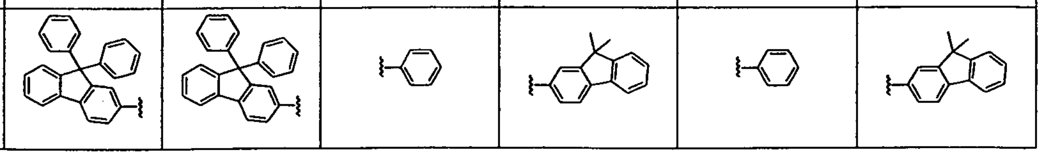
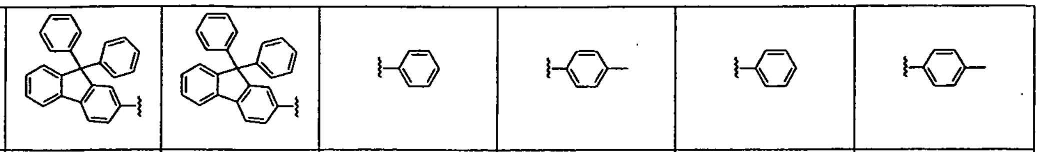
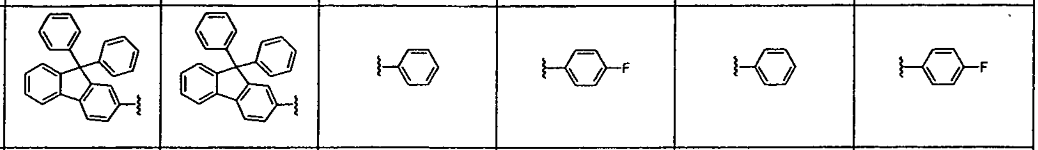
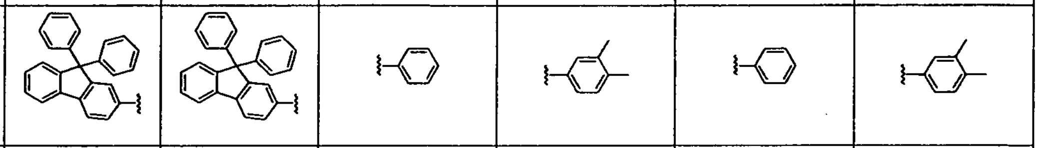
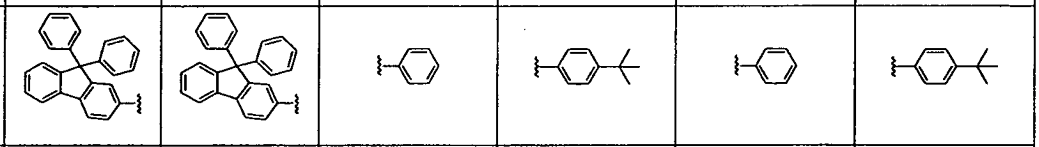
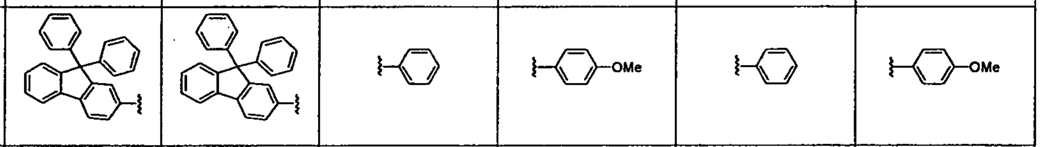
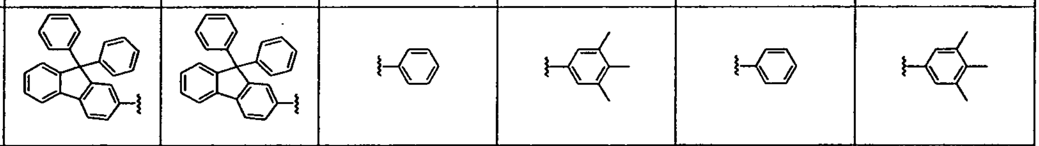
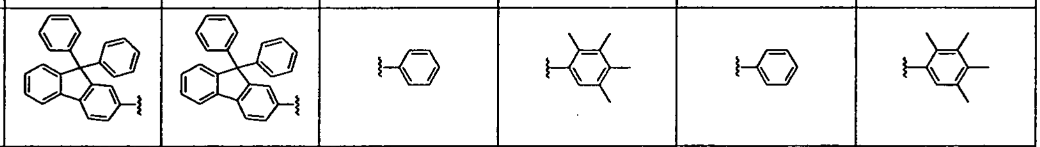
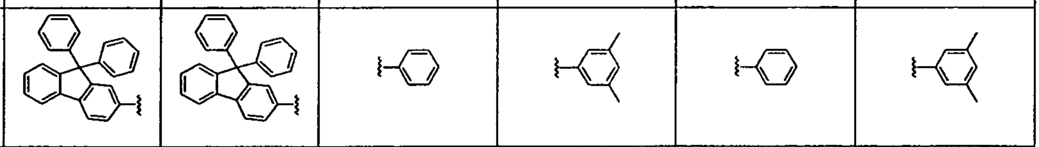
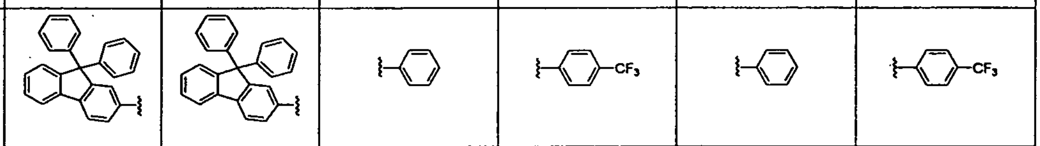
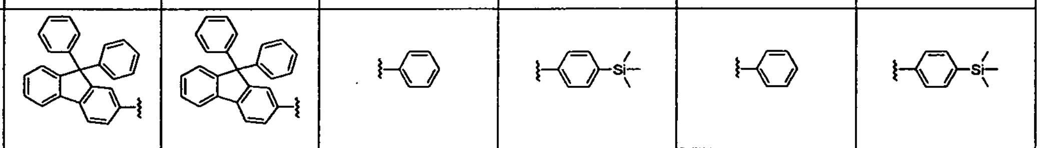
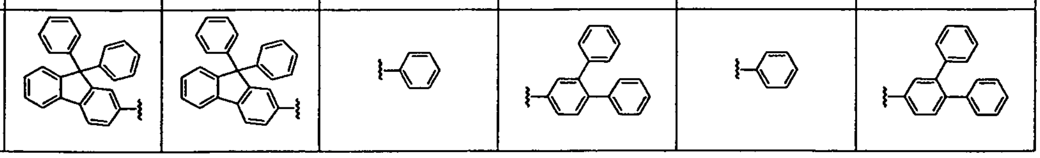
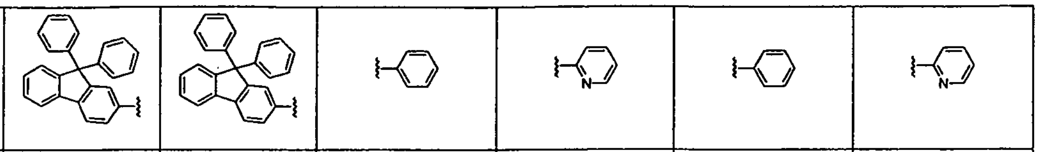
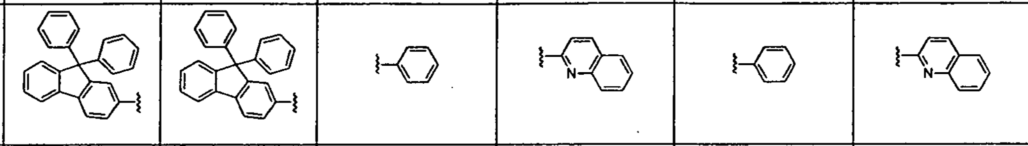
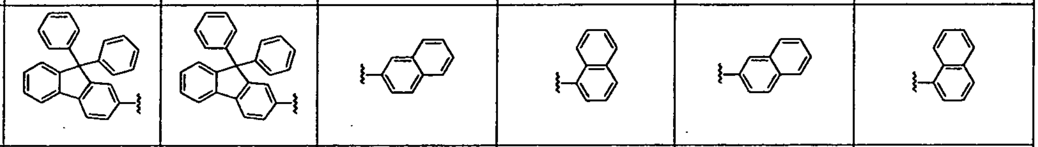
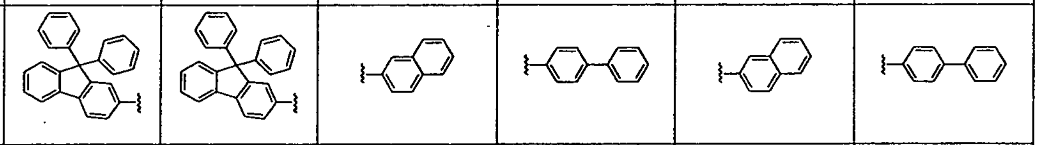
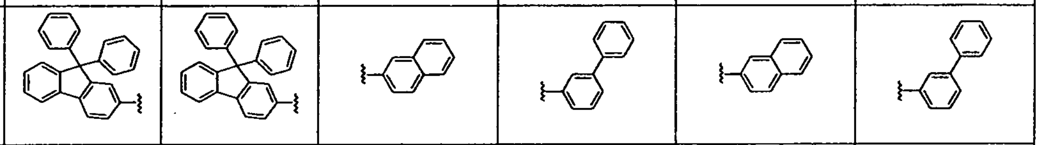
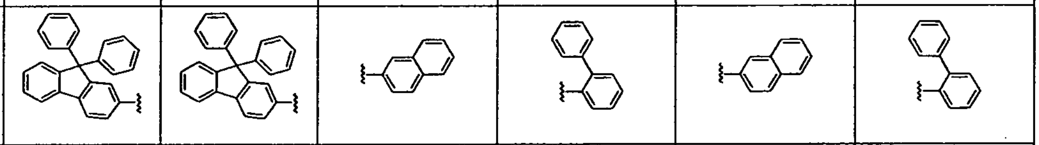
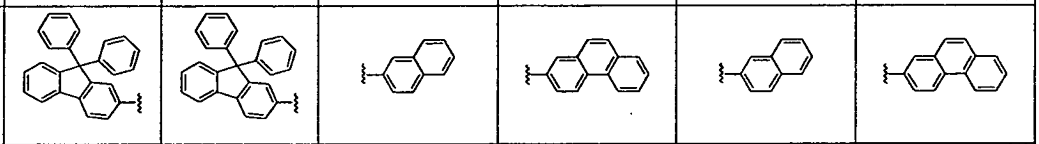
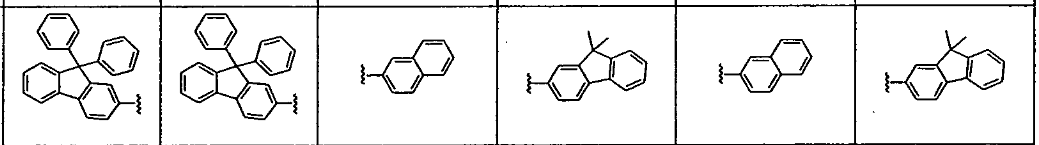
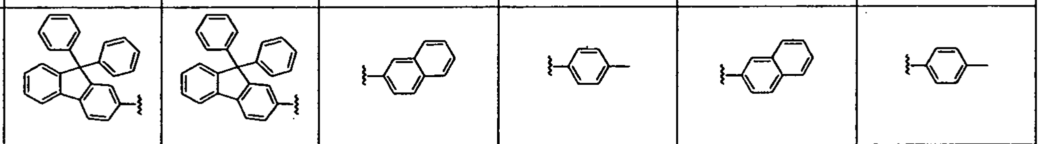
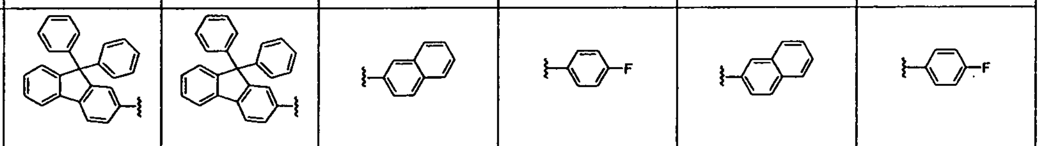
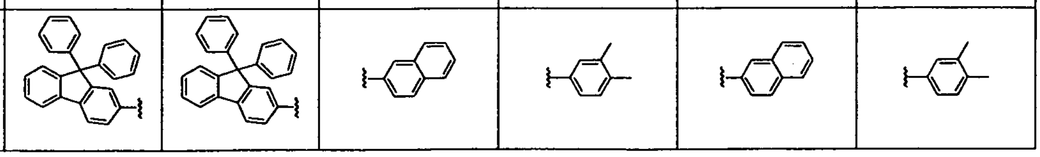
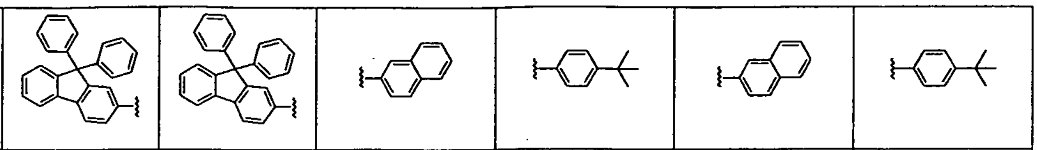
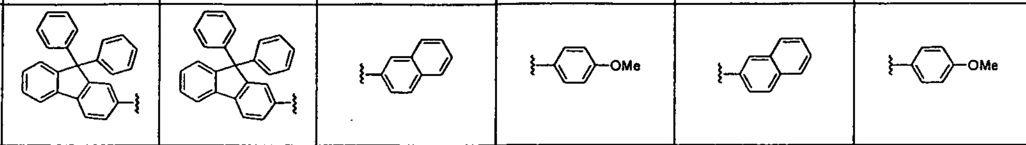
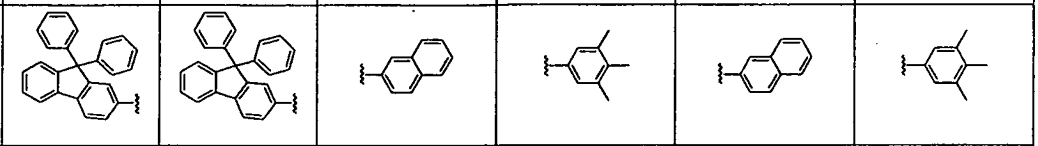
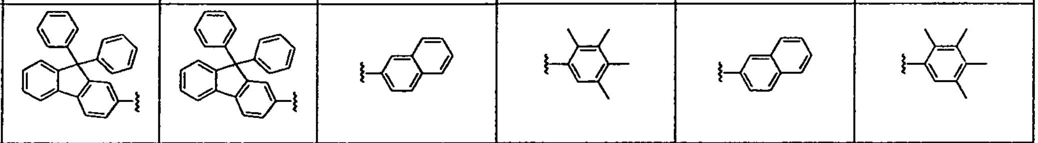
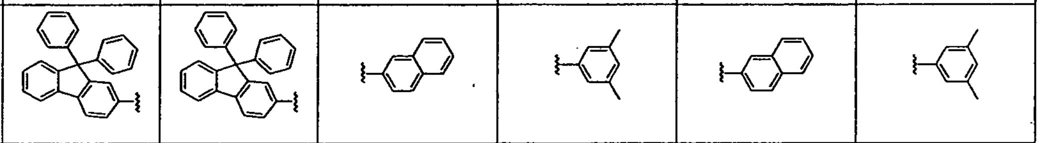
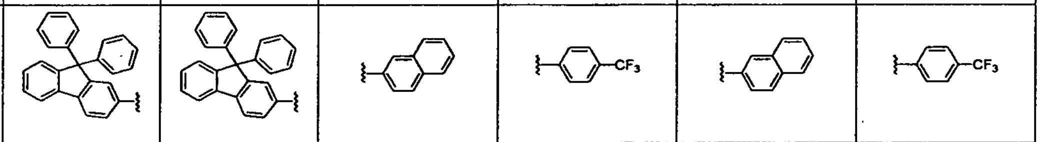
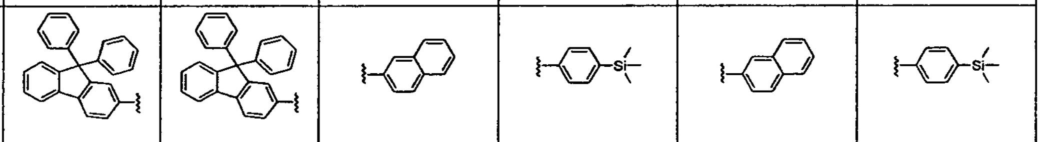
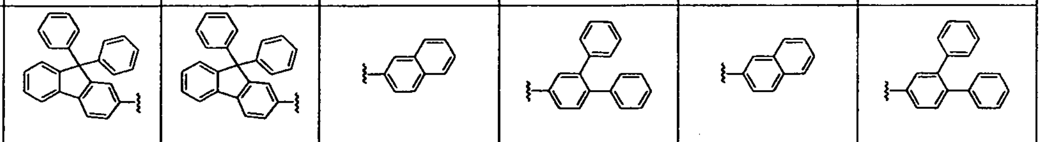
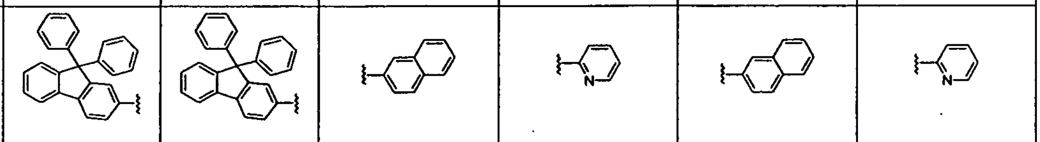
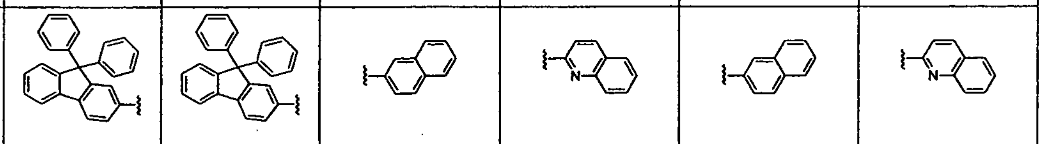
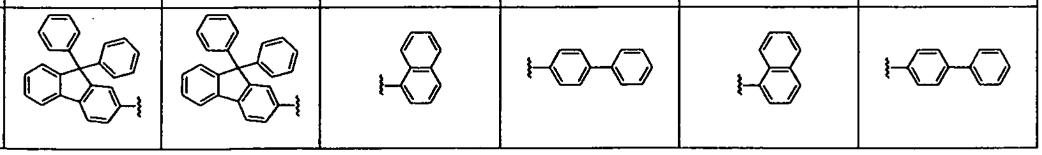
1316						
1317						
1318						

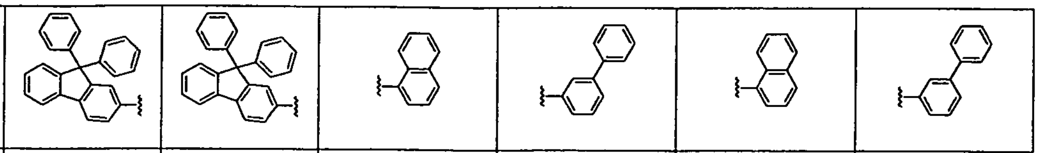
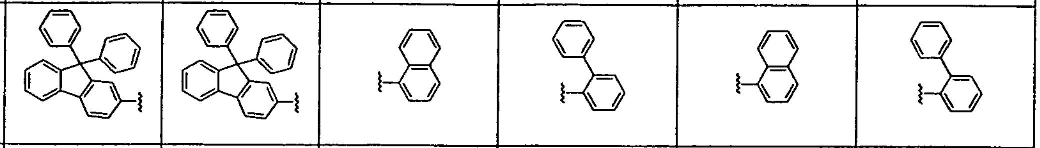
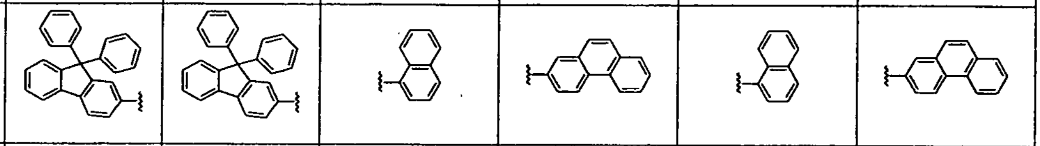
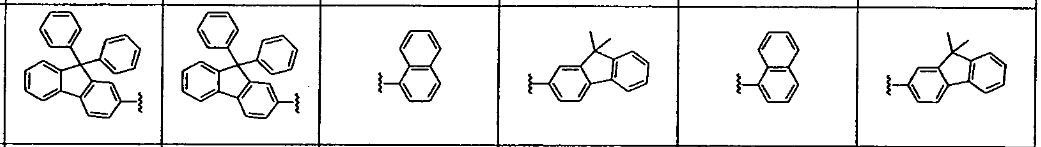
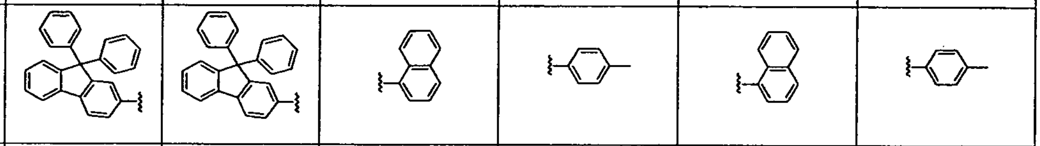
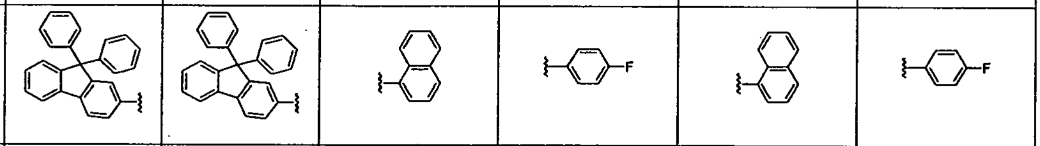
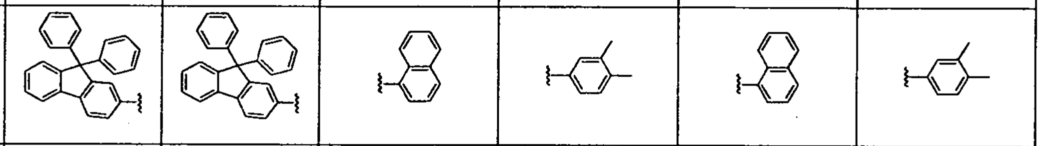
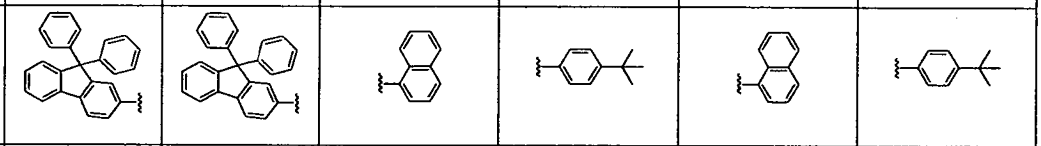
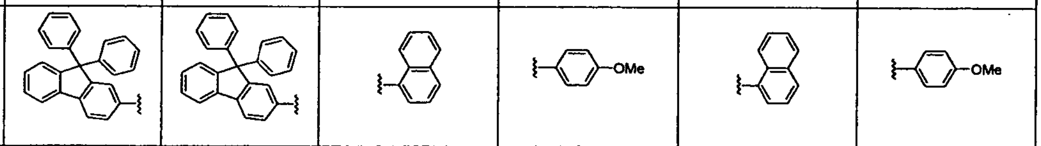
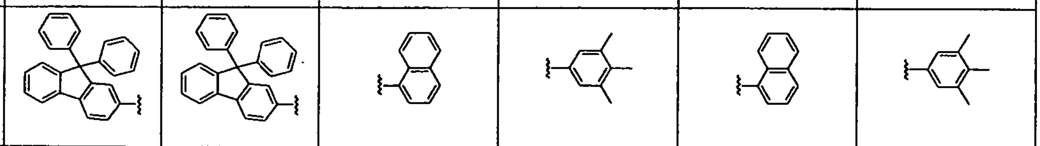
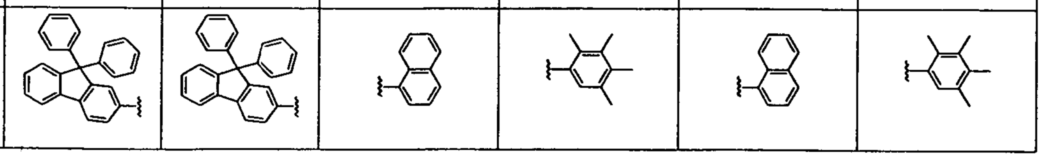
1319	
1320	
1321	
1322	
1323	
1324	
1325	
1326	
1327	
1328	
1329	
1330	

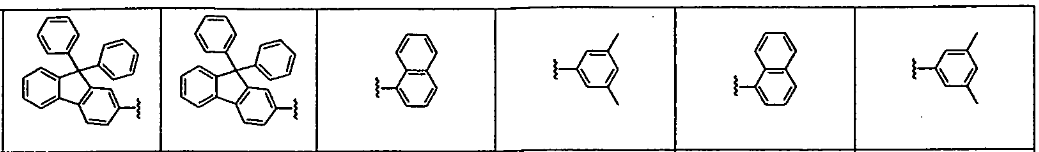
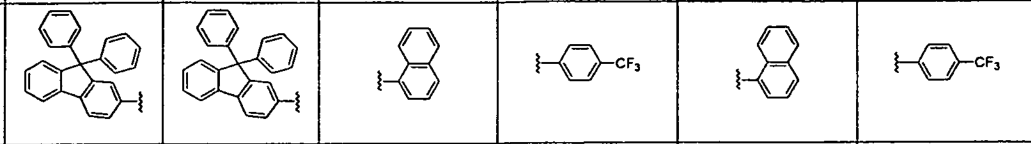
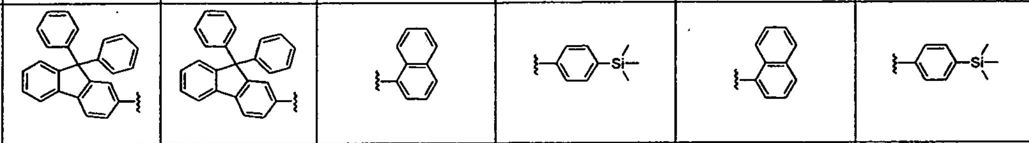
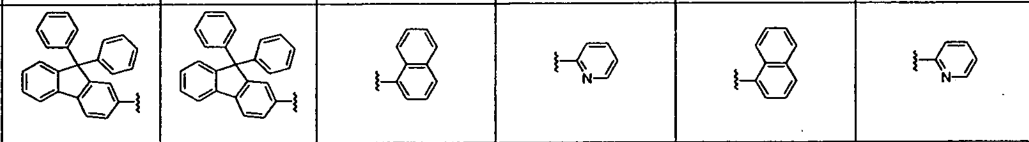
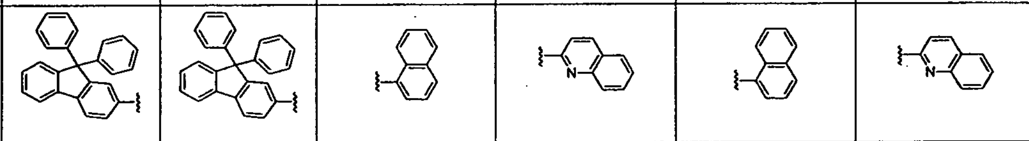
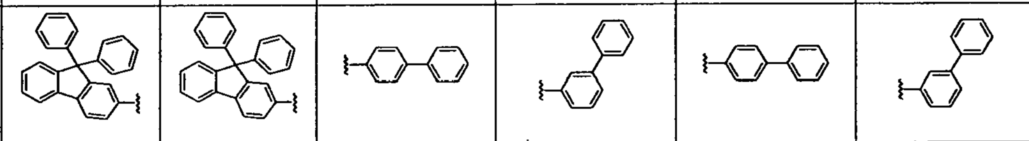
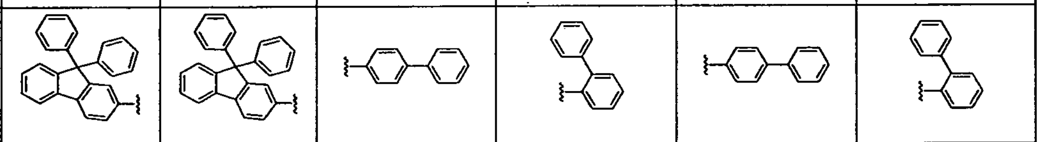
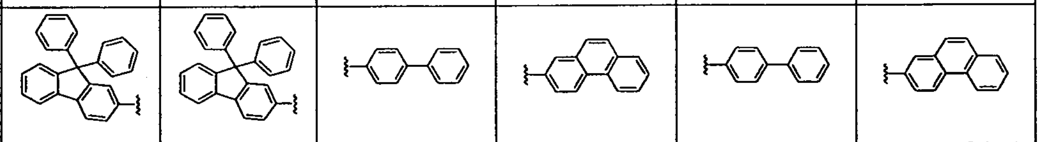
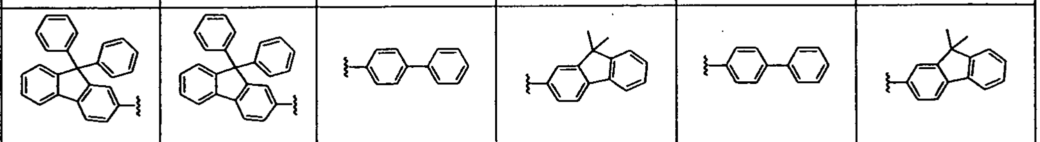
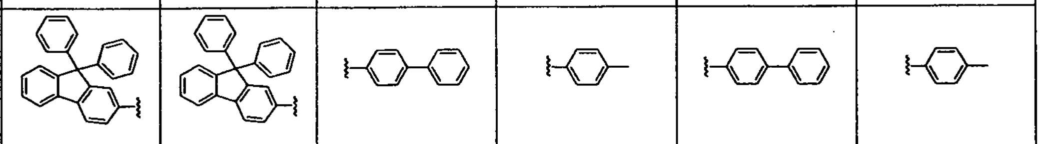
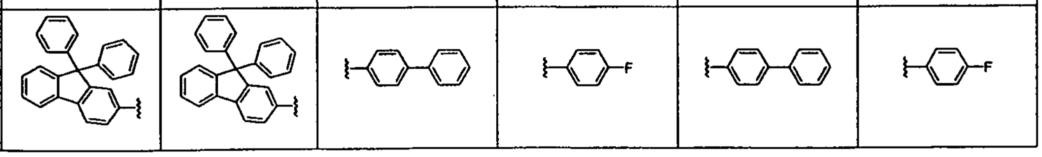
1331	
1332	
1333	
1334	
1335	
1336	
1337	
1338	
1339	
1340	
1341	

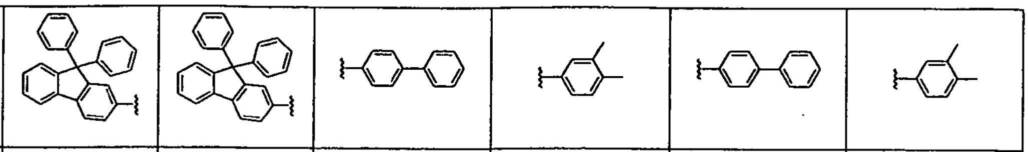
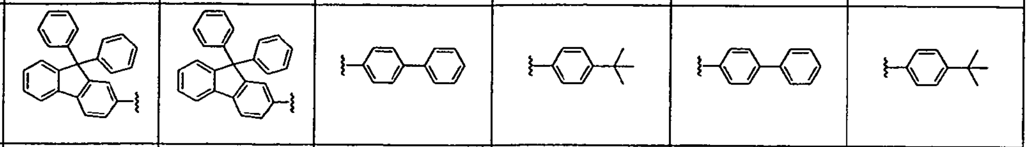
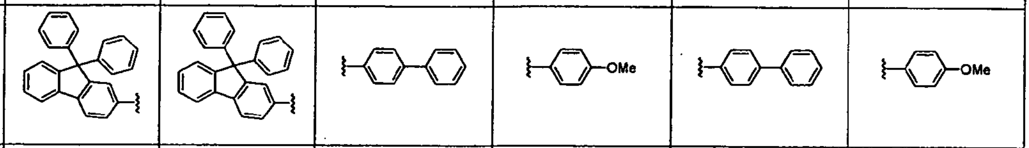
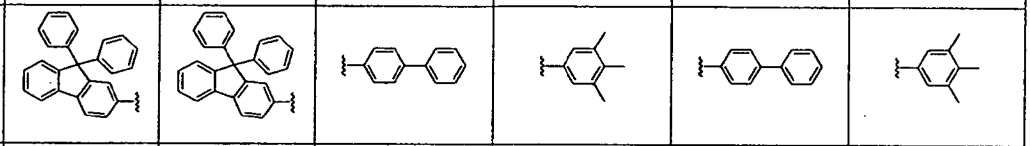
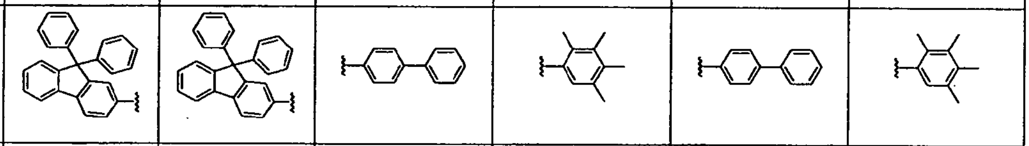
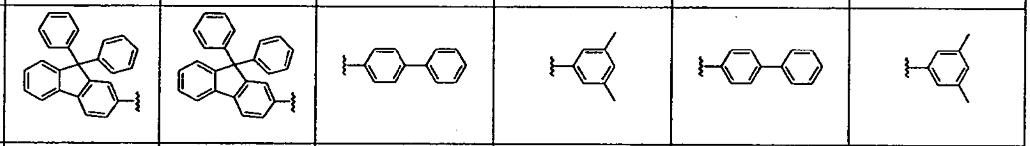
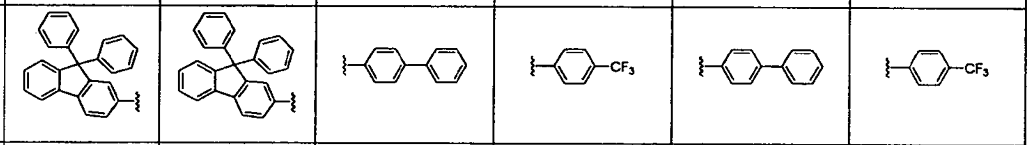
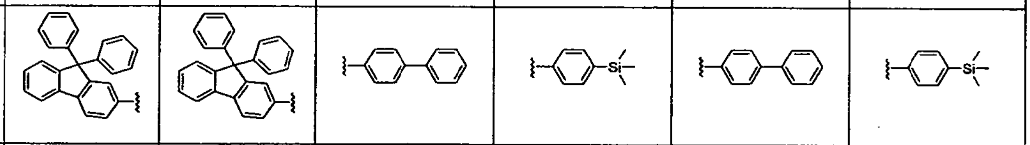
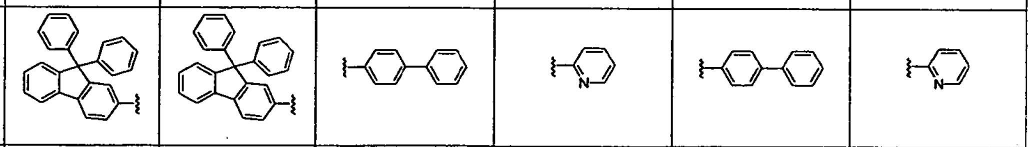
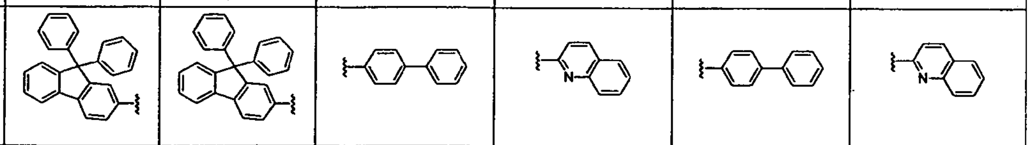
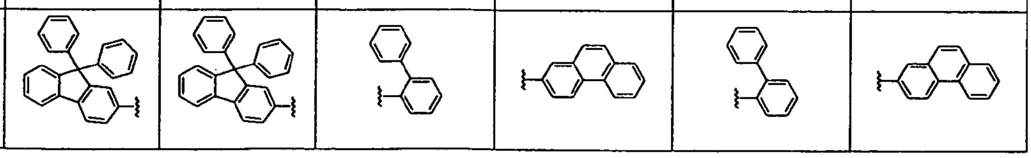
1342	
1343	
1344	
1345	
1346	
1347	
1348	
1349	
1350	
1351	
1352	

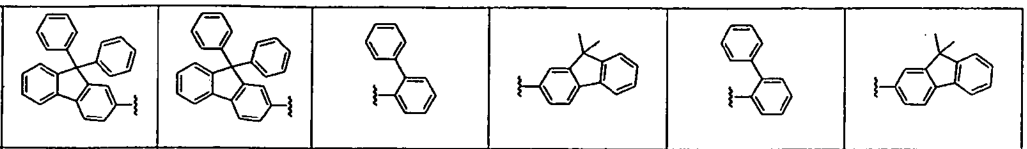
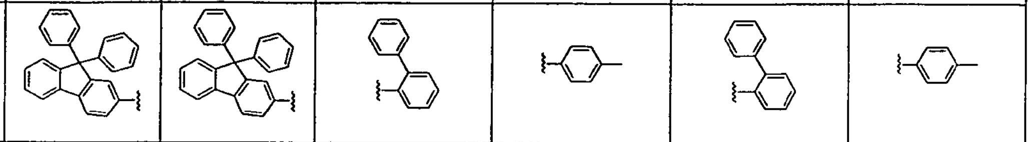
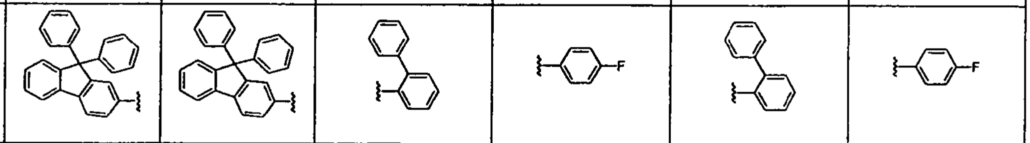
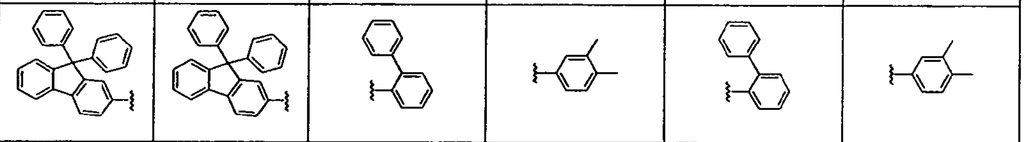
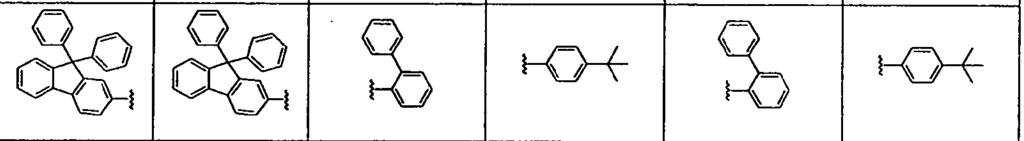
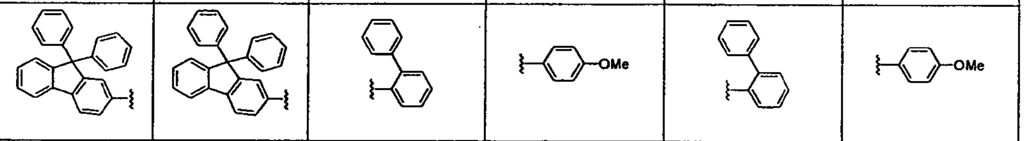
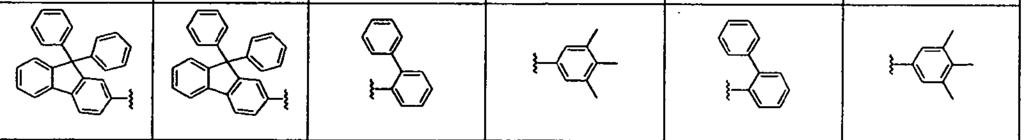
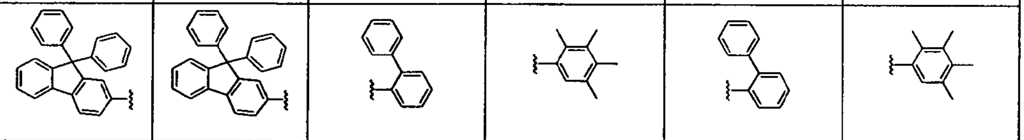
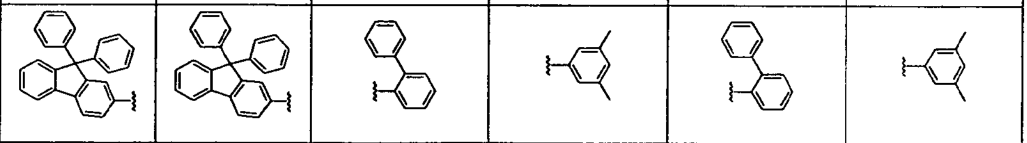
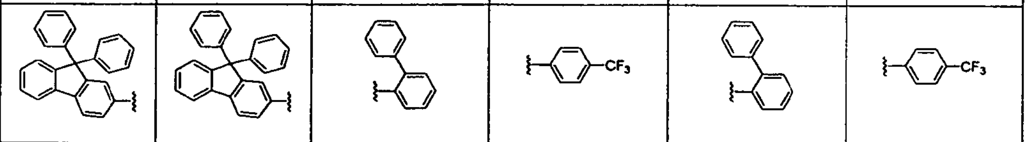
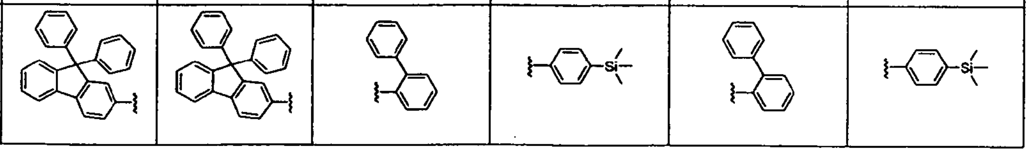
1353	
1354	
1355	
1356	
1357	
1358	
1359	
1360	
1361	
1362	
1363	

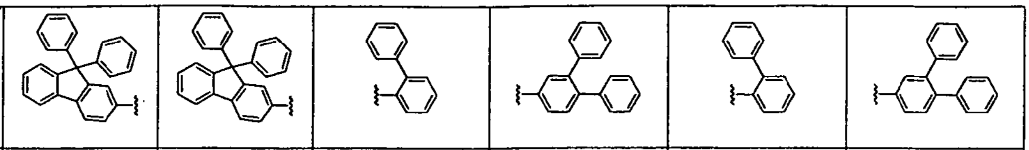
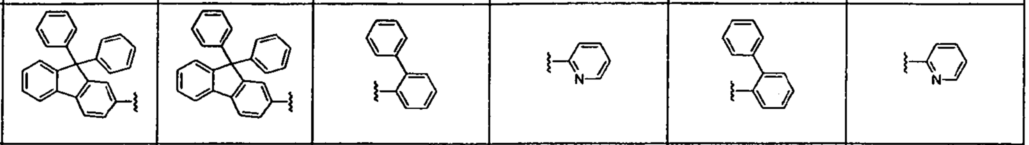
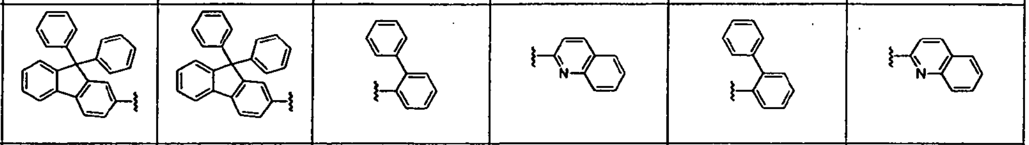
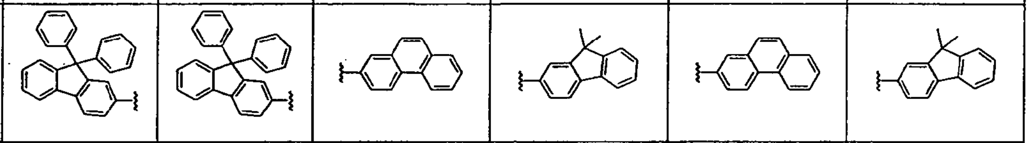
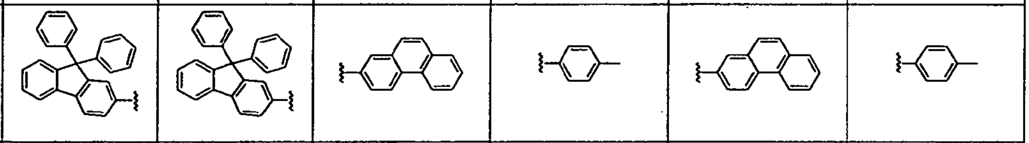
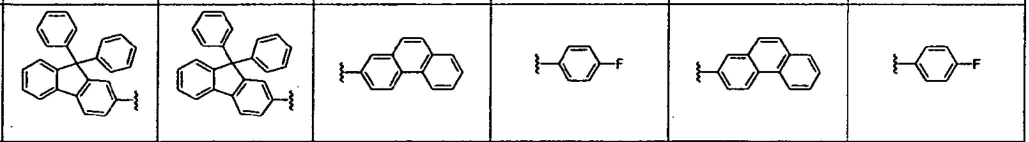
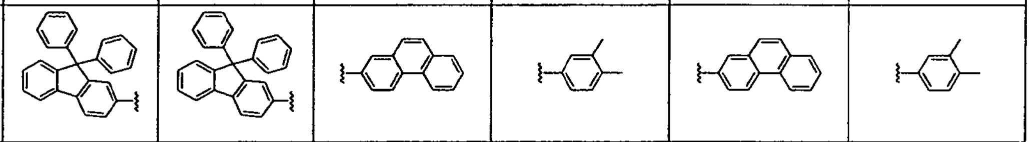
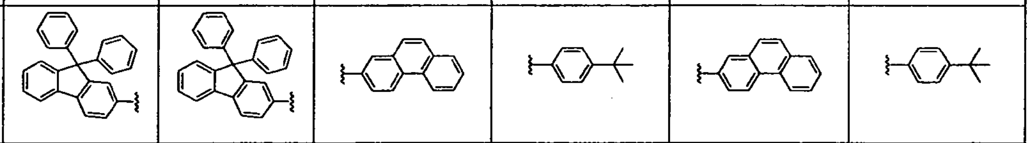
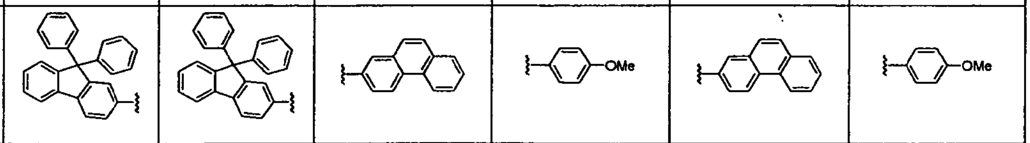
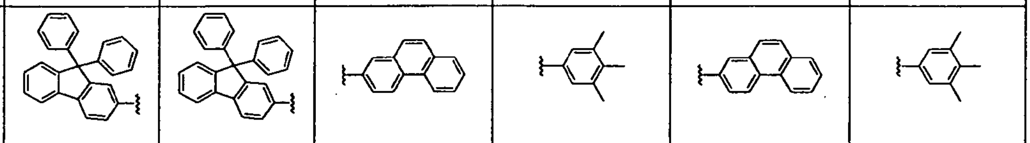
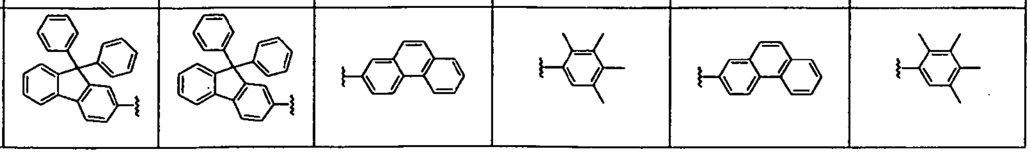
1364	
1365	
1366	
1367	
1368	
1369	
1370	
1371	
1372	
1373	
1374	

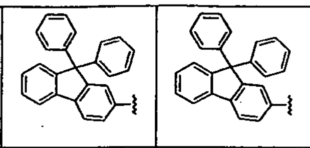
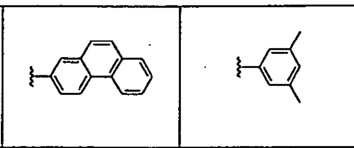
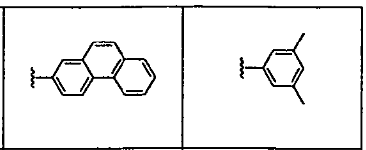
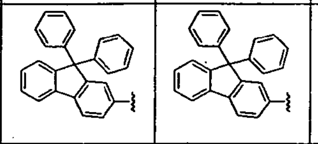
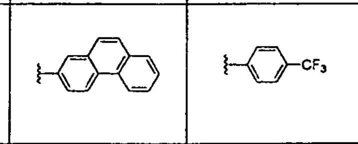
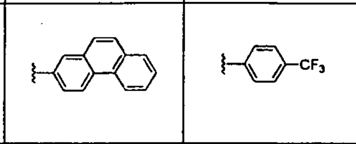
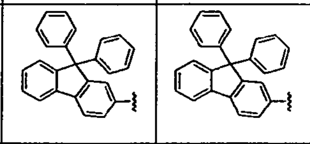
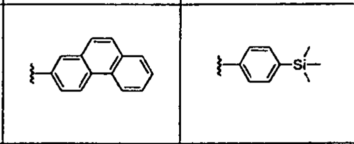
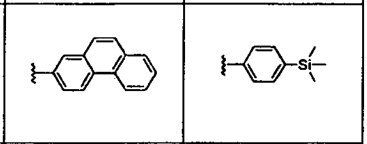
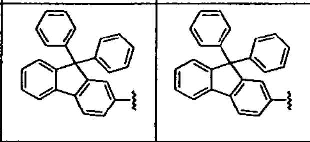
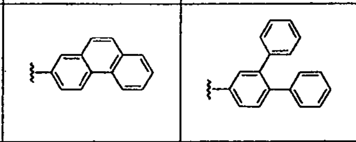
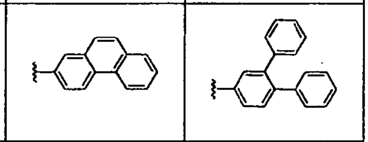
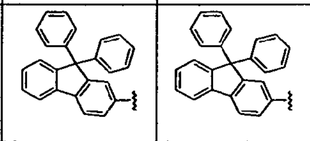
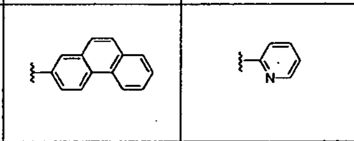
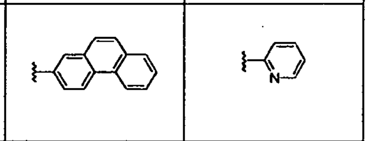
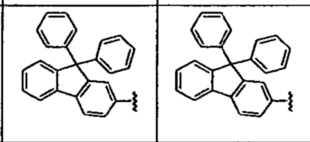
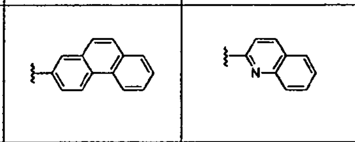
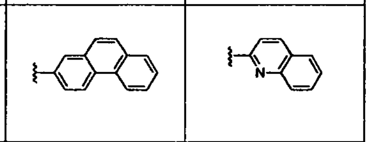
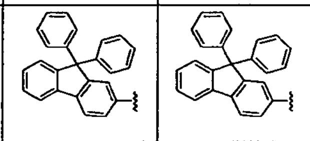
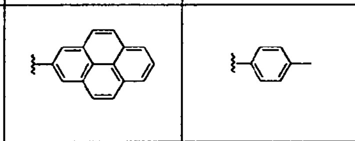
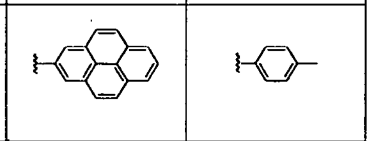
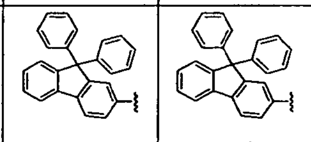
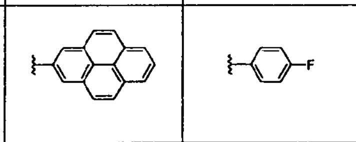
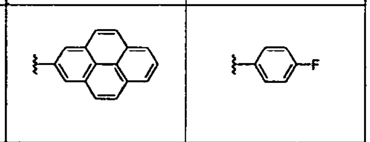
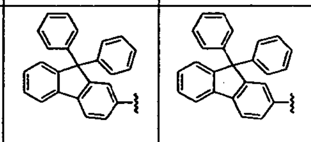
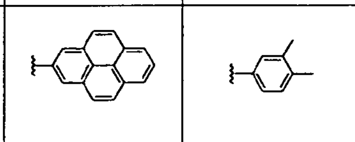
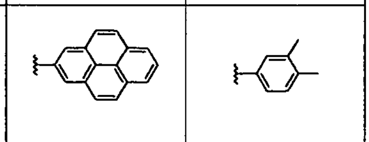
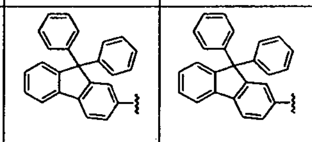
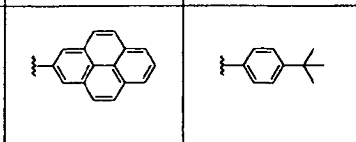
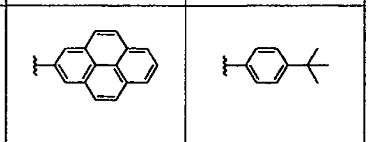
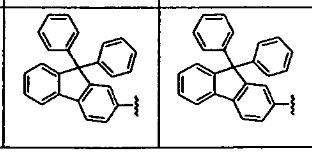
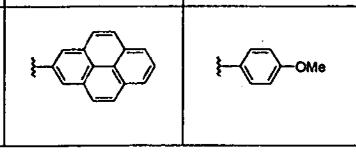
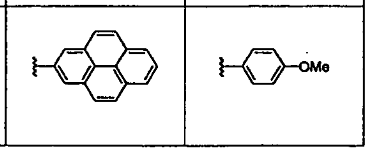
1375	
1376	
1377	
1378	
1379	
1380	
1381	
1382	
1383	
1384	
1385	

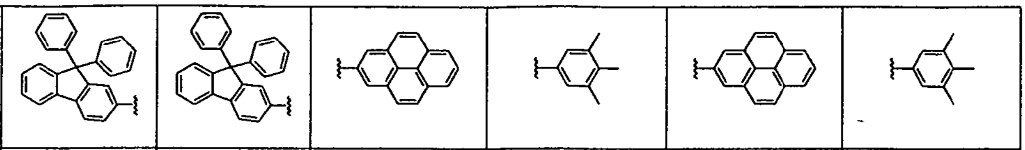
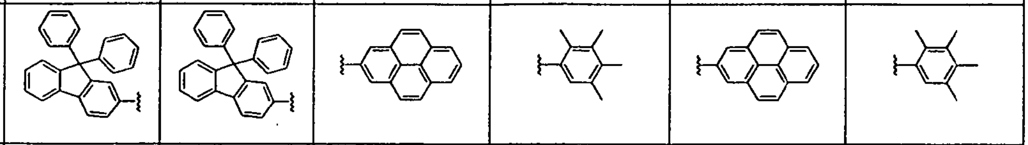
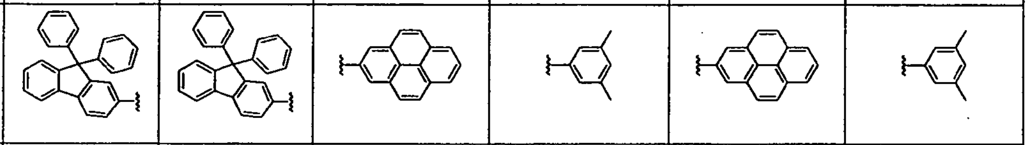
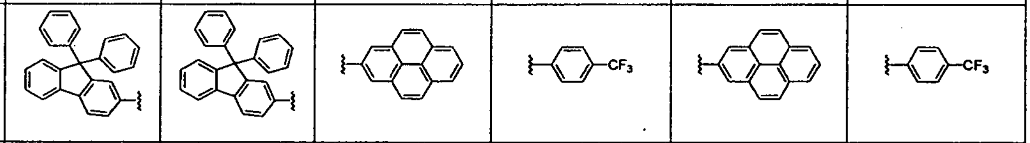
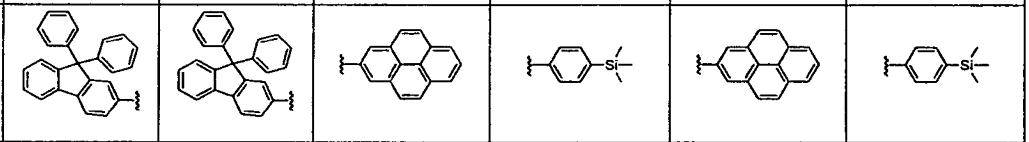
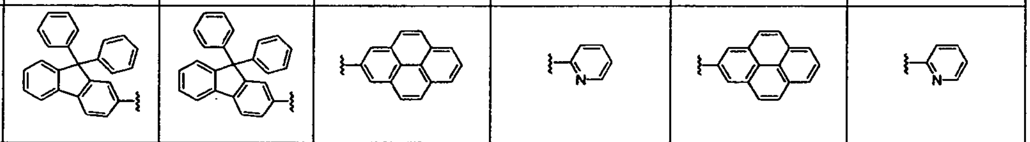
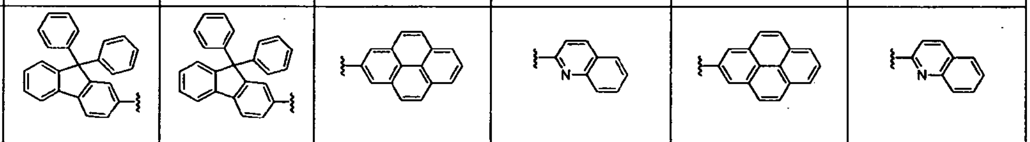
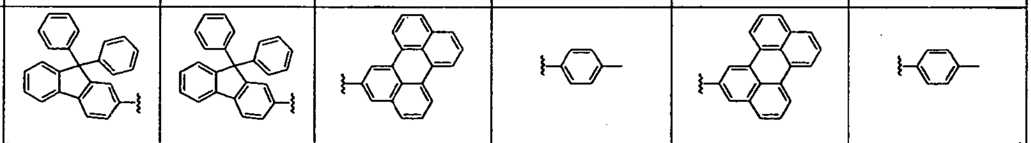
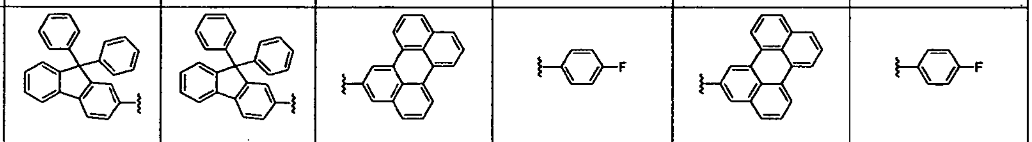
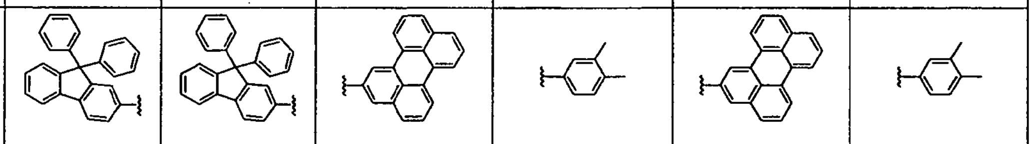
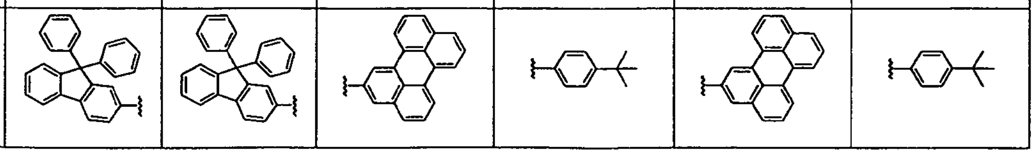
1386	
1387	
1388	
1389	
1390	
1391	
1392	
1393	
1394	
1395	
1396	

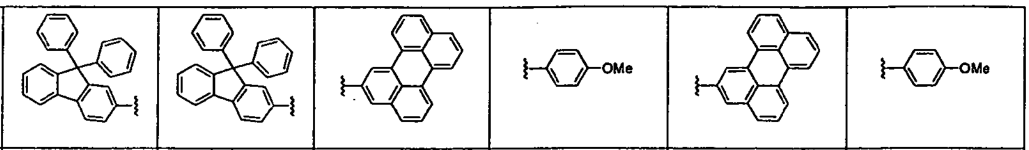
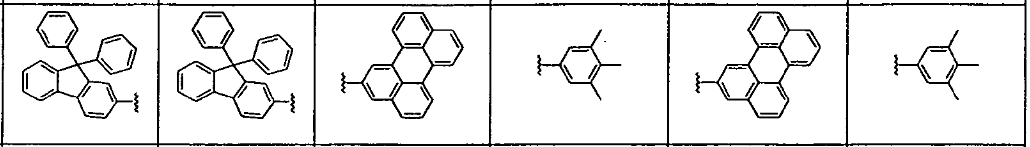
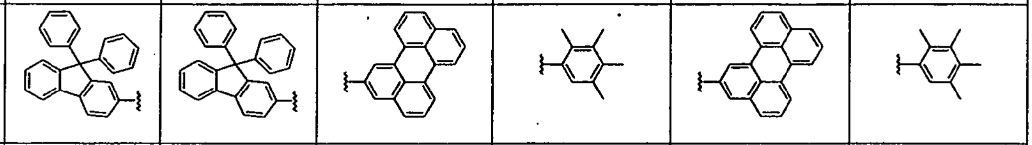
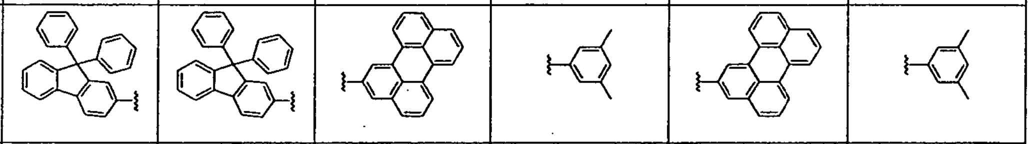
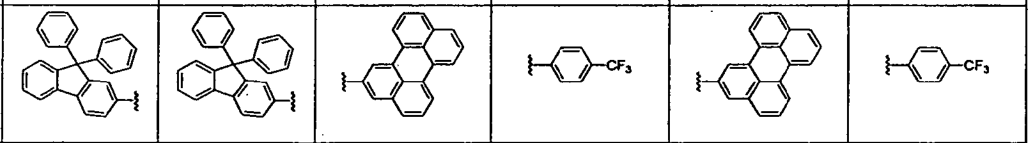
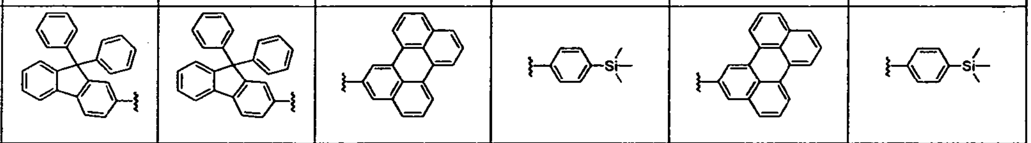
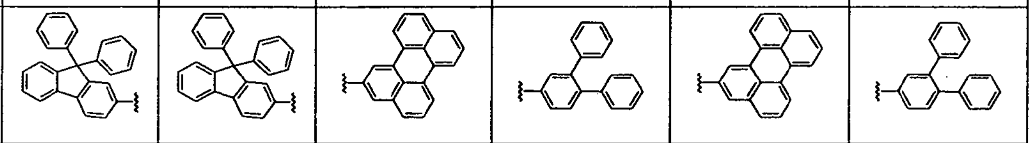
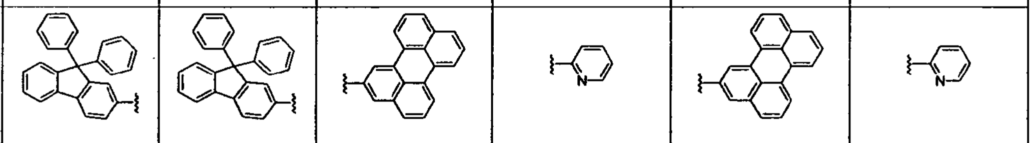
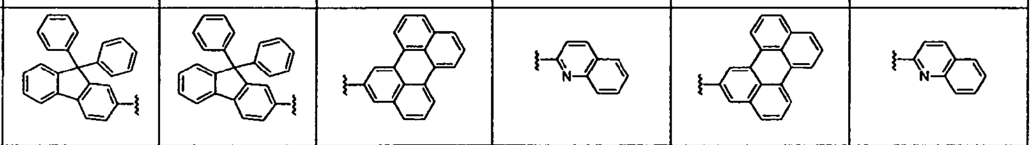
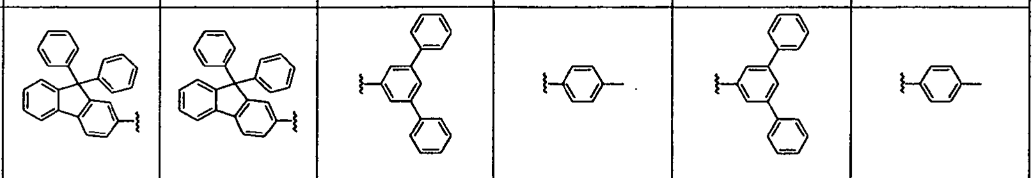
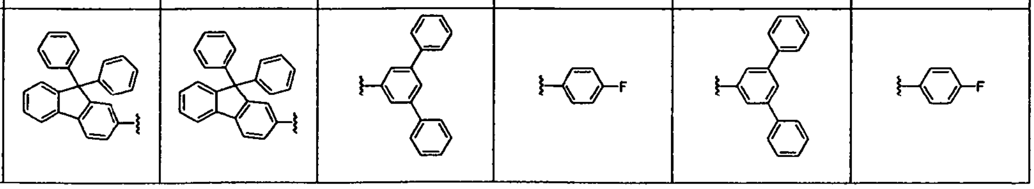
1397	
1398	
1399	
1400	
1401	
1402	
1403	
1404	
1405	
1406	
1407	

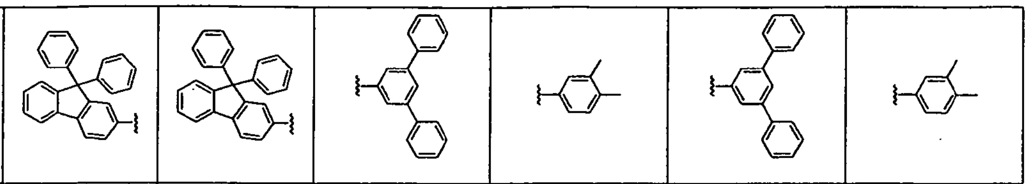
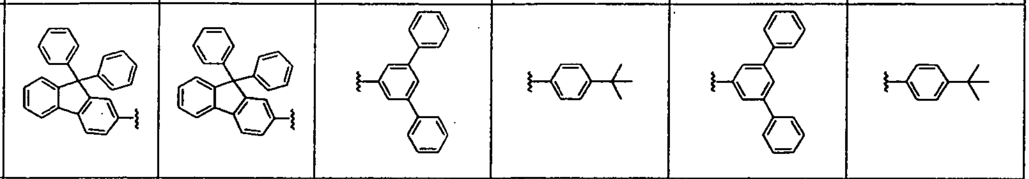
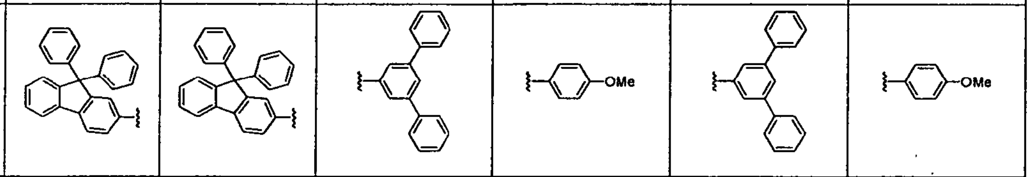
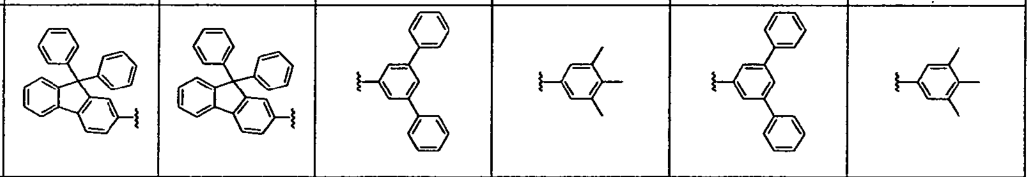
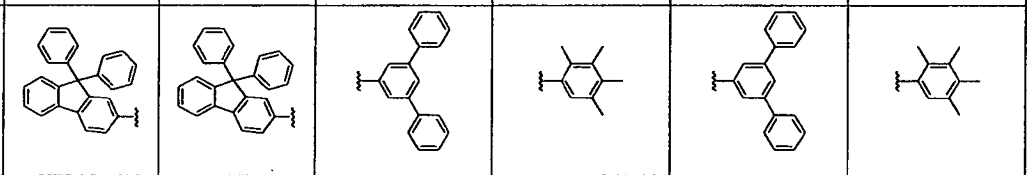
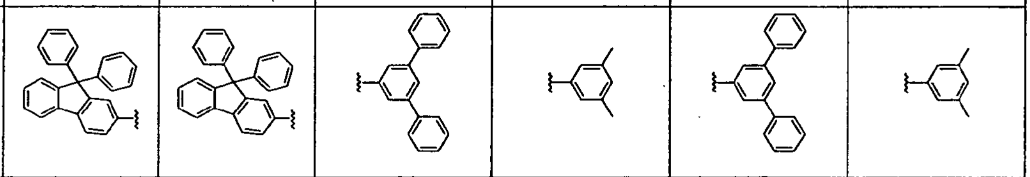
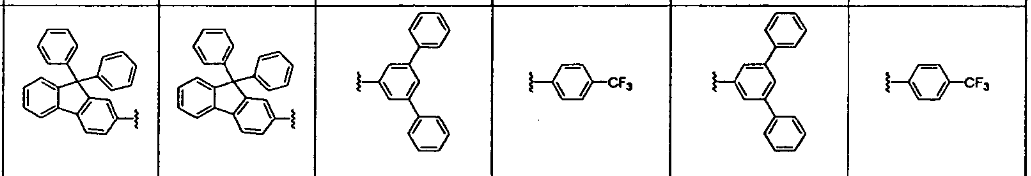
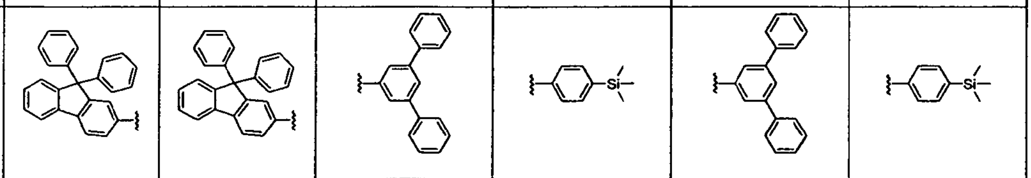
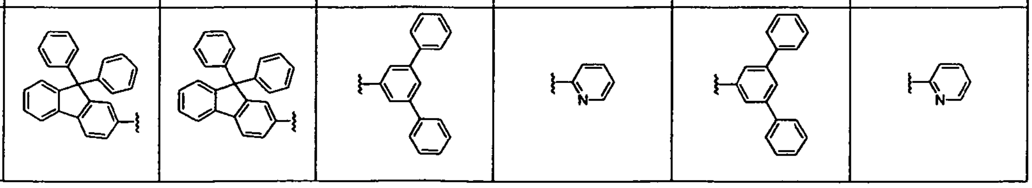
1408	
1409	
1410	
1411	
1412	
1413	
1414	
1415	
1416	
1417	
1418	

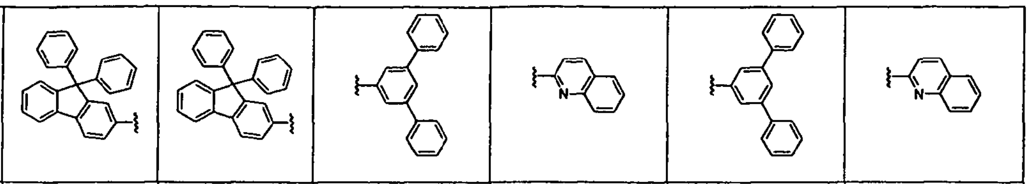
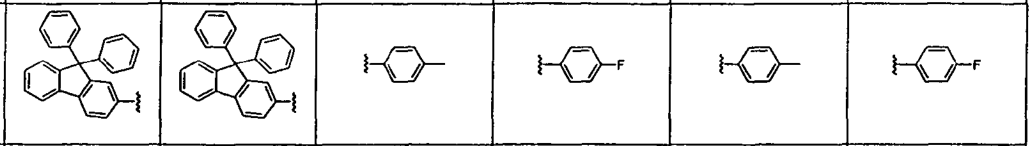
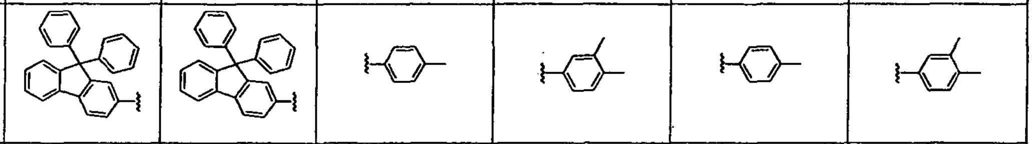
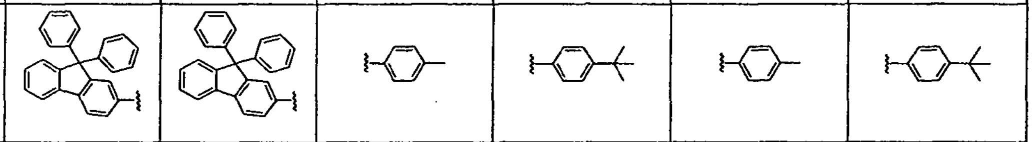
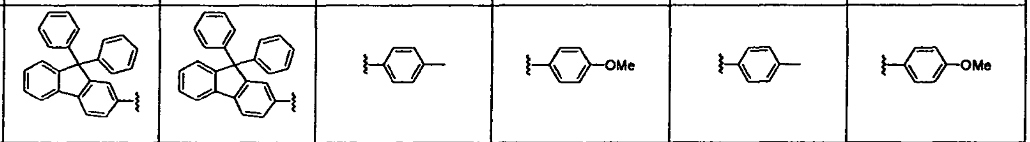
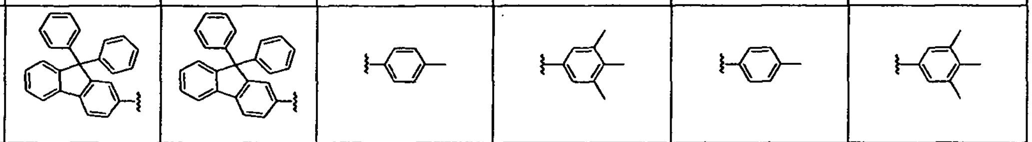
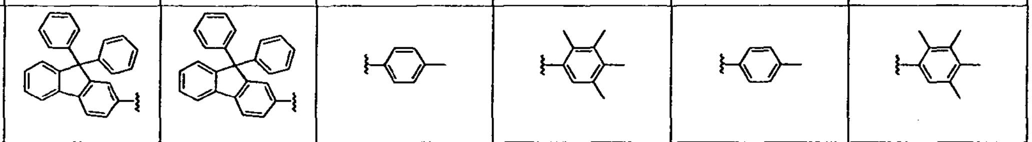
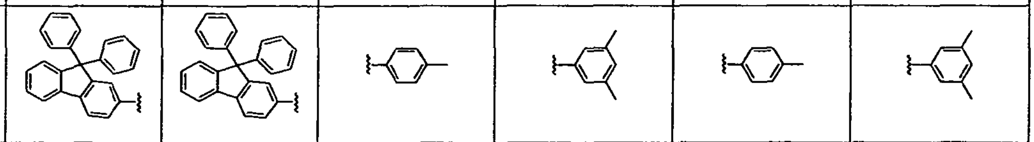
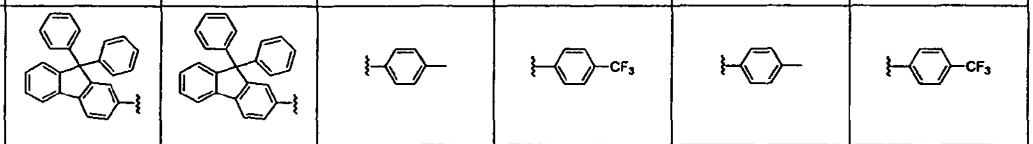
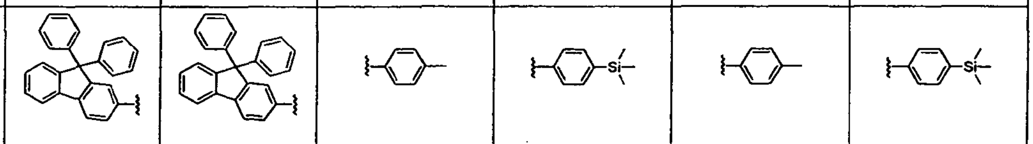
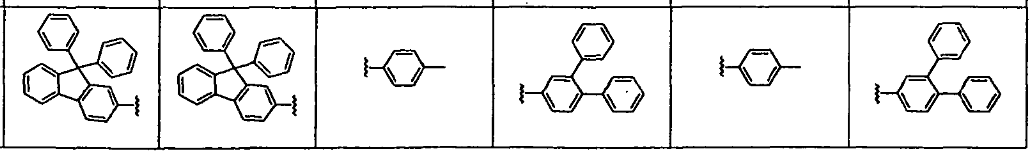
1419	
1420	
1421	
1422	
1423	
1424	
1425	
1426	
1427	
1428	
1429	

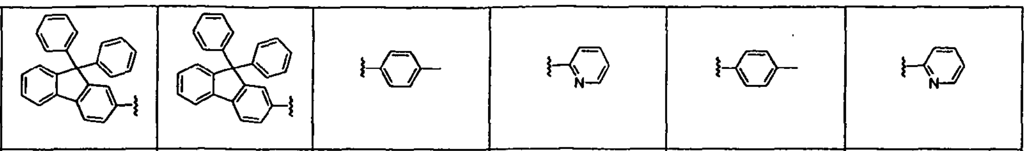
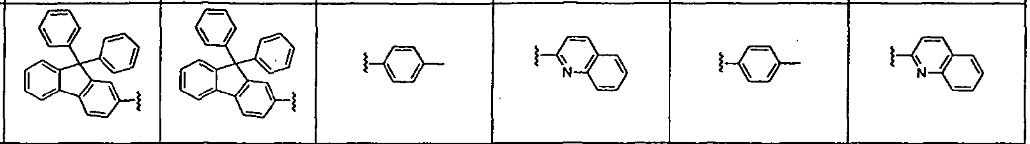
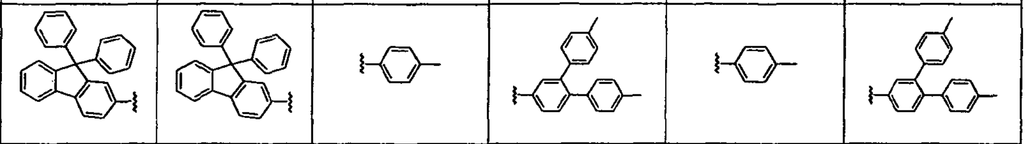
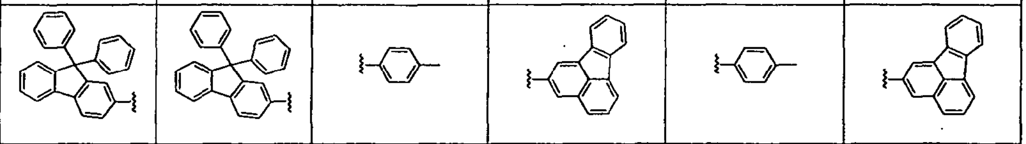
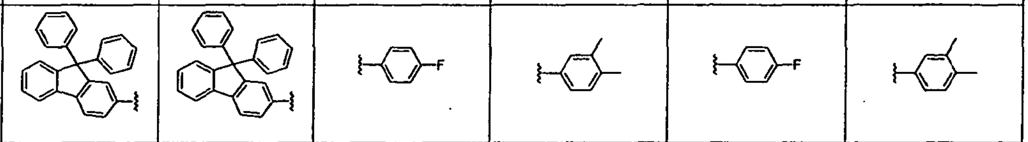
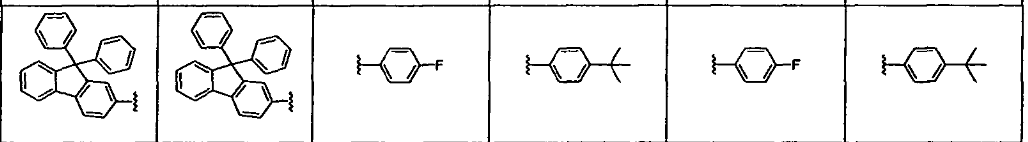
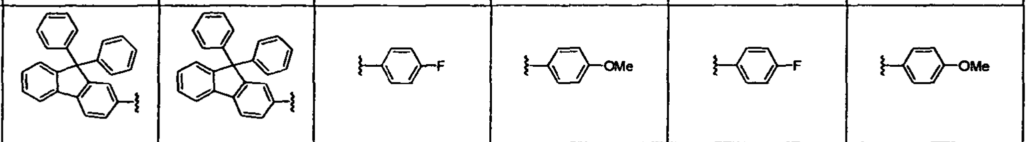
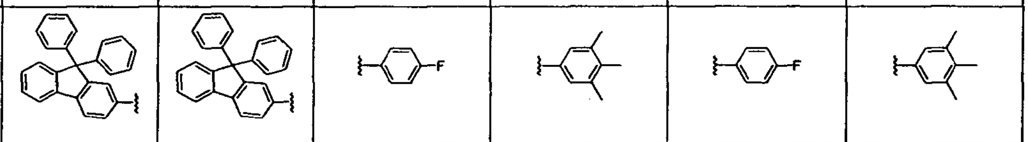
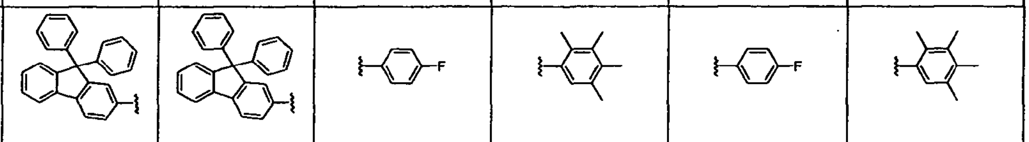
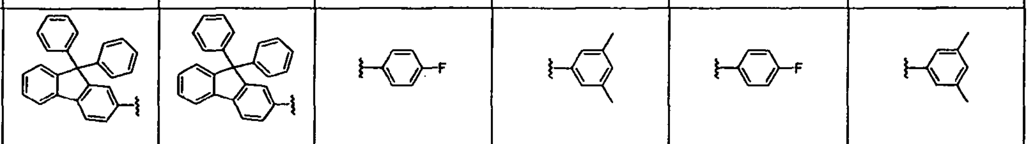
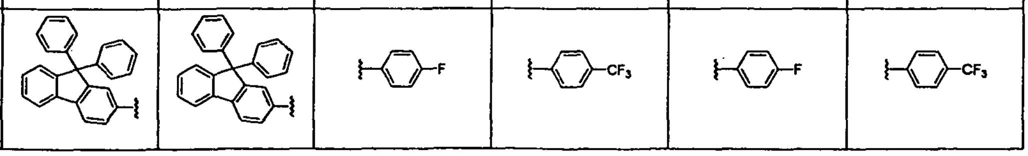
1430			
1431			
1432			
1433			
1434			
1435			
1436			
1437			
1438			
1439			
1440			

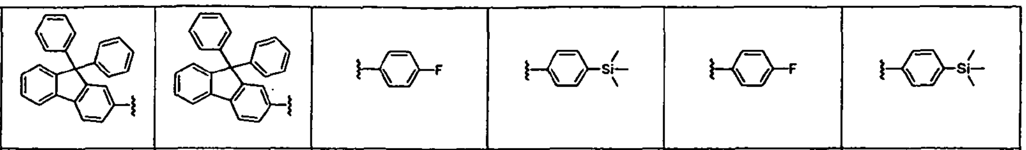
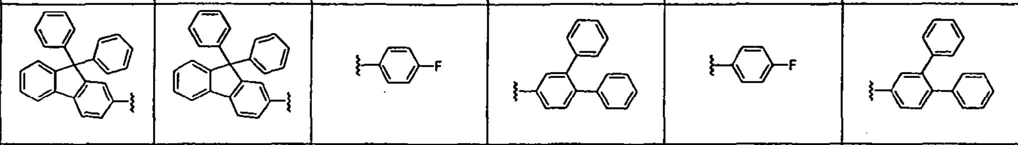
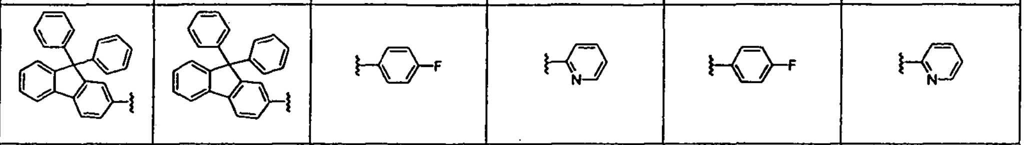
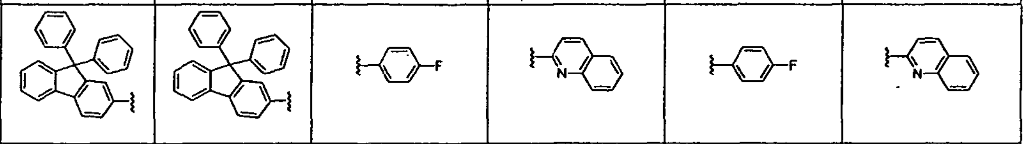
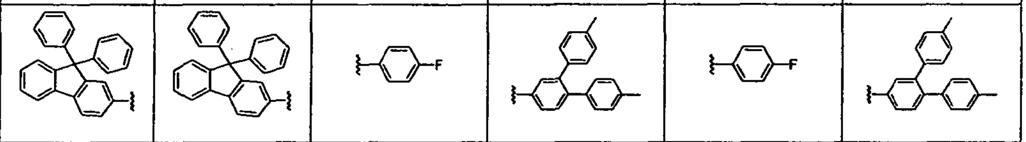
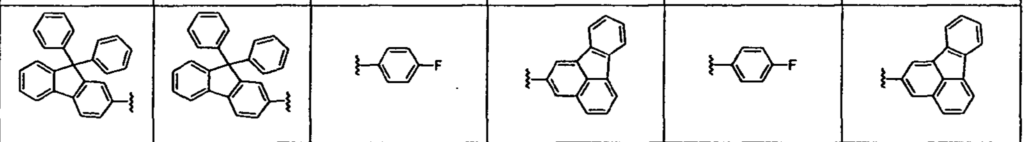
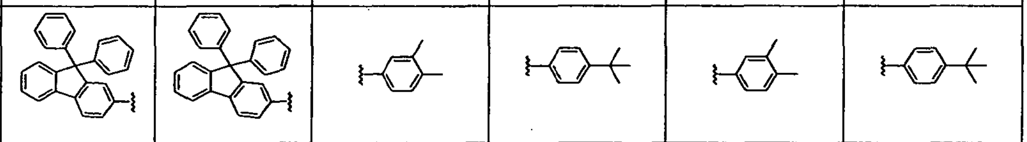
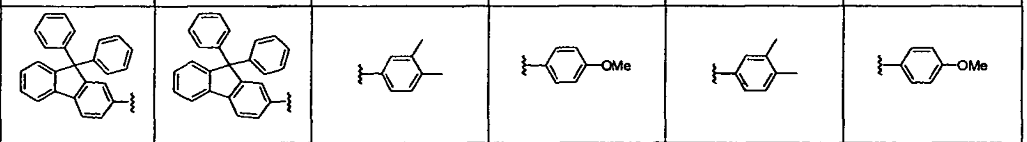
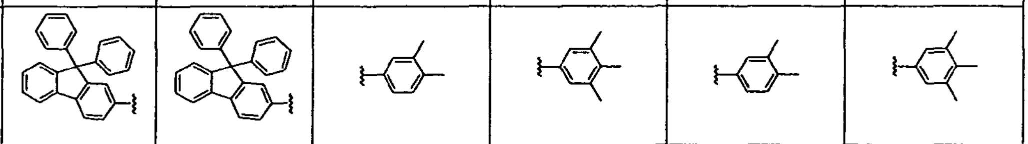
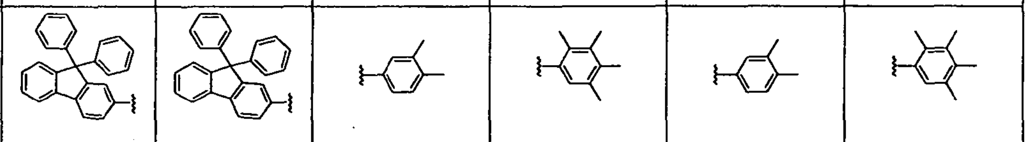
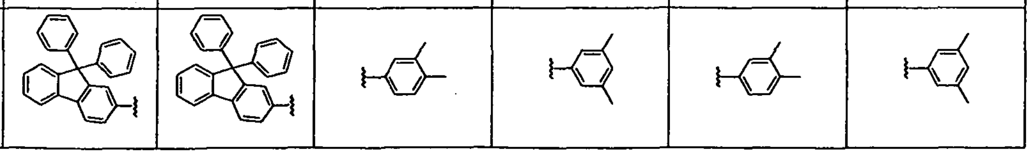
1441	
1442	
1443	
1444	
1445	
1446	
1447	
1448	
1449	
1450	
1451	

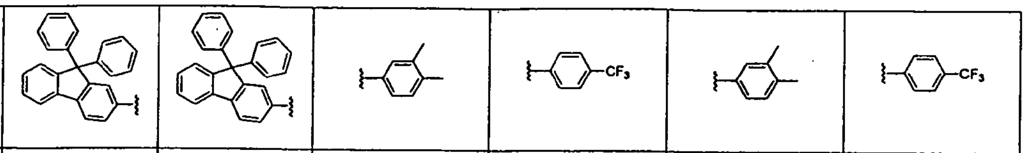
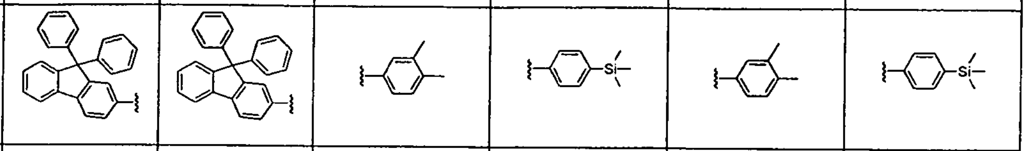
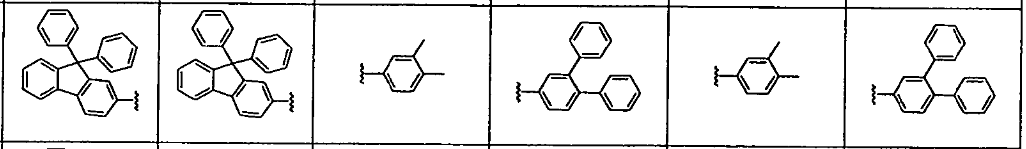
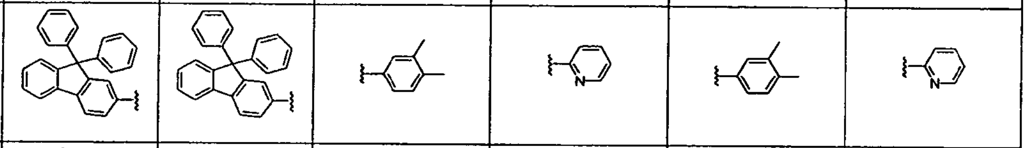
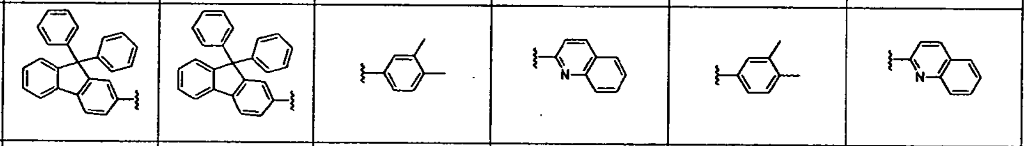
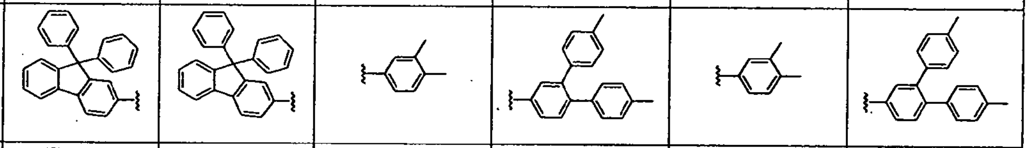
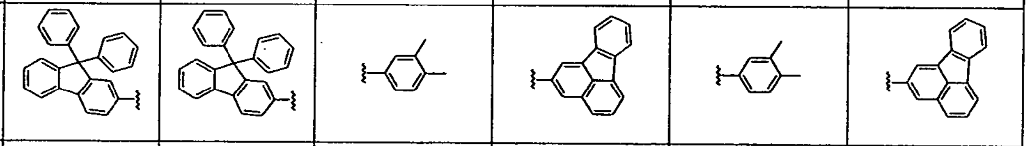
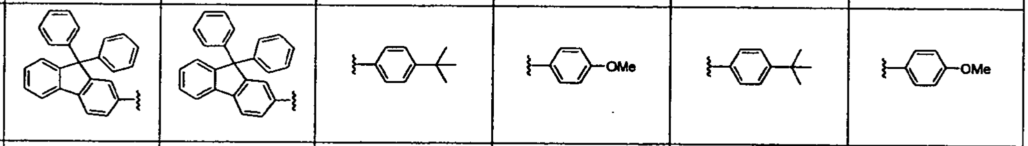
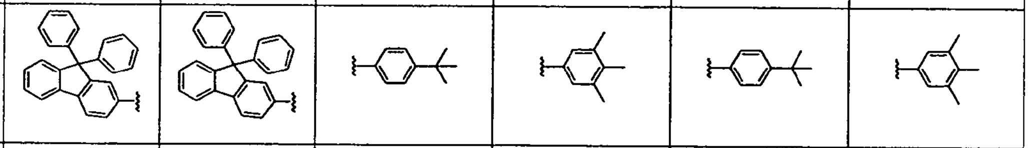
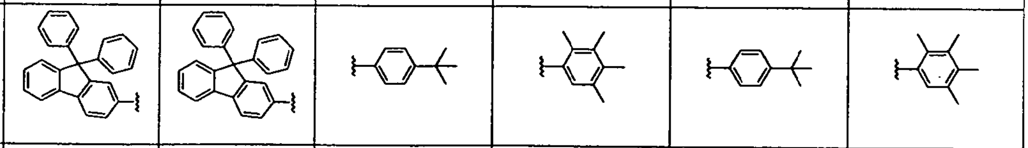
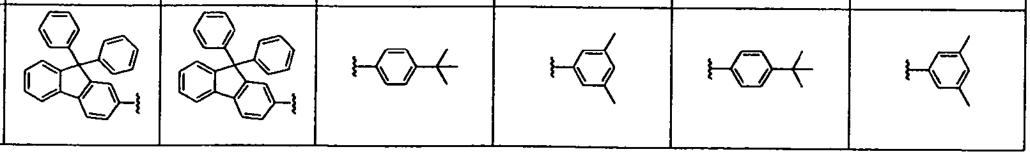
1452	
1453	
1454	
1455	
1456	
1457	
1458	
1459	
1460	
1461	
1462	

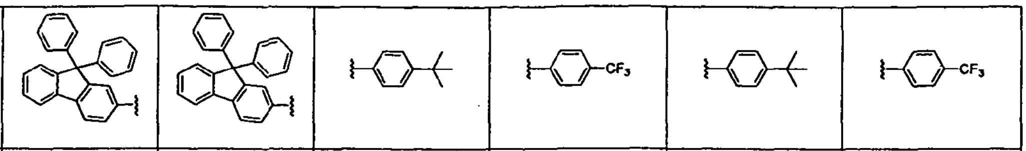
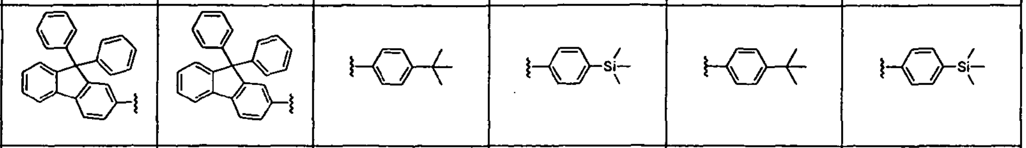
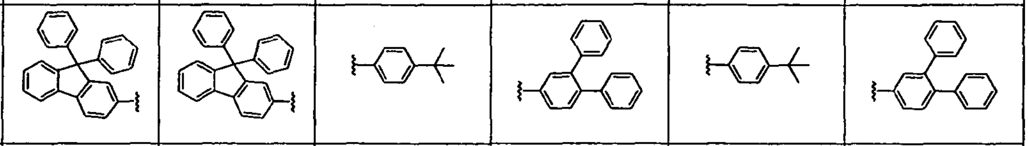
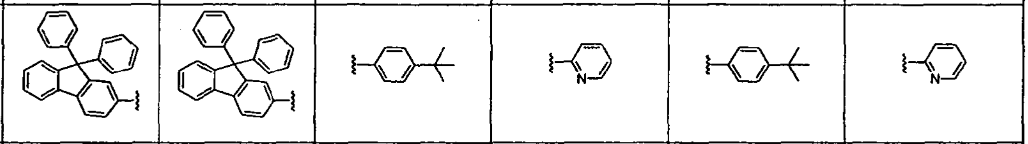
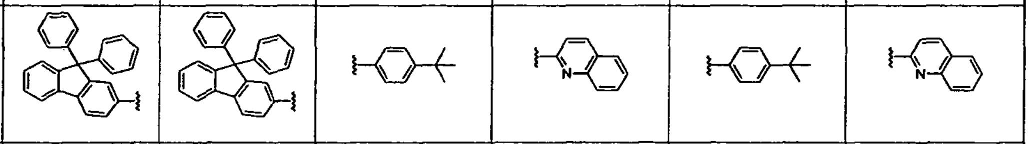
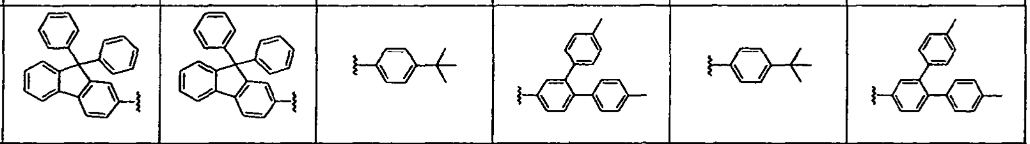
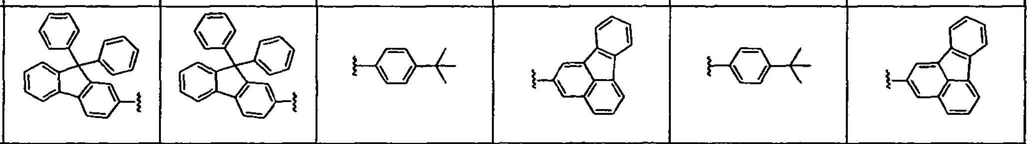
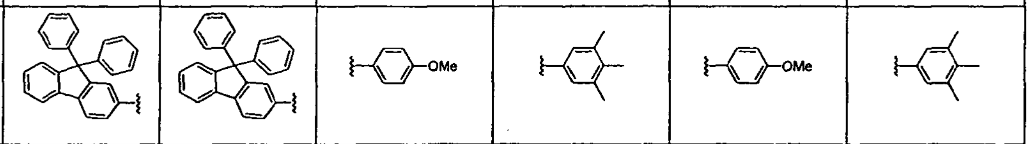
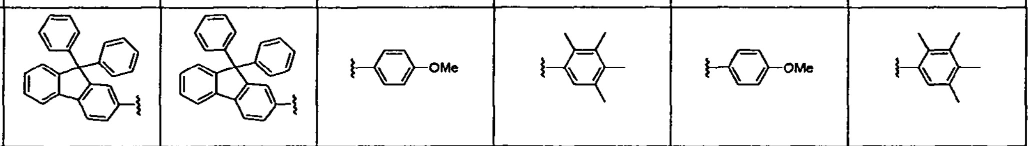
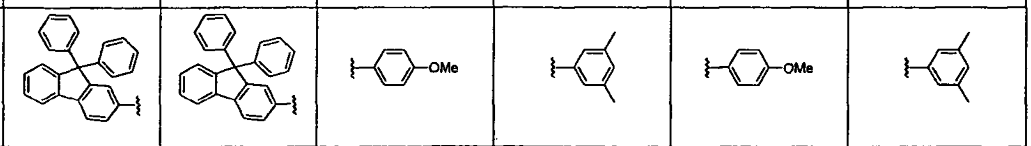
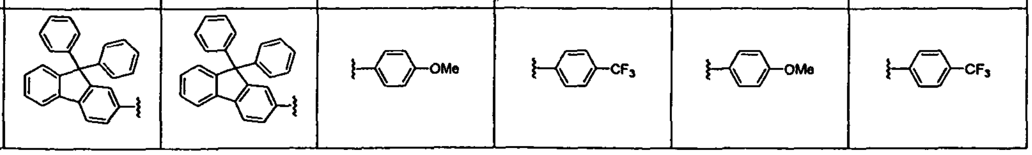
1463	
1464	
1465	
1466	
1467	
1468	
1469	
1470	
1471	

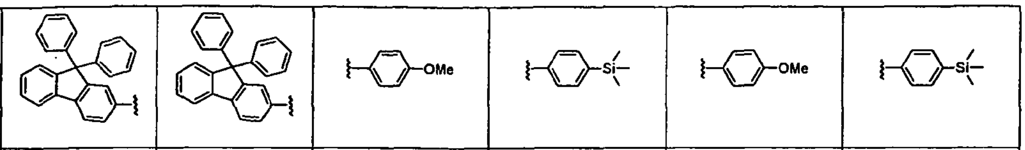
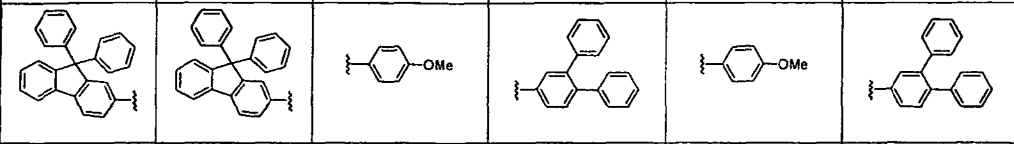
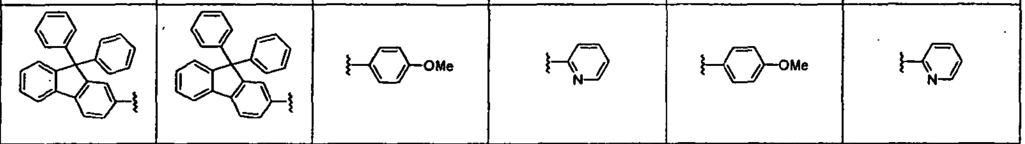
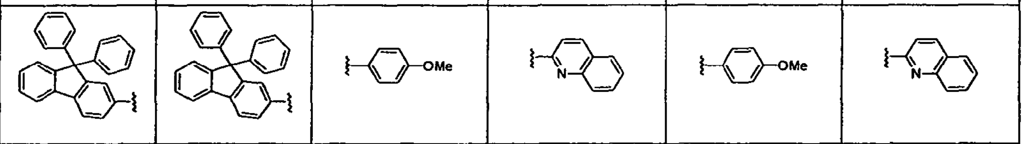
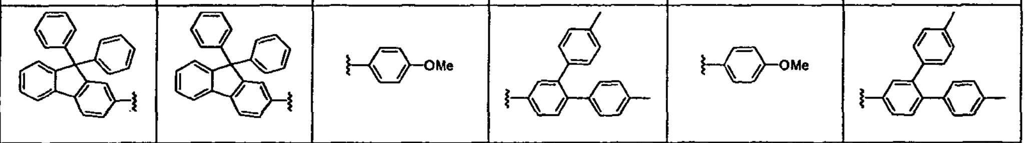
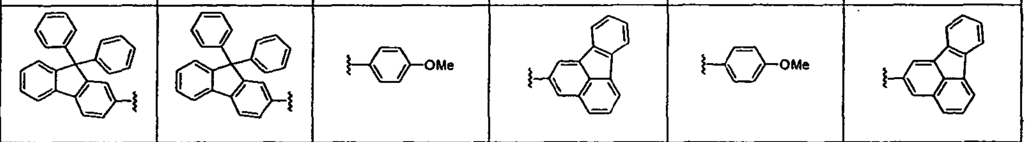
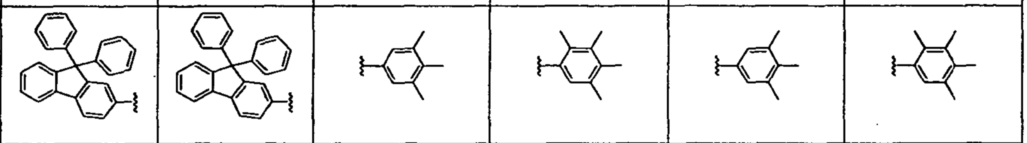
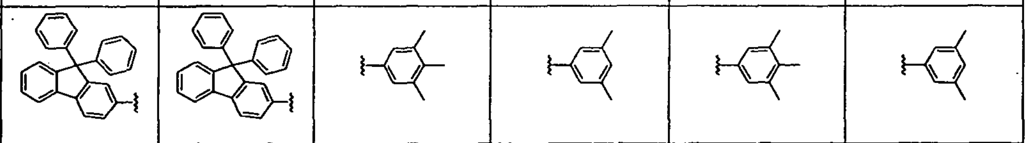
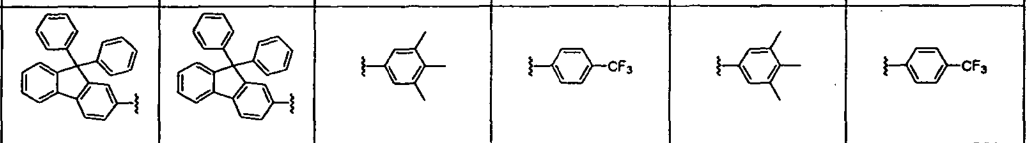
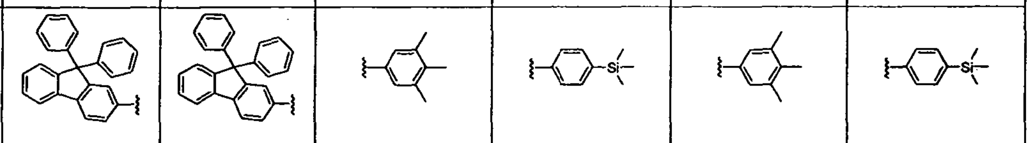
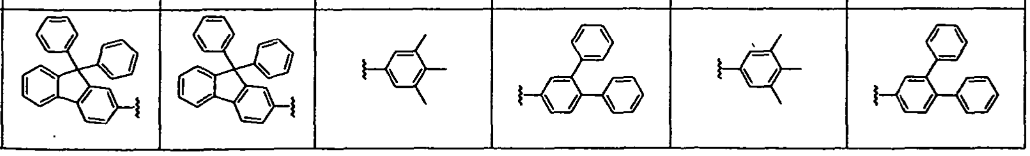
1472	
1473	
1474	
1475	
1476	
1477	
1478	
1479	
1480	
1481	
1482	

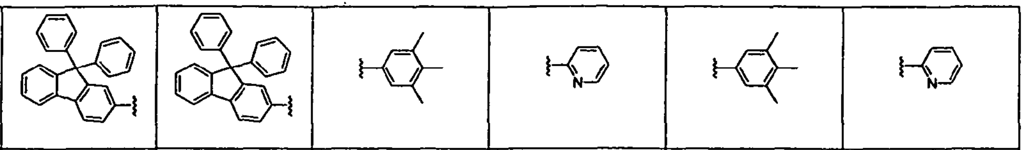
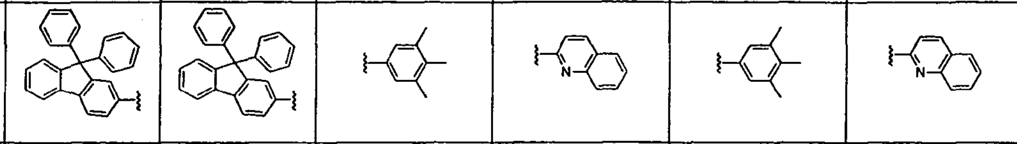
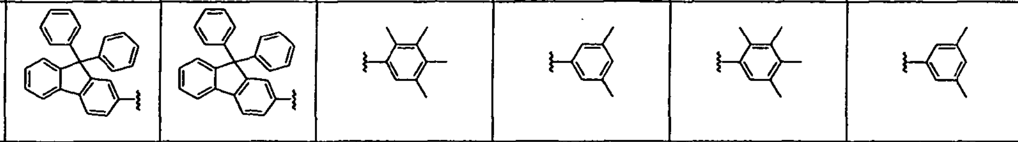
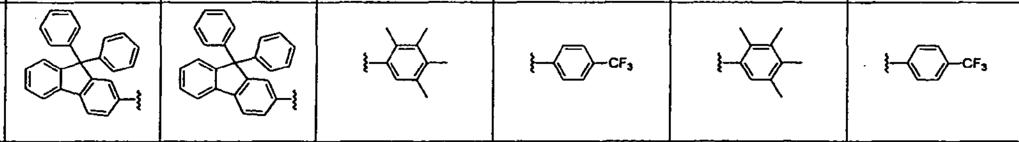
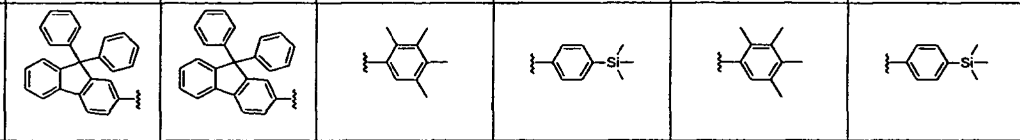
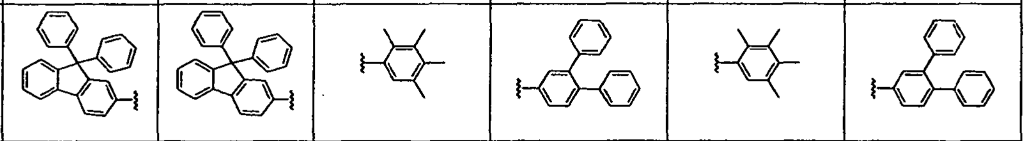
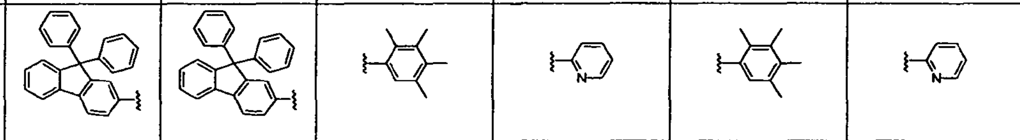
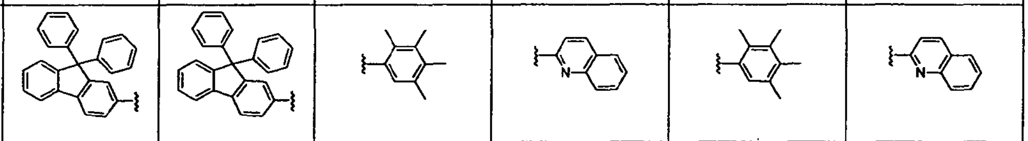
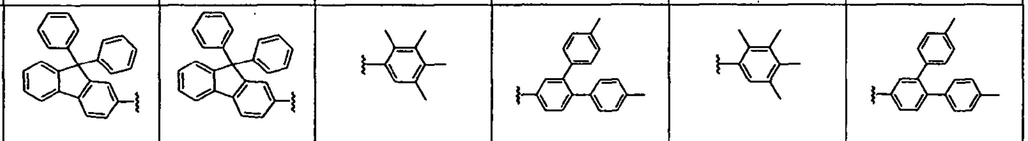
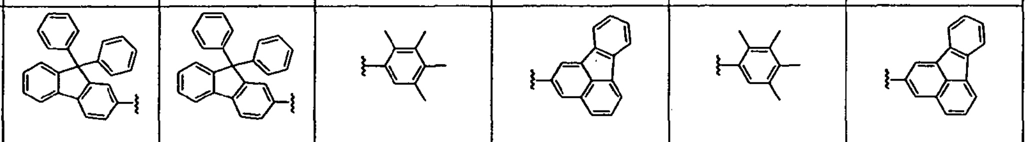
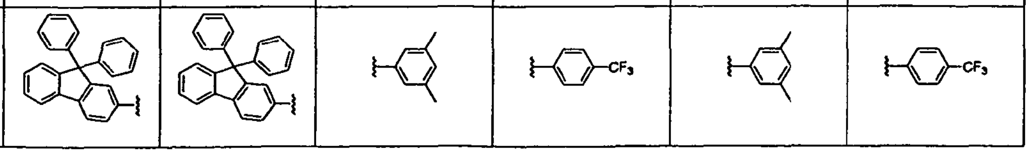
1483	
1484	
1485	
1486	
1487	
1488	
1489	
1490	
1491	
1492	
1493	

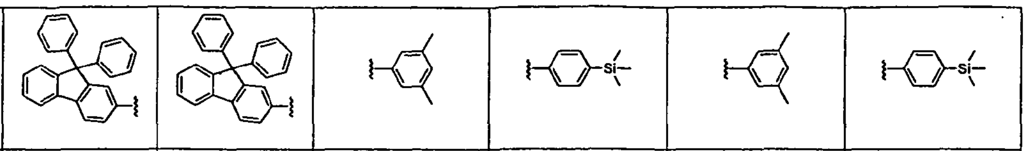
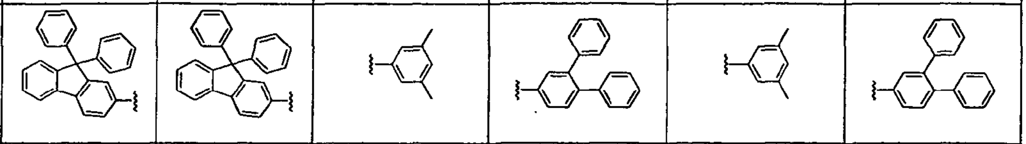
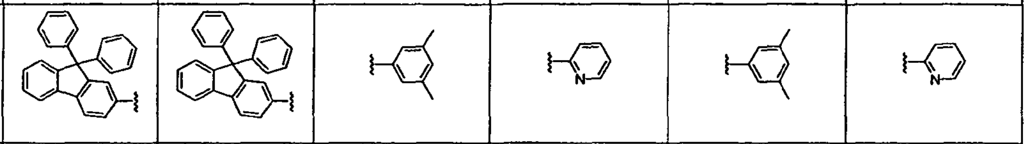
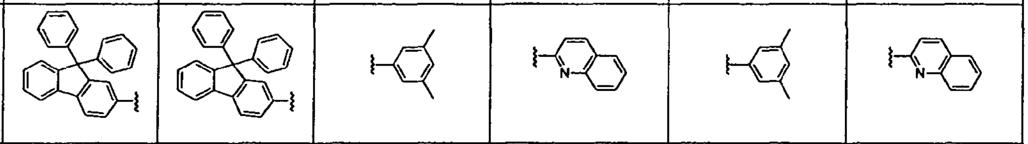
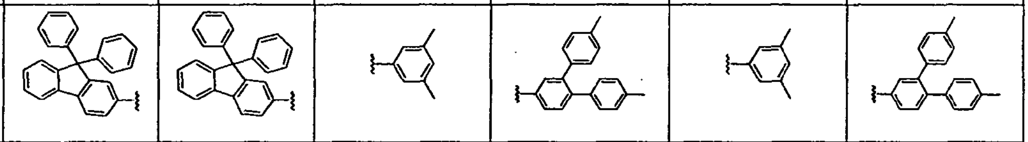
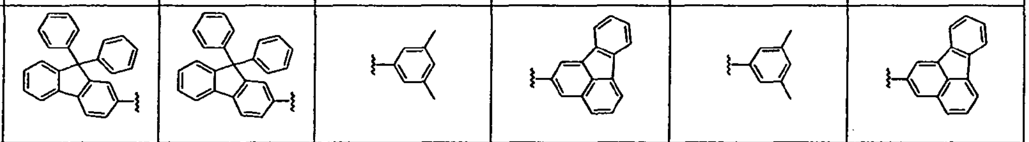
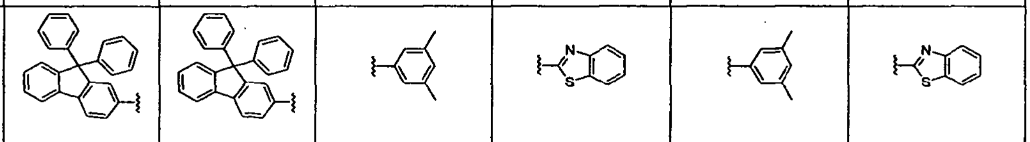
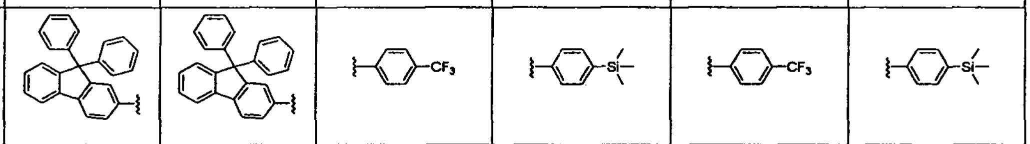
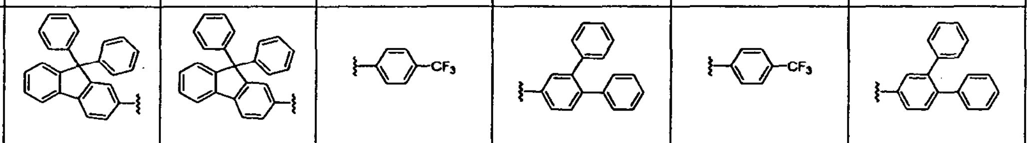
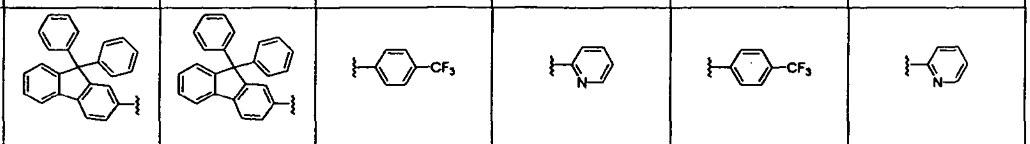
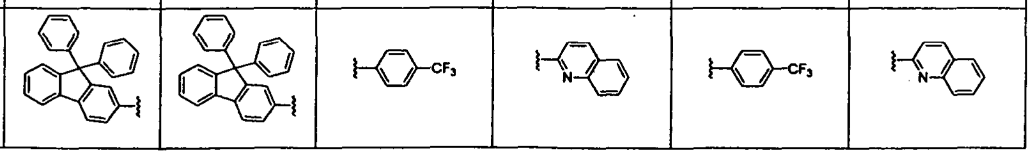
1494	
1495	
1496	
1497	
1498	
1499	
1500	
1501	
1502	
1503	
1504	

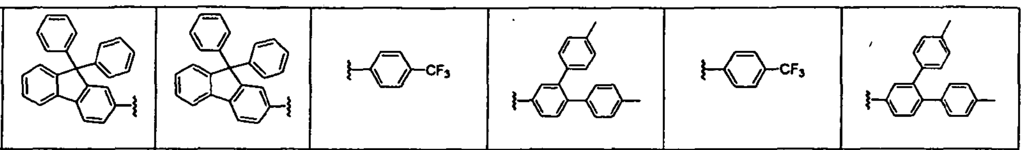
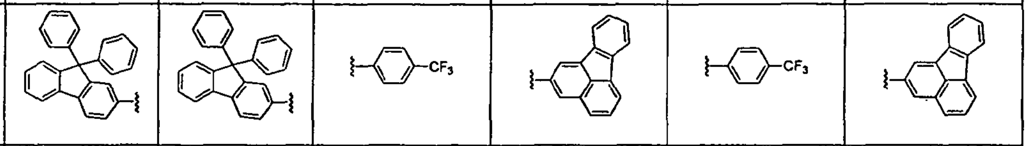
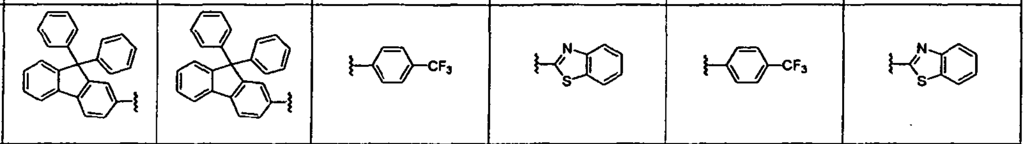
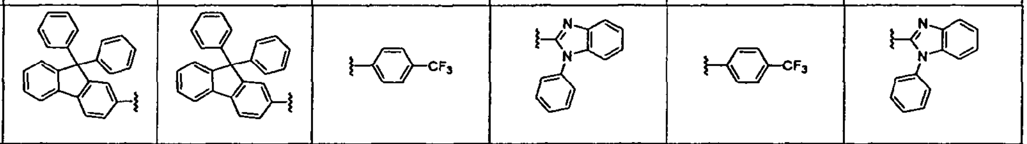
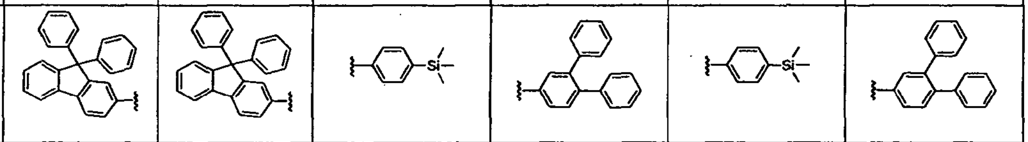
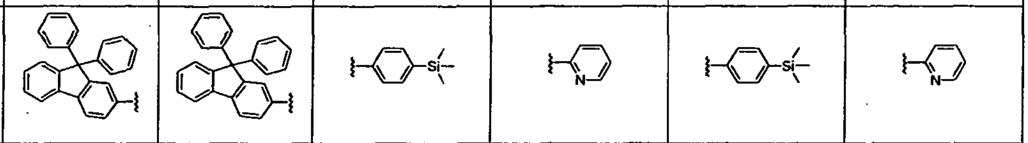
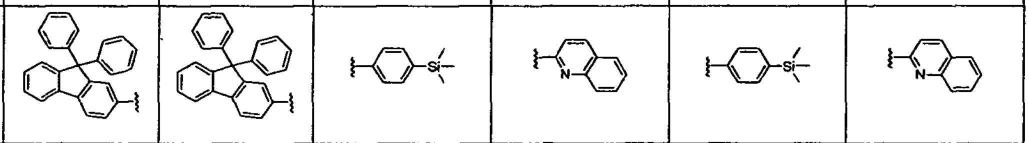
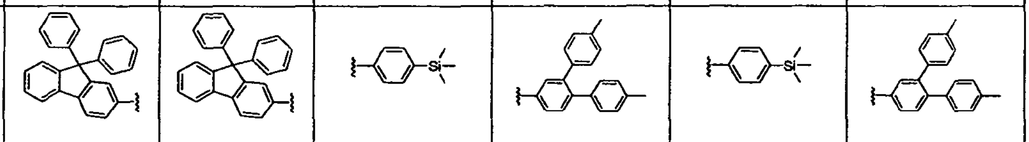
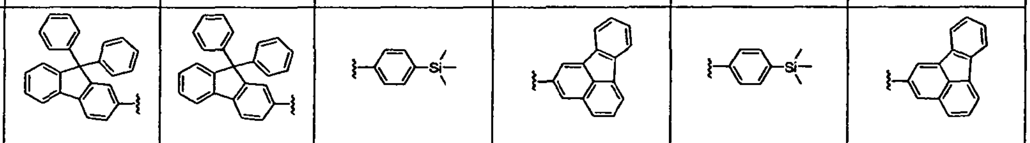
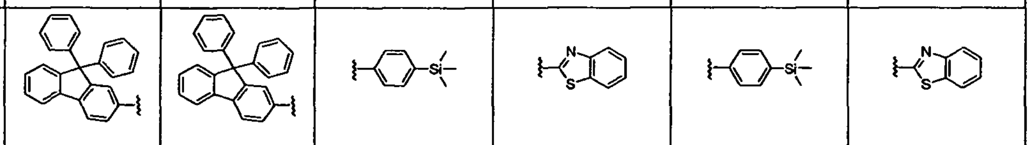
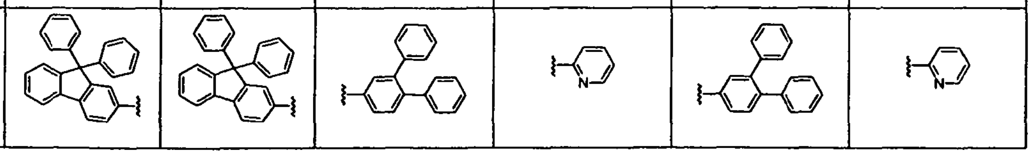
1505	
1506	
1507	
1508	
1509	
1510	
1511	
1512	
1513	
1514	
1515	

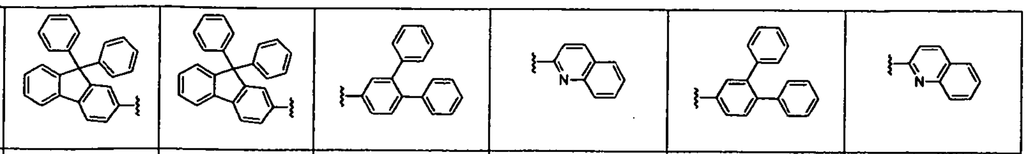
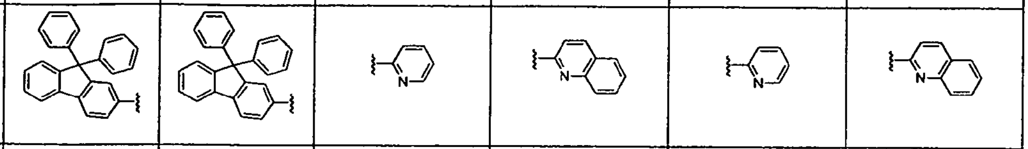
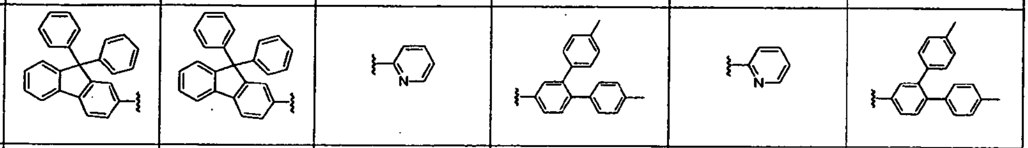
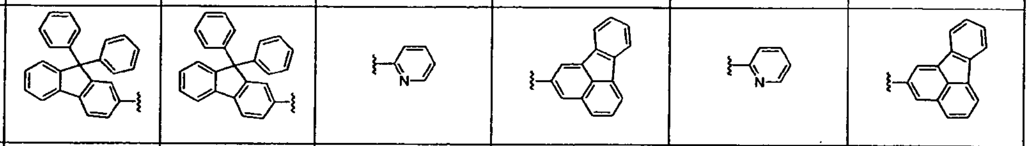
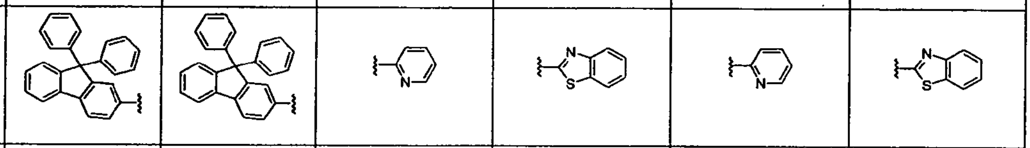
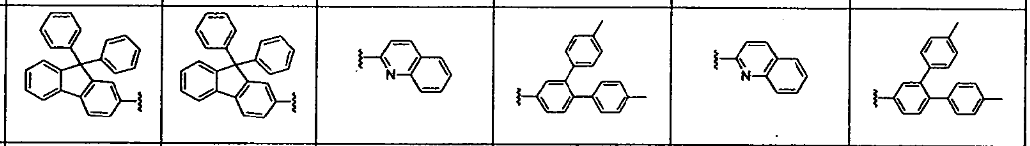
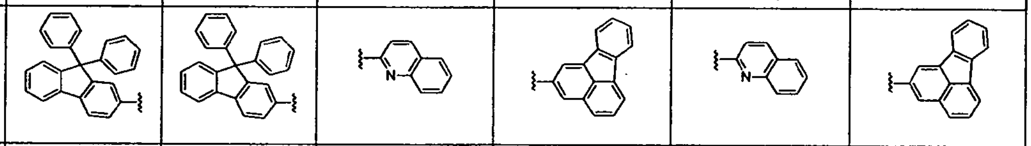
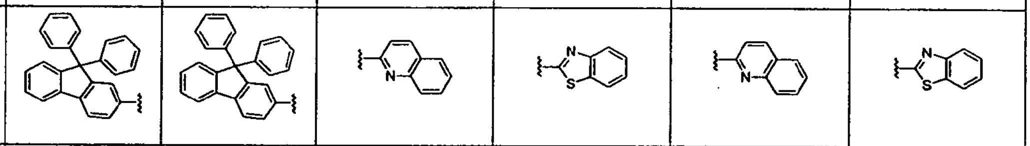
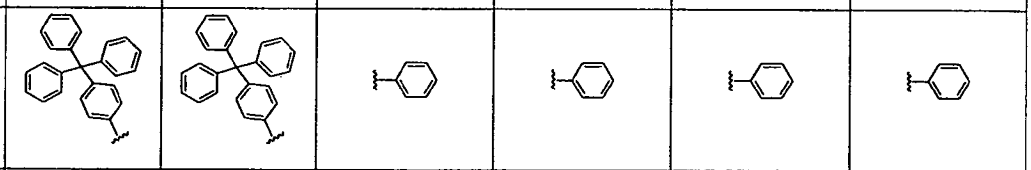
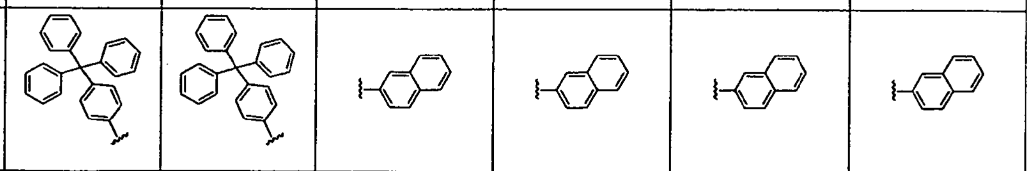
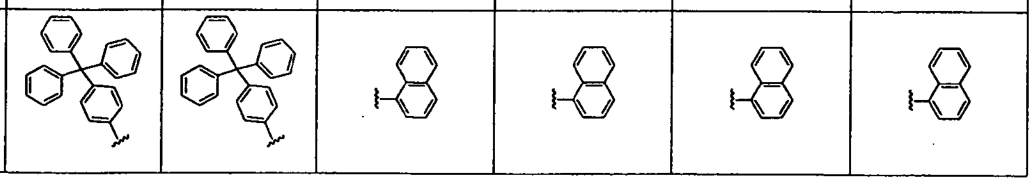
1516	
1517	
1518	
1519	
1520	
1521	
1522	
1523	
1524	
1525	
1526	

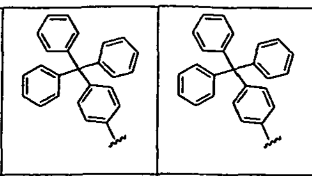
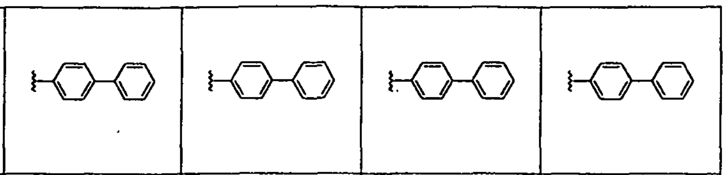
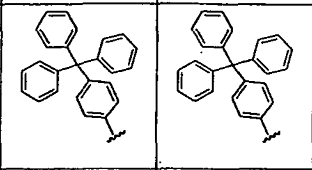
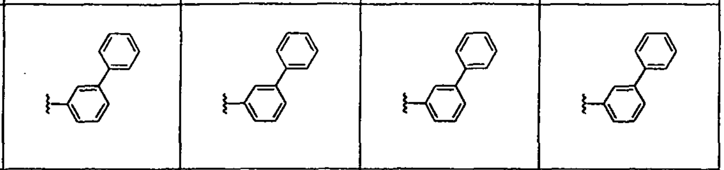
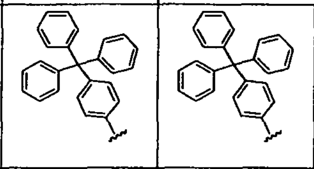
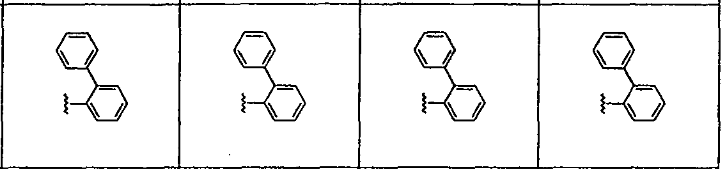
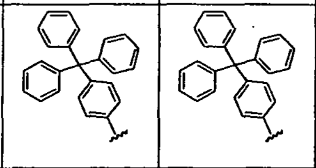
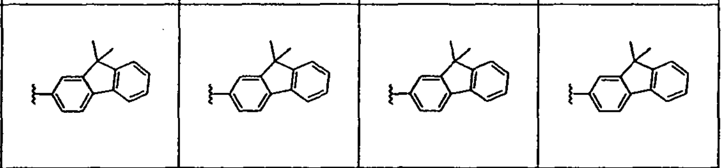
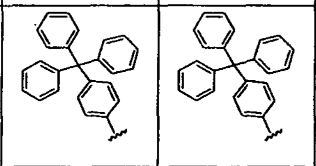
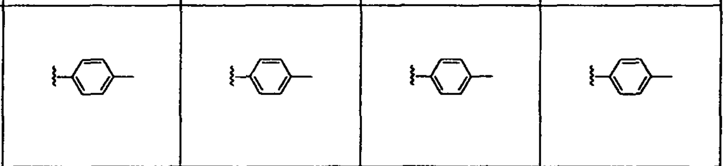
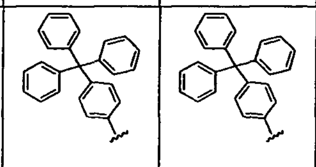
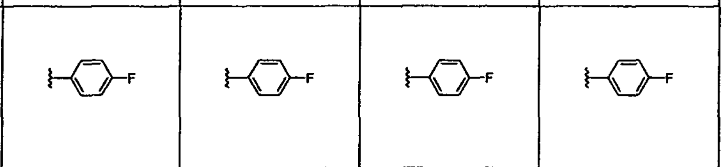
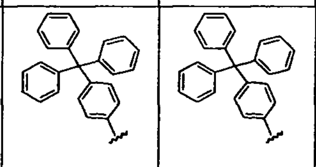
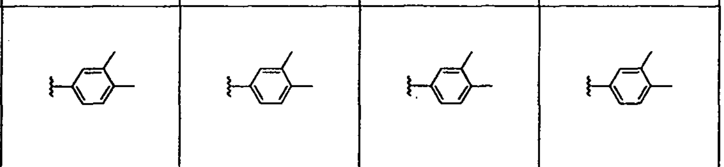
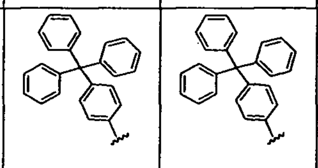
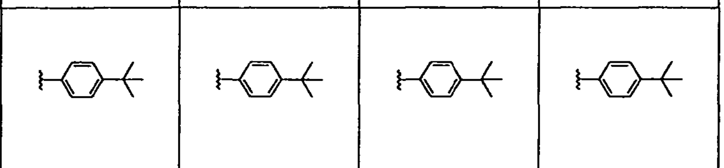
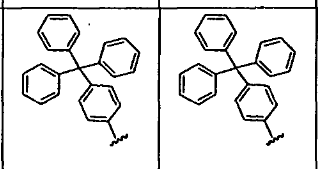
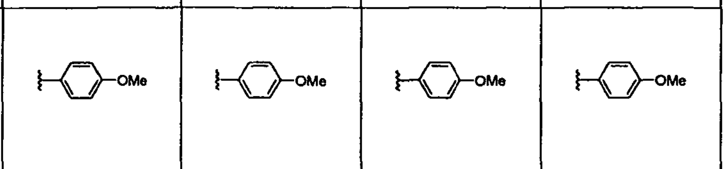
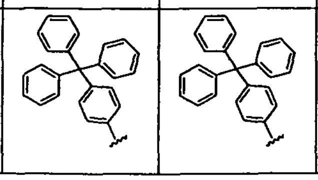
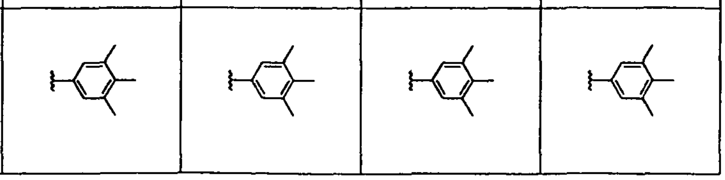
1527	
1528	
1529	
1530	
1531	
1532	
1533	
1534	
1535	
1536	
1537	

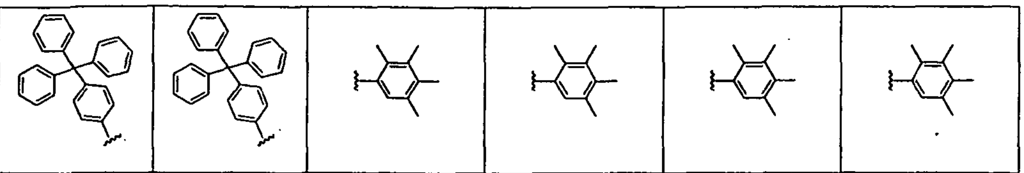
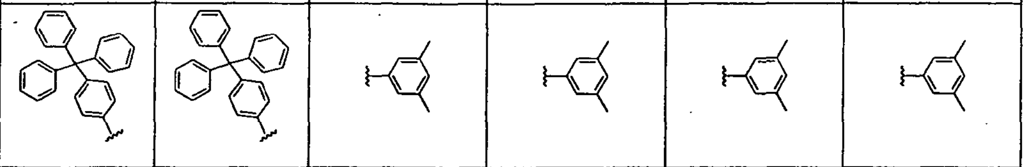
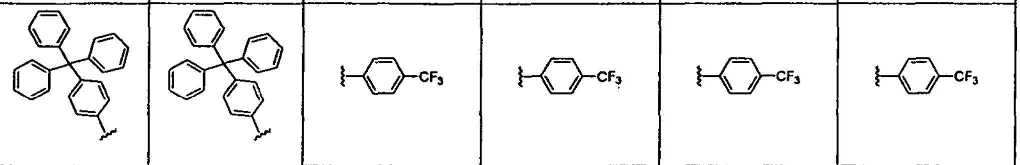
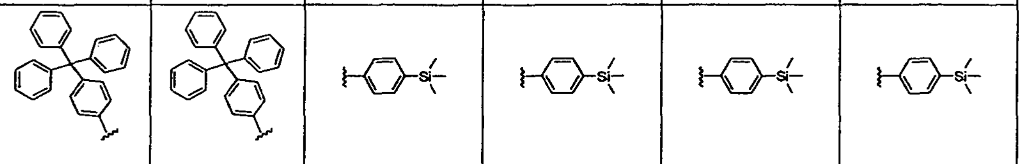
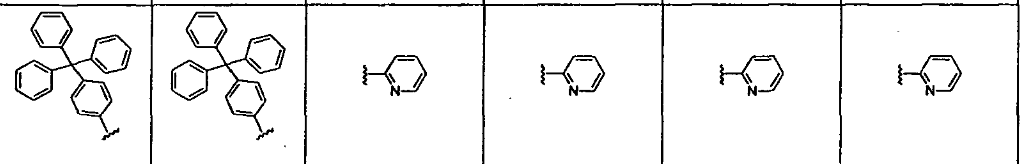
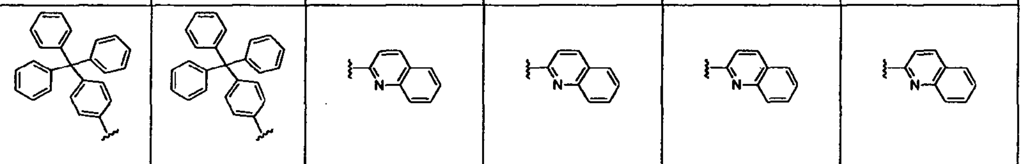
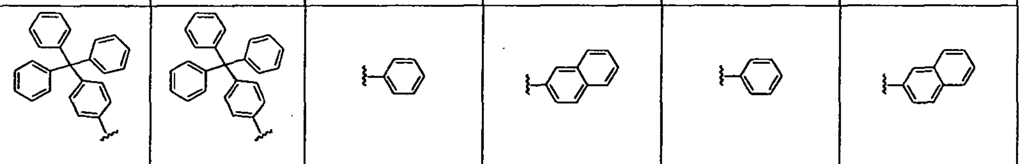
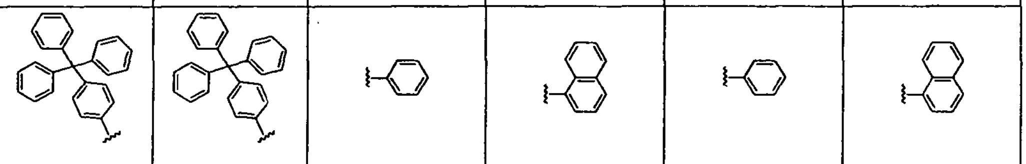
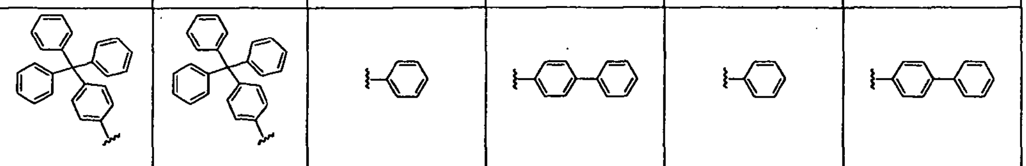
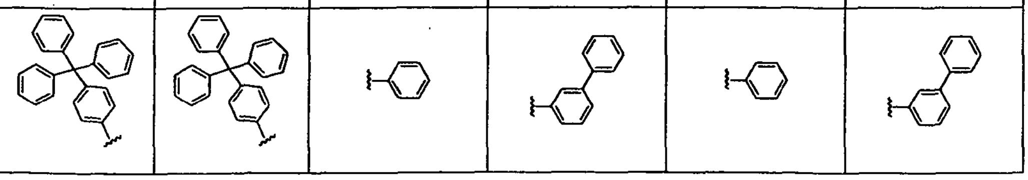
1538	
1539	
1540	
1541	
1542	
1543	
1544	
1545	
1546	
1547	
1548	

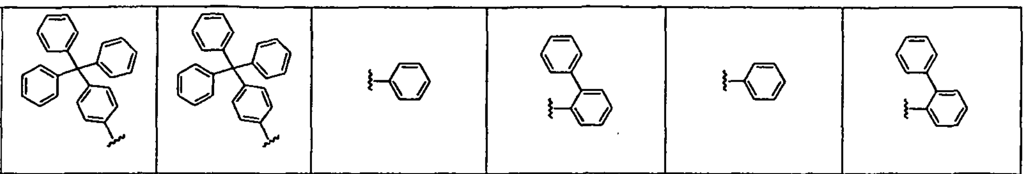
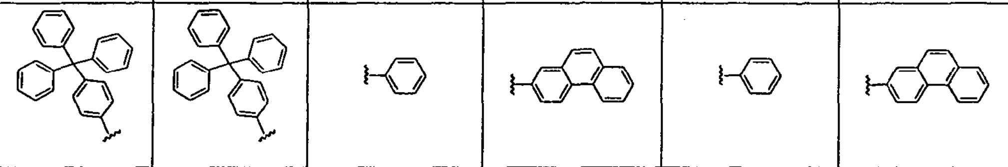
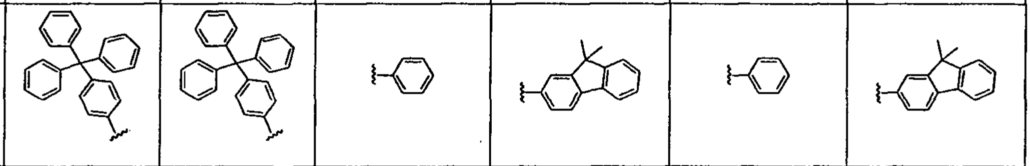
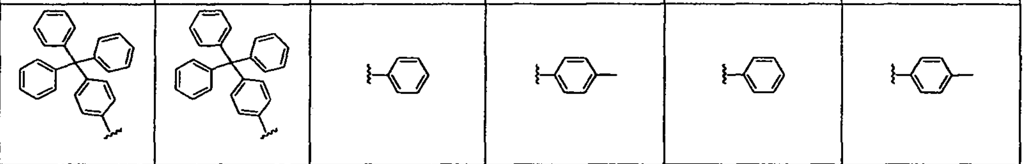
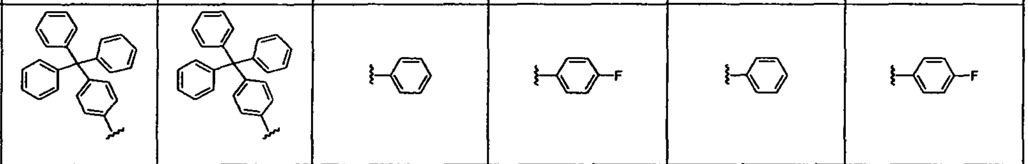
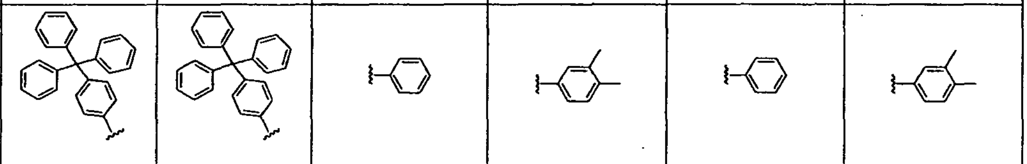
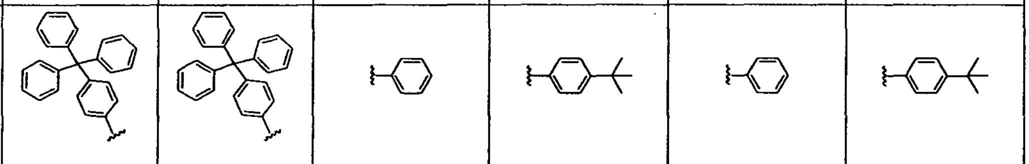
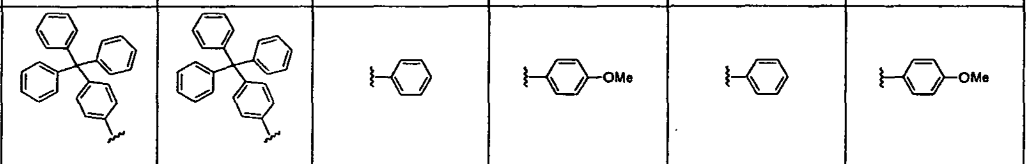
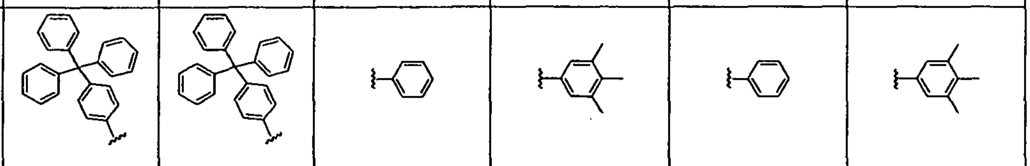
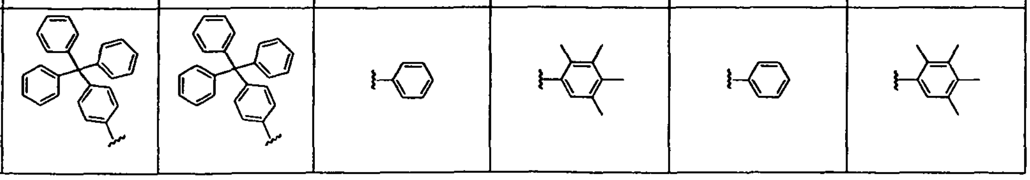
1549	
1550	
1551	
1552	
1553	
1554	
1555	
1556	
1557	
1558	
1559	

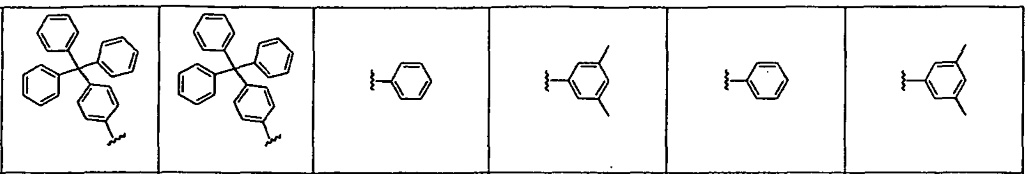
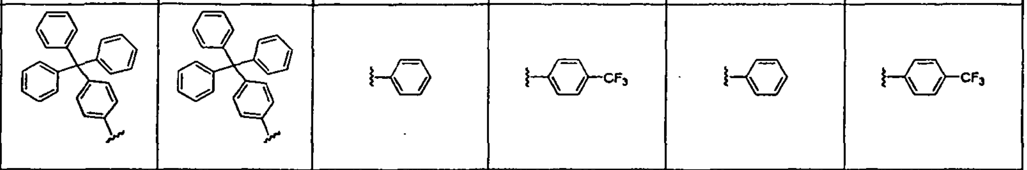
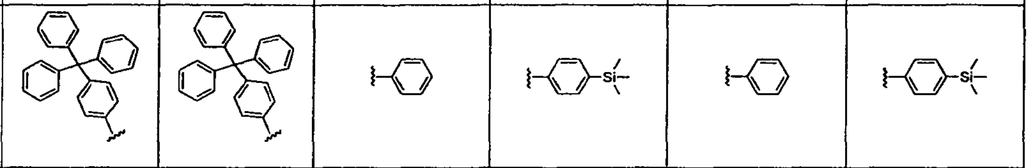
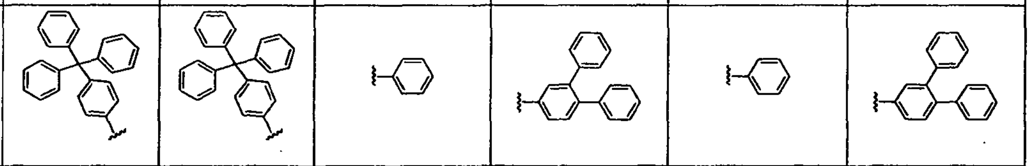
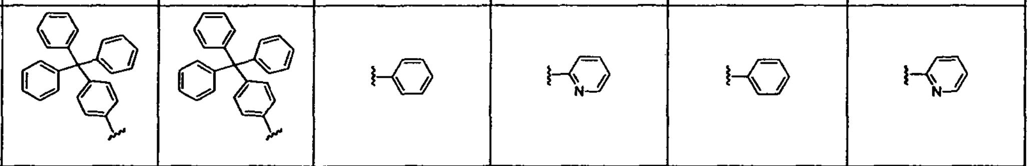
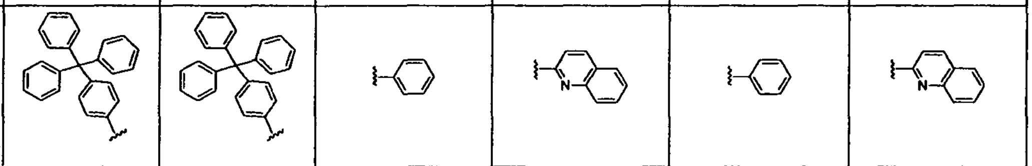
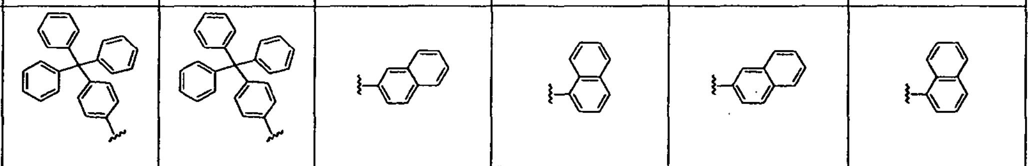
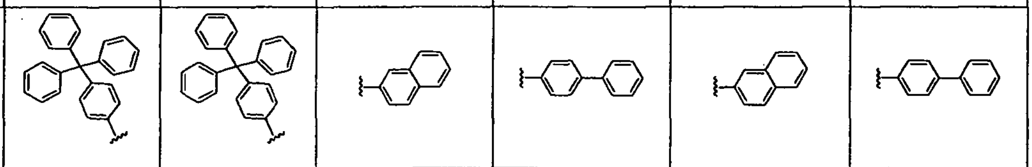
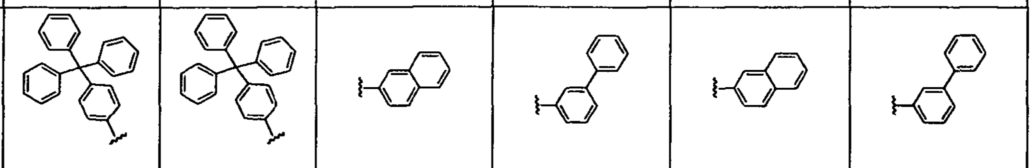
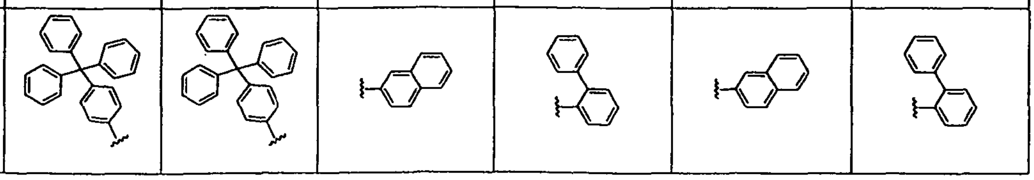
1560	
1561	
1562	
1563	
1564	
1565	
1566	
1567	
1568	
1569	
1570	

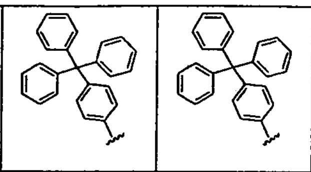
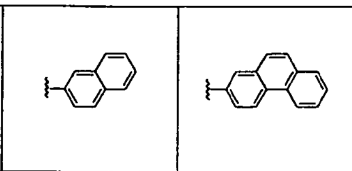
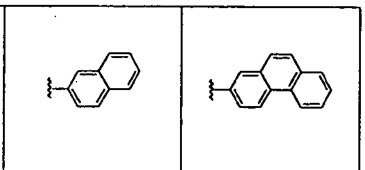
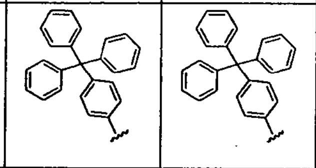
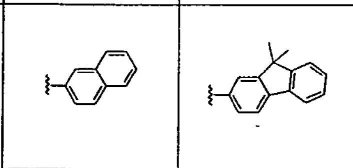
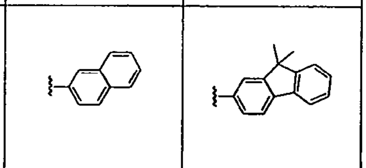
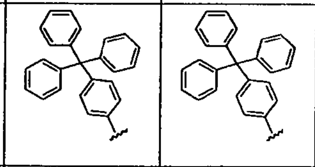
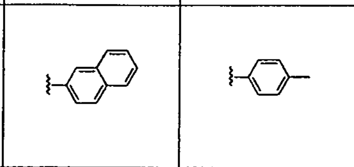
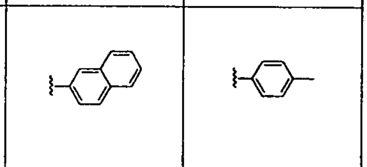
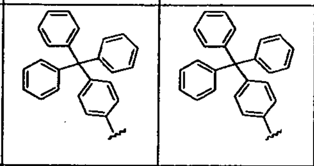
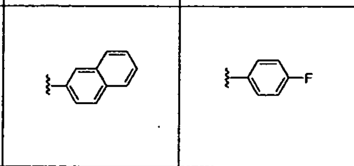
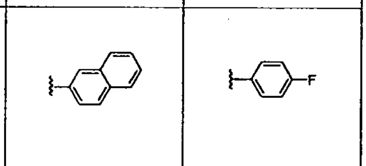
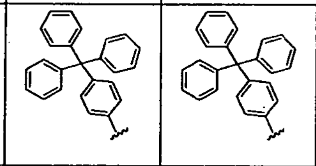
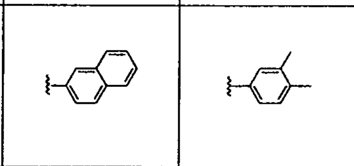
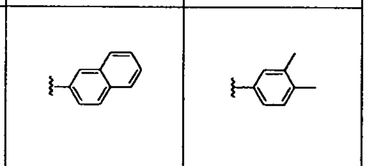
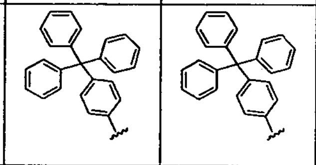
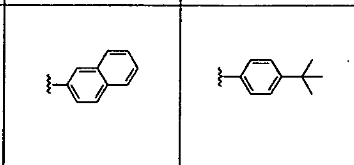
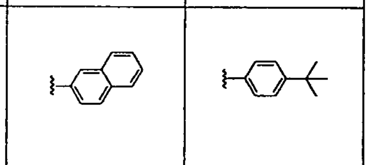
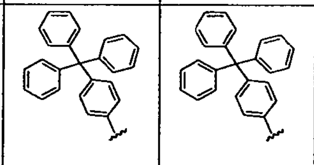
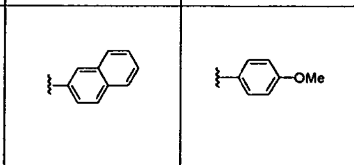
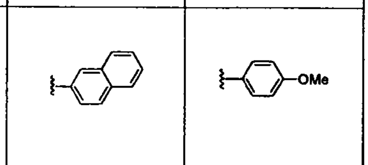
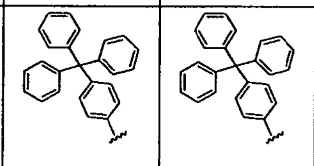
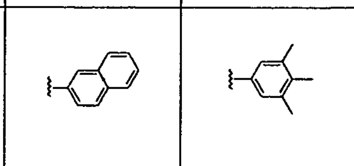
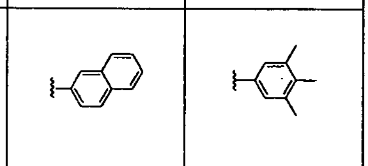
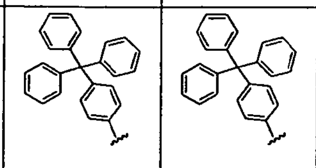
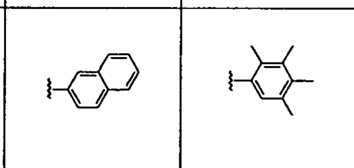
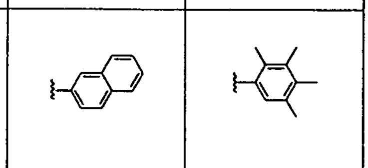
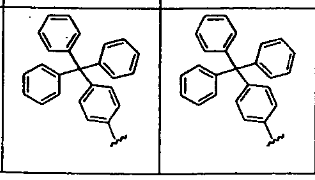
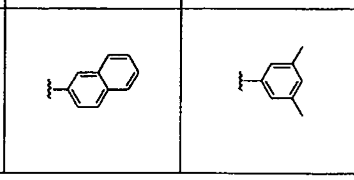
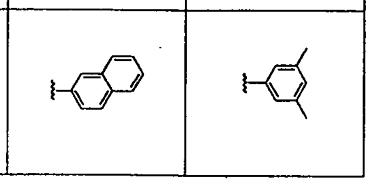
1571	
1572	
1573	
1574	
1575	
1576	
1577	
1578	
1579	
1580	
1581	

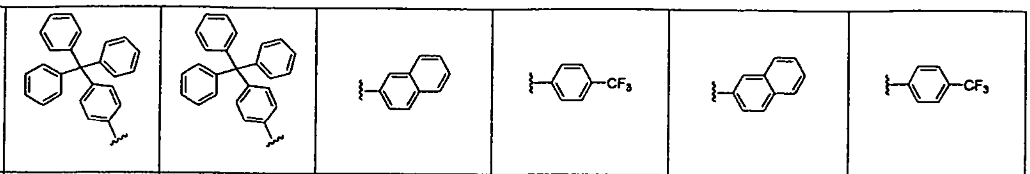
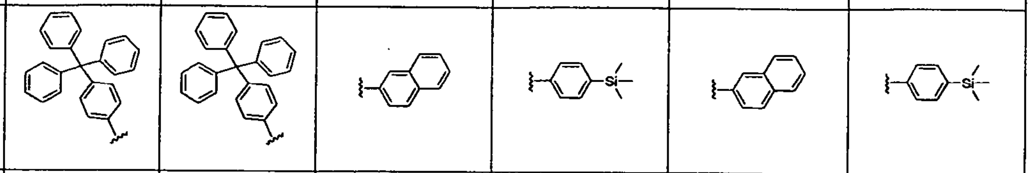
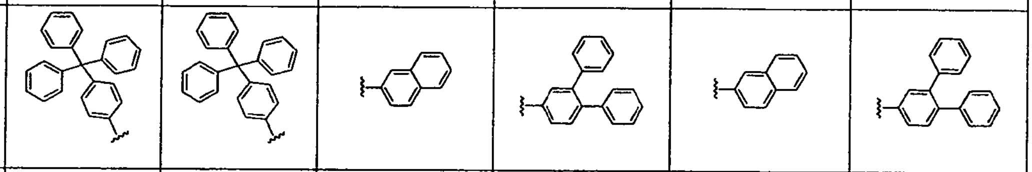
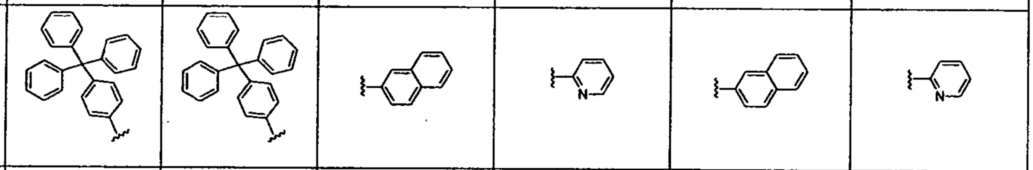
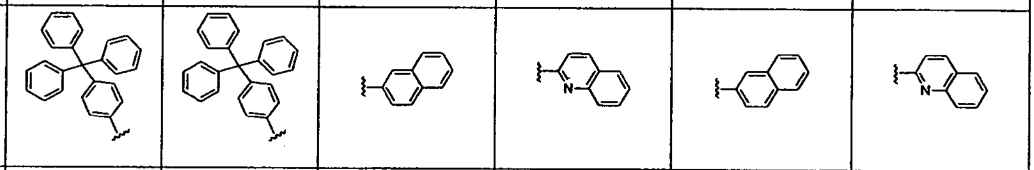
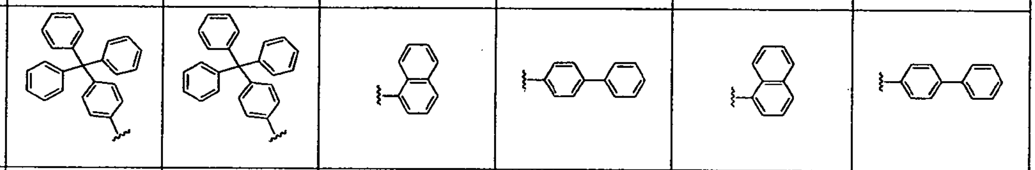
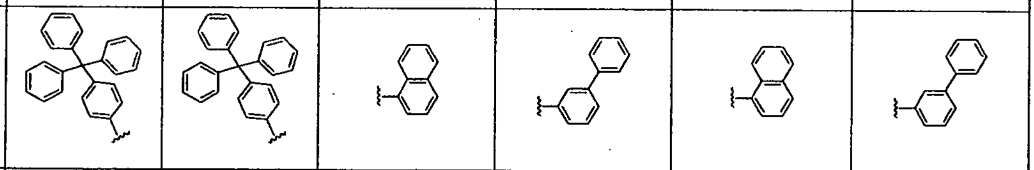
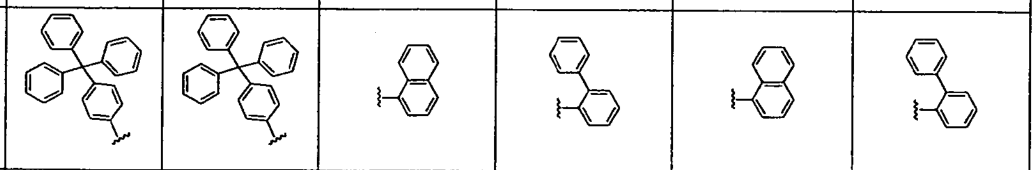
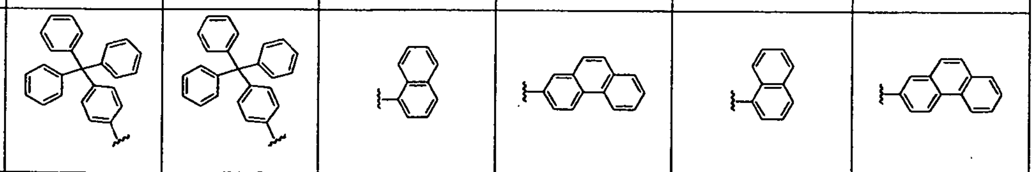
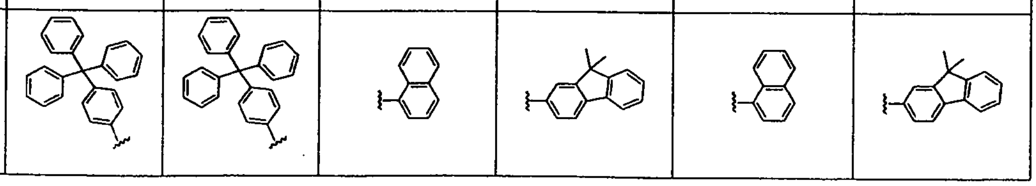
1582		
1583		
1584		
1585		
1586		
1587		
1588		
1589		
1590		
1591		

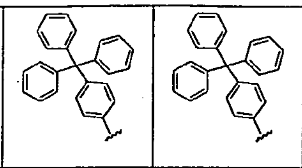
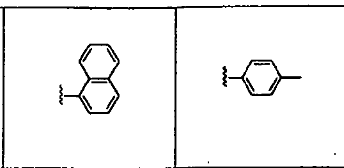
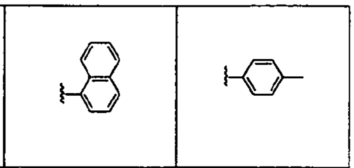
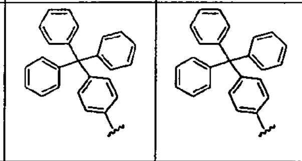
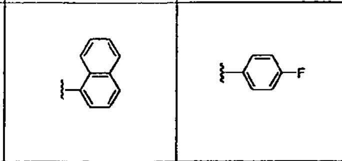
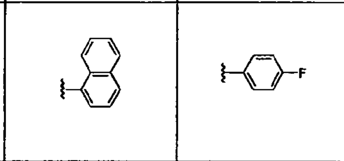
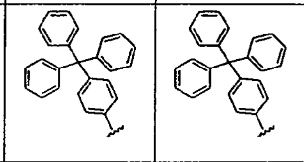
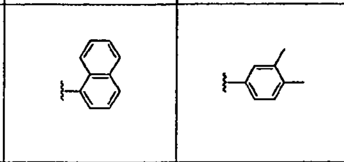
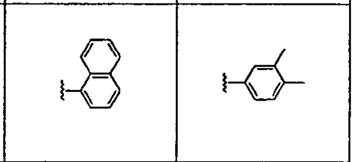
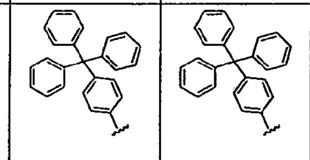
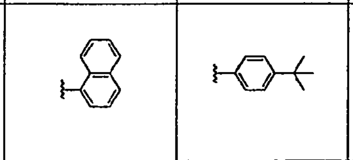
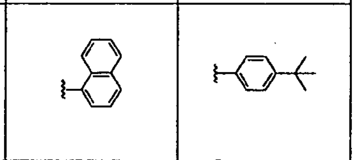
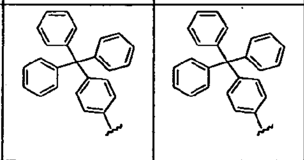
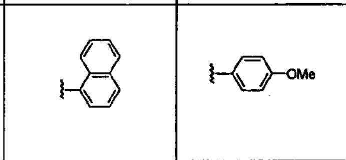
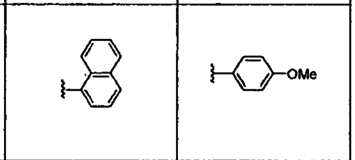
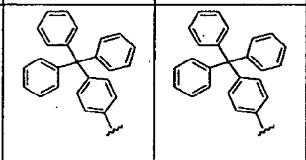
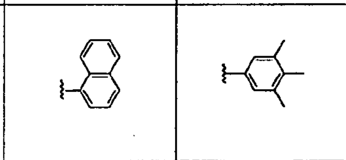
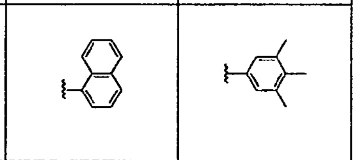
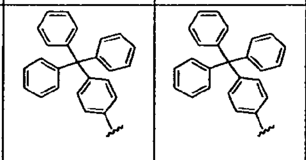
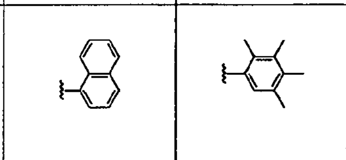
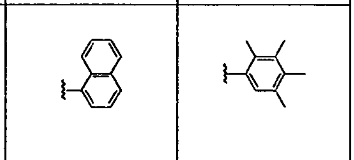
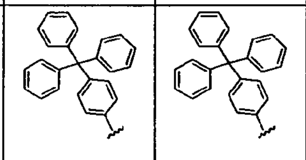
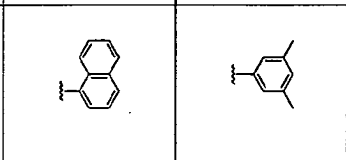
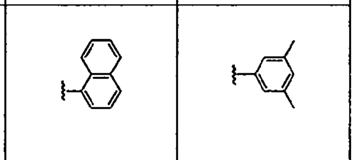
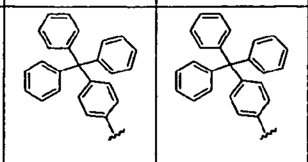
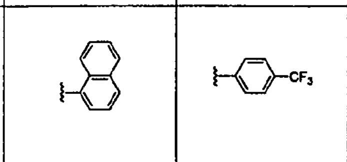
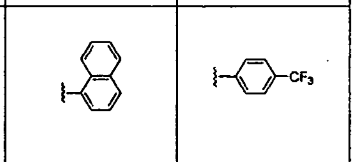
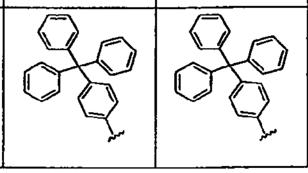
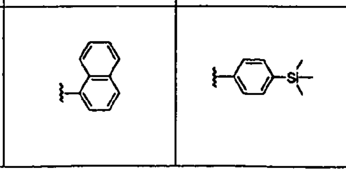
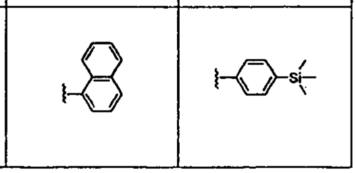
1592	
1593	
1594	
1595	
1596	
1597	
1598	
1599	
1600	
1601	

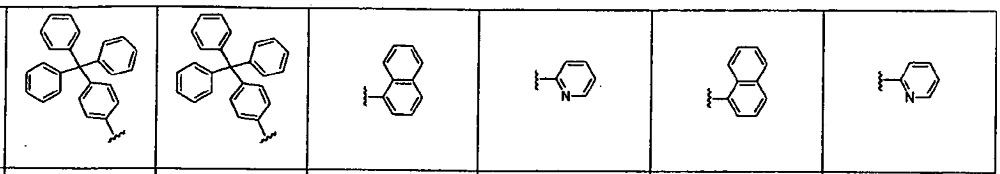
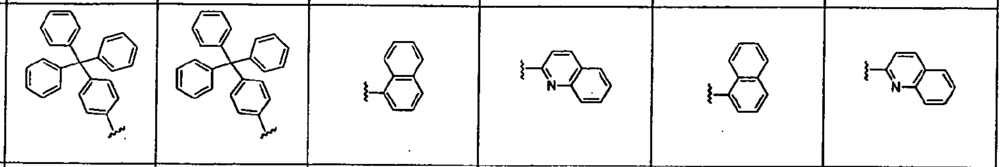
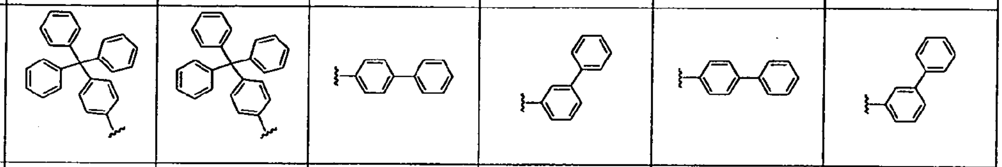
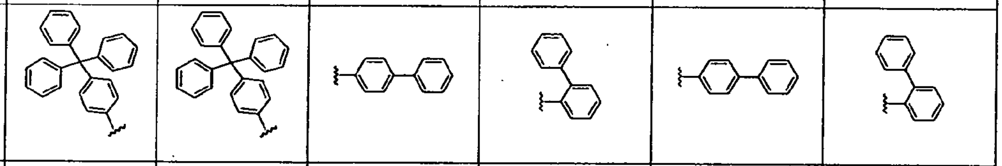
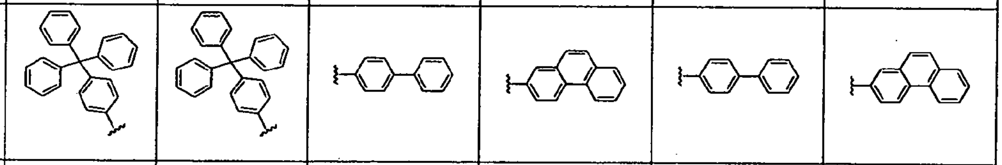
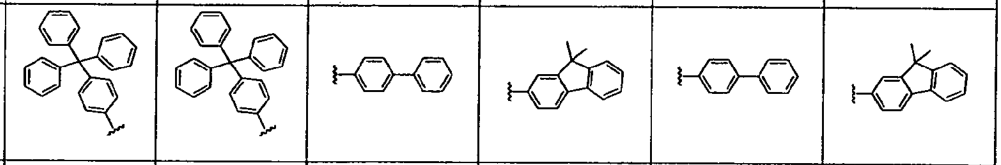
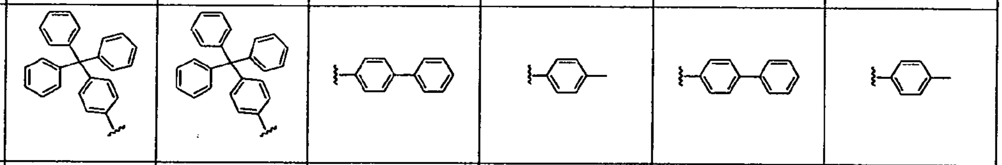
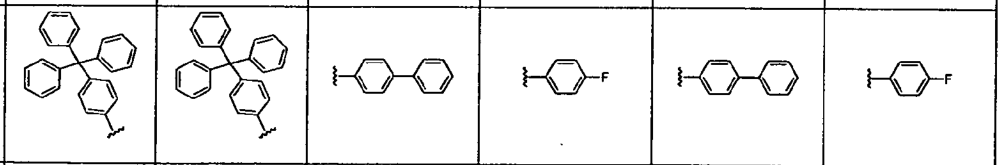
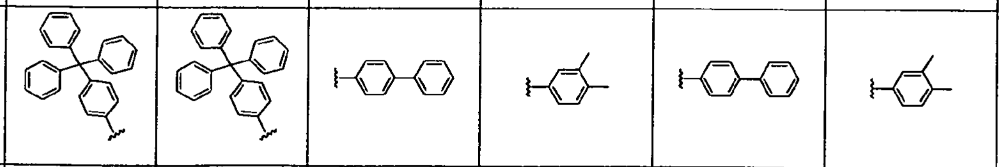
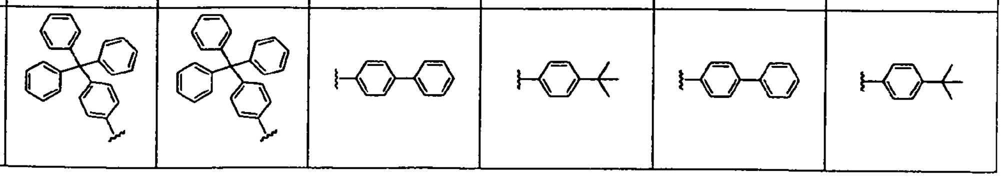
1602	
1603	
1604	
1605	
1606	
1607	
1608	
1609	
1610	
1611	

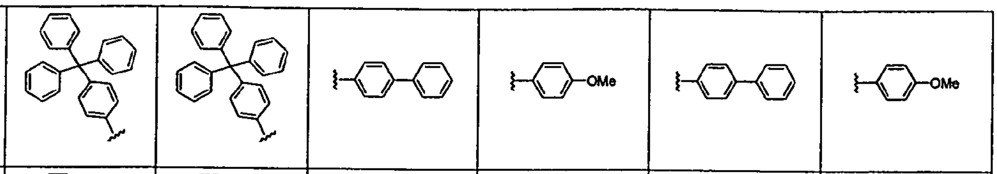
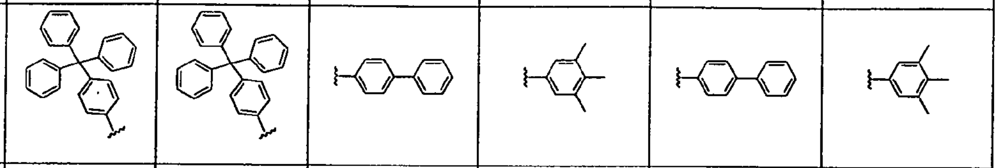
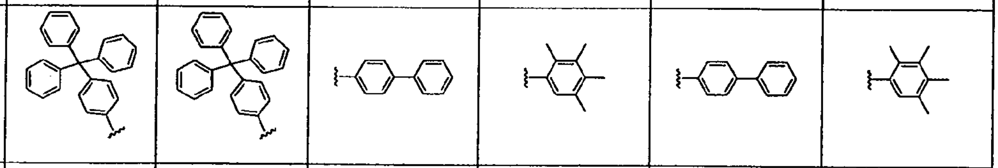
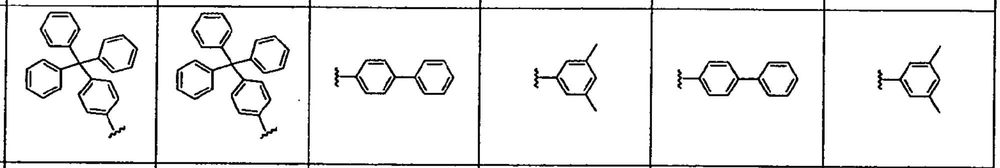
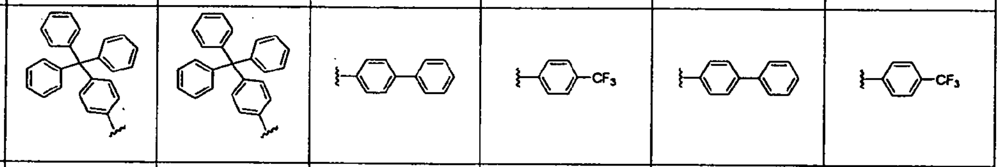
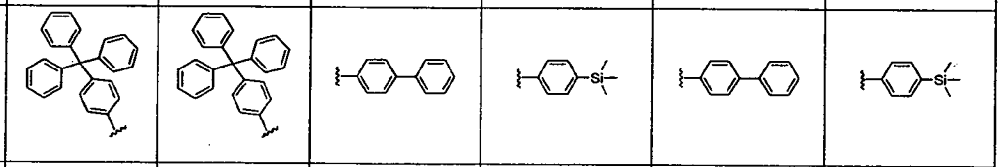
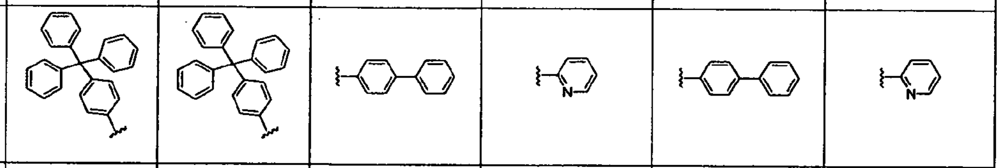
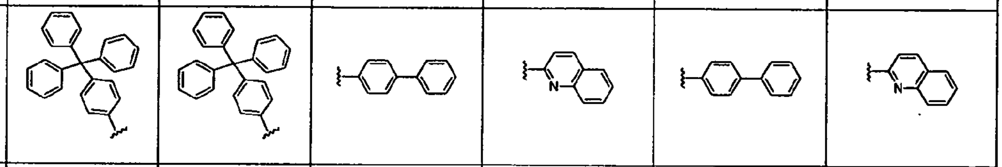
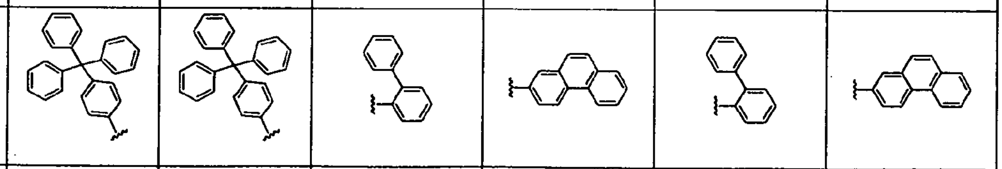
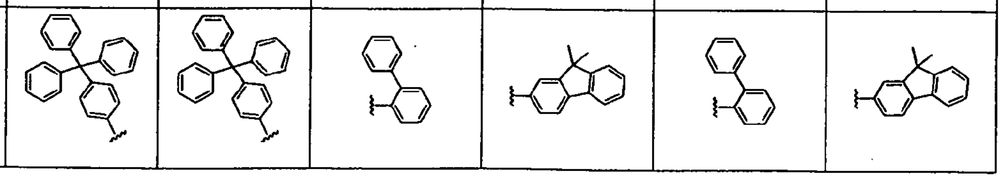
1612	
1613	
1614	
1615	
1616	
1617	
1618	
1619	
1620	
1621	

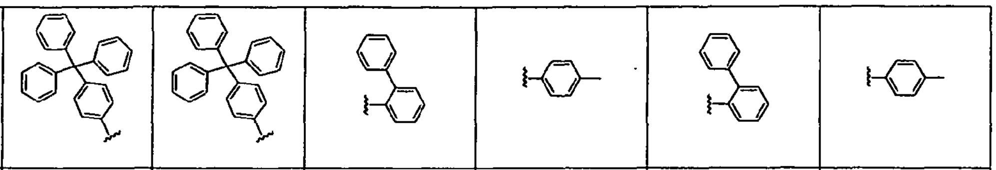
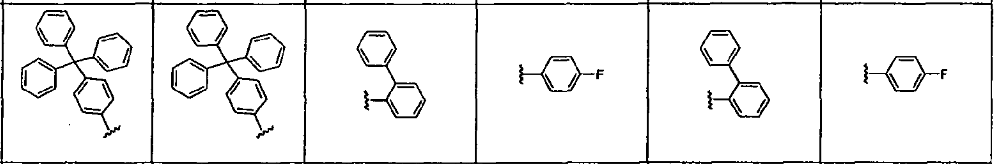
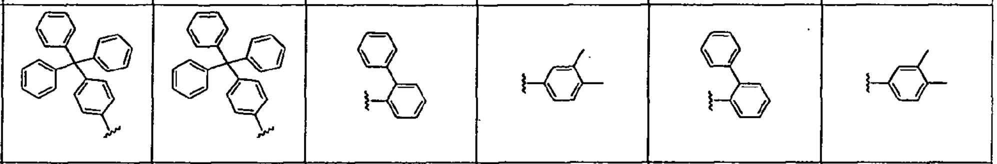
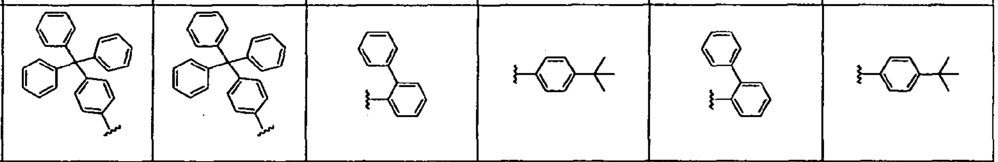
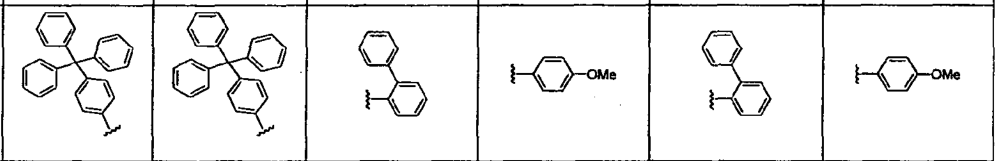
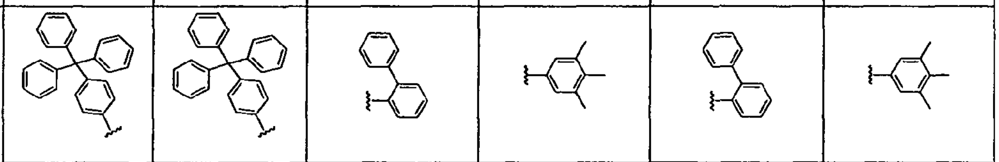
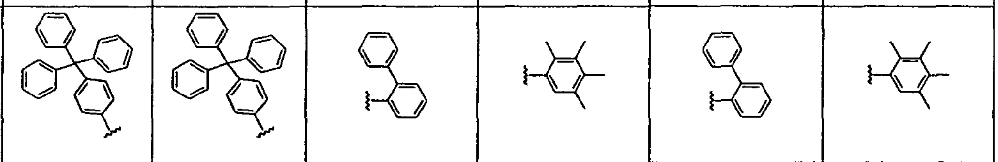
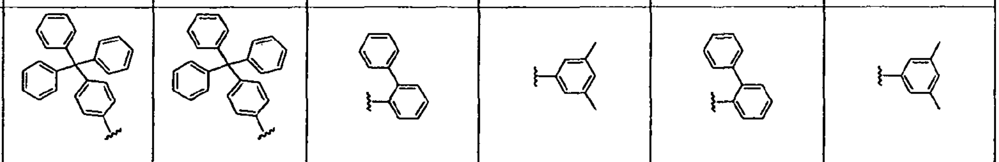
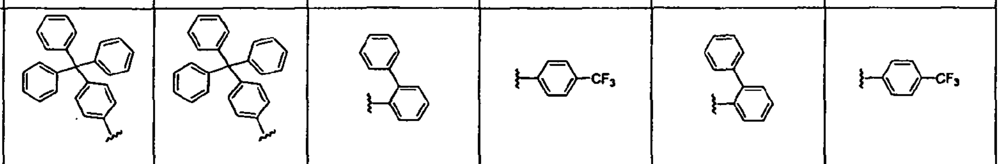
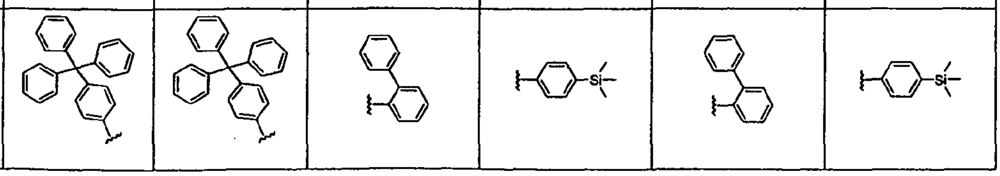
1622			
1623			
1624			
1625			
1626			
1627			
1628			
1629			
1630			
1631			

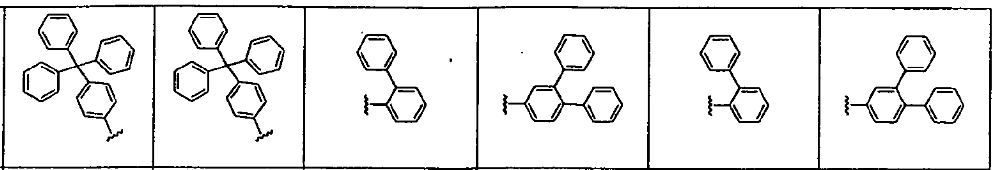
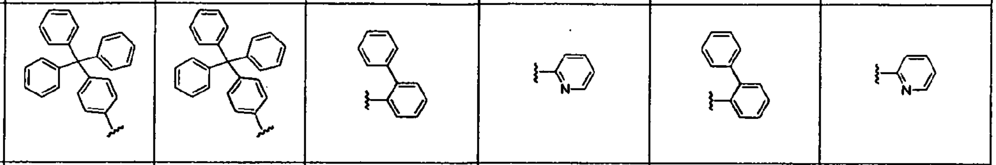
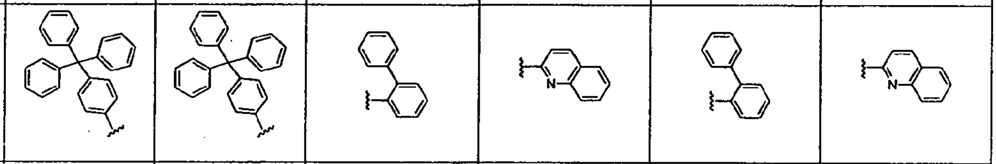
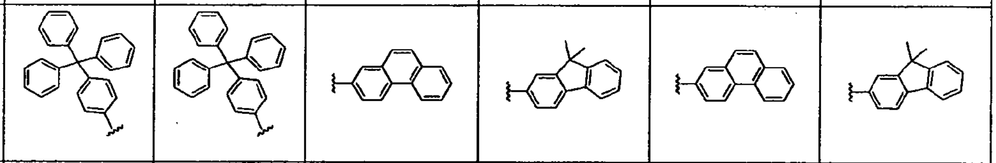
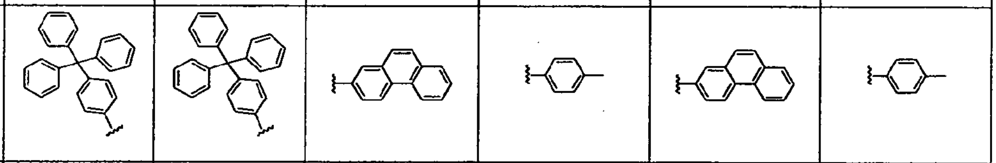
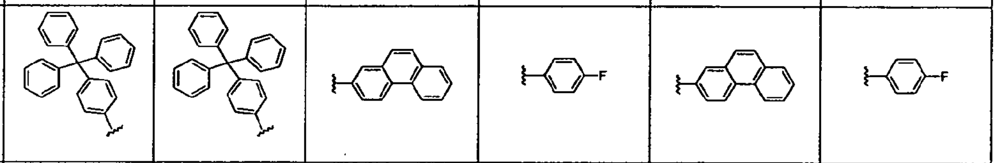
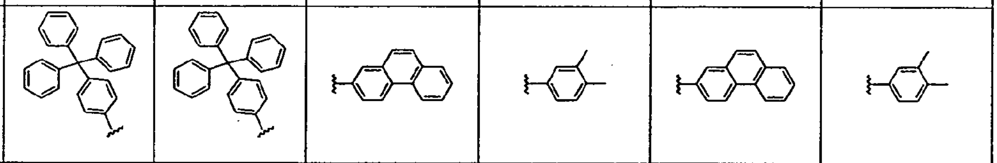
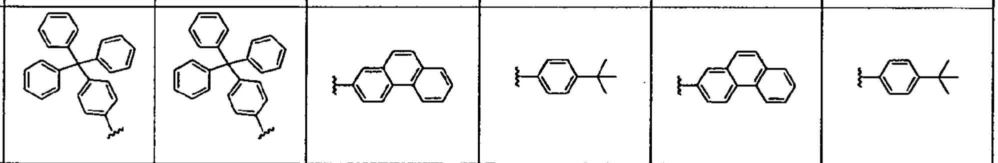
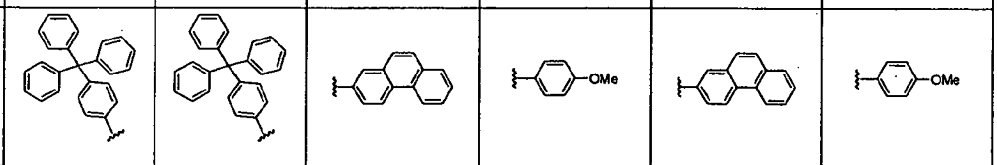
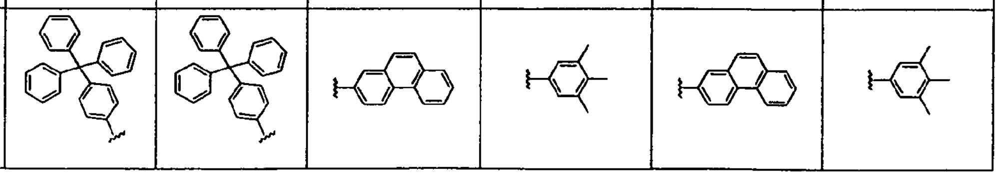
1632	
1633	
1634	
1635	
1636	
1637	
1638	
1639	
1640	
1641	

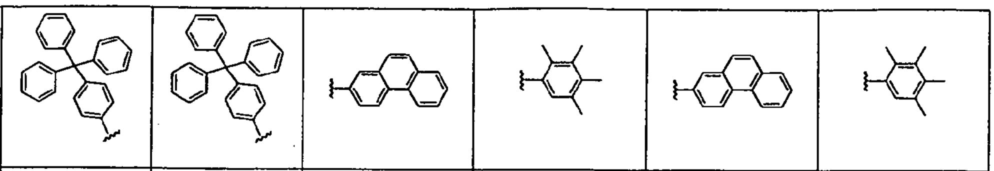
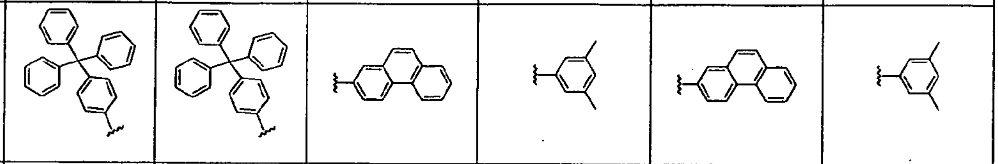
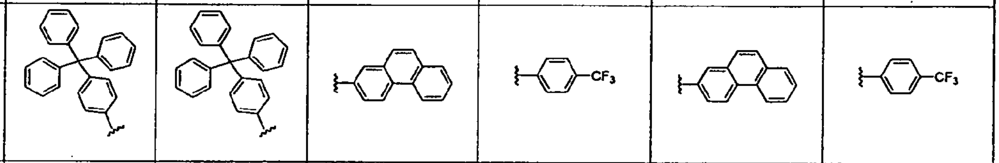
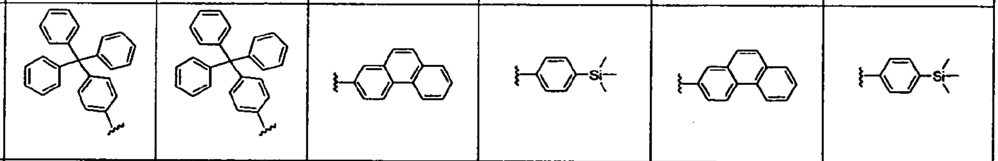
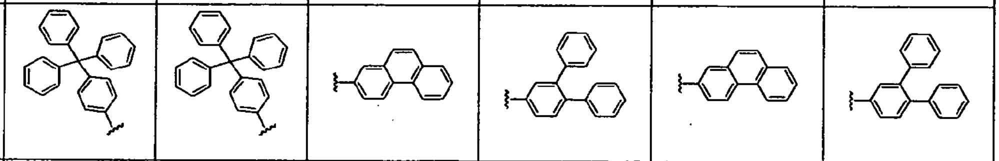
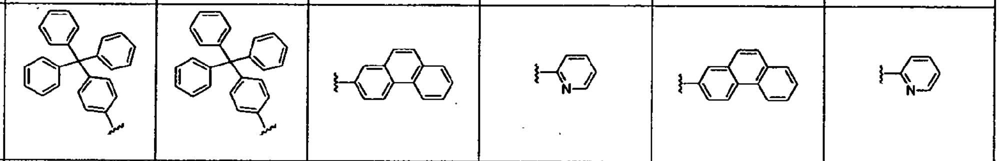
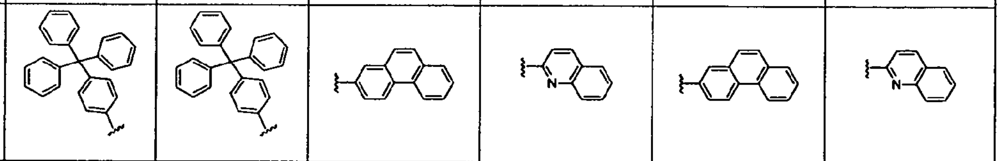
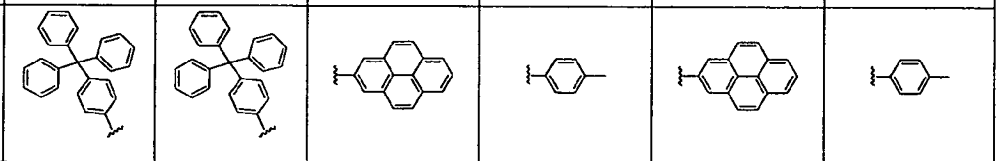
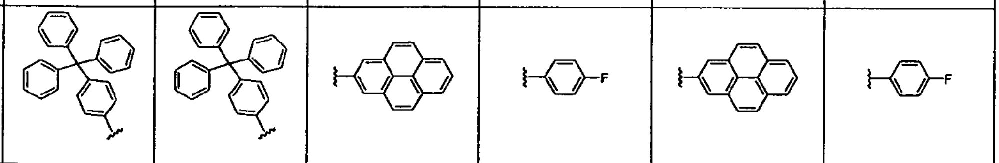
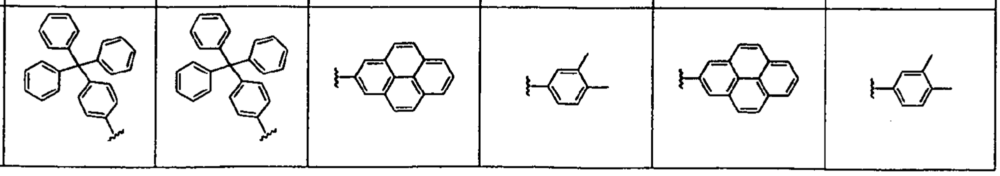
1642			
1643			
1644			
1645			
1646			
1647			
1648			
1649			
1650			
1651			

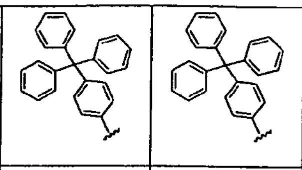
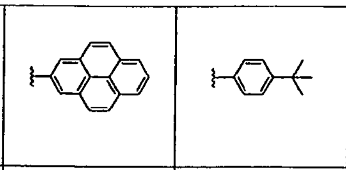
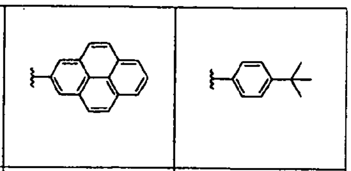
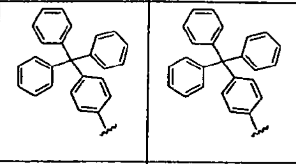
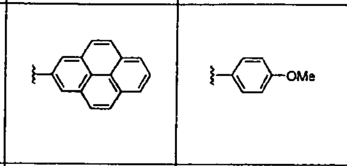
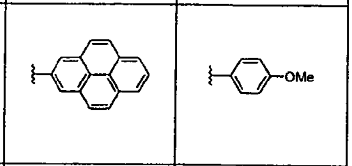
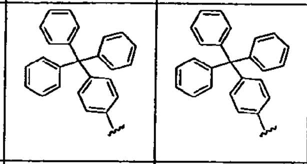
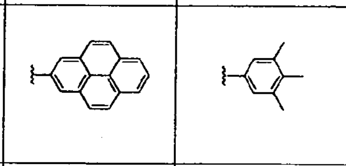
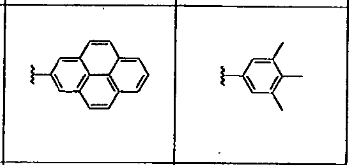
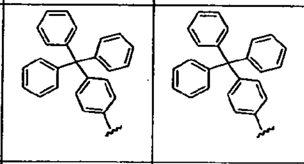
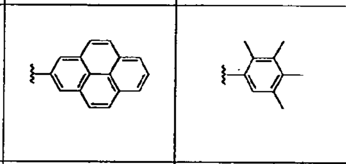
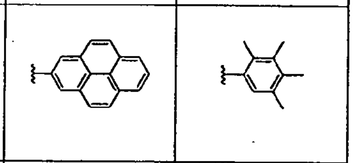
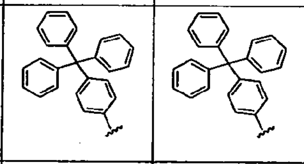
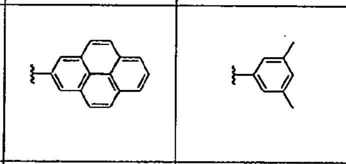
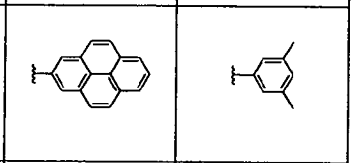
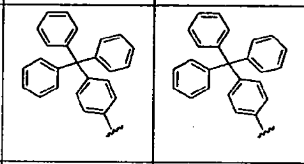
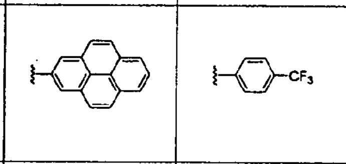
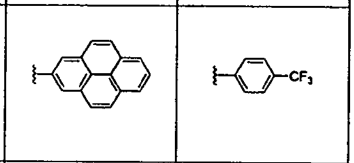
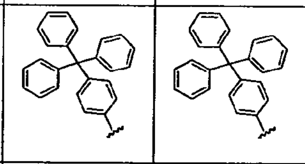
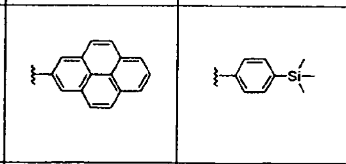
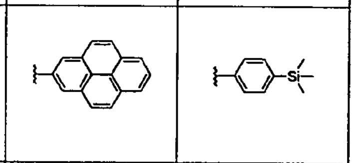
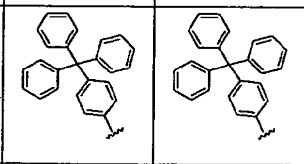
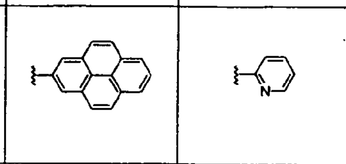
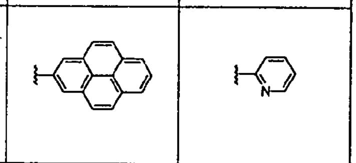
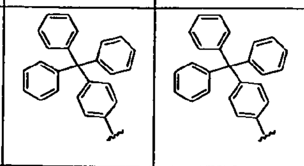
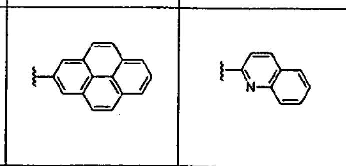
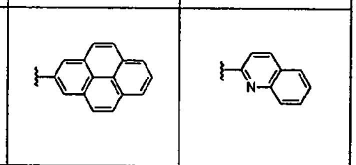
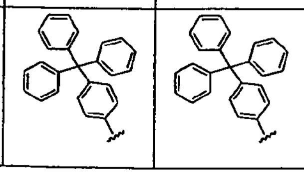
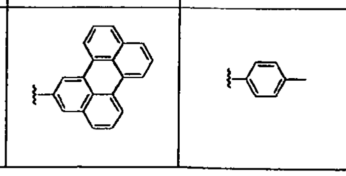
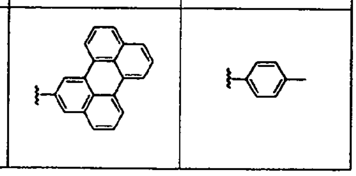
1652	
1653	
1654	
1655	
1656	
1657	
1658	
1659	
1660	
1661	

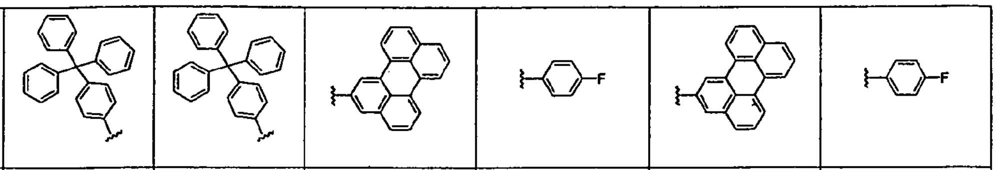
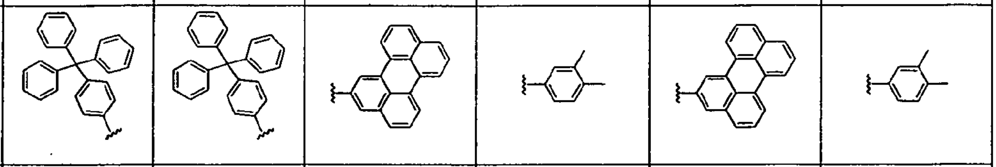
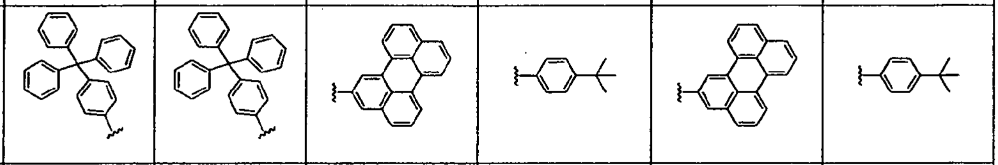
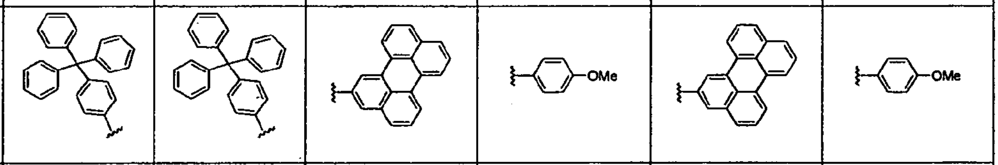
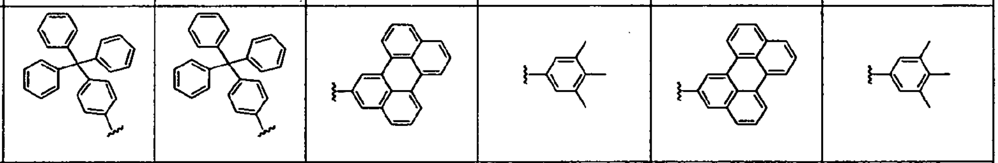
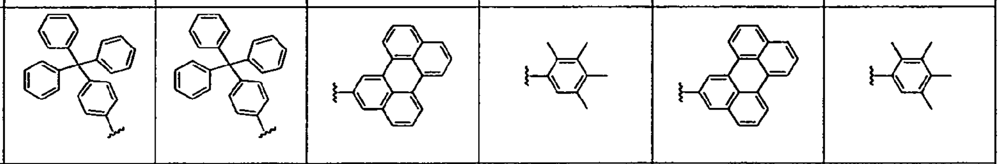
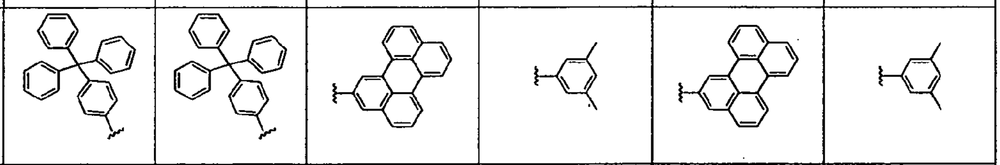
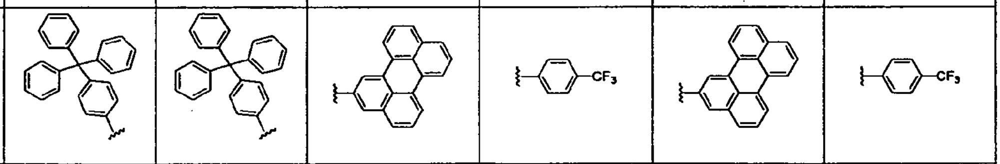
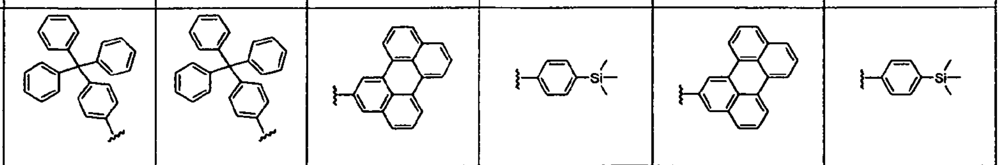
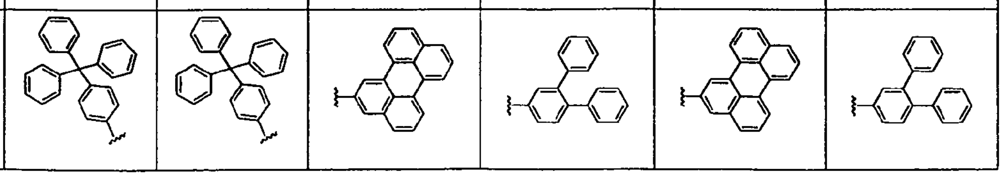
1662	
1663	
1664	
1665	
1666	
1667	
1668	
1669	
1670	
1671	

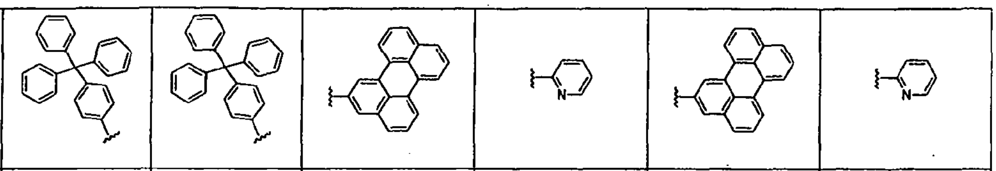
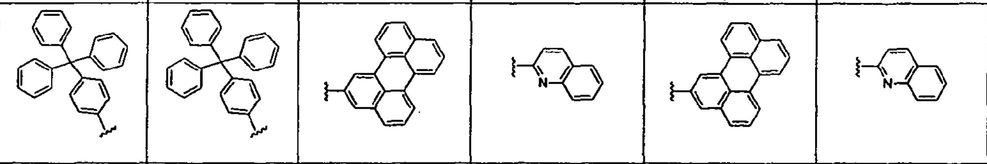
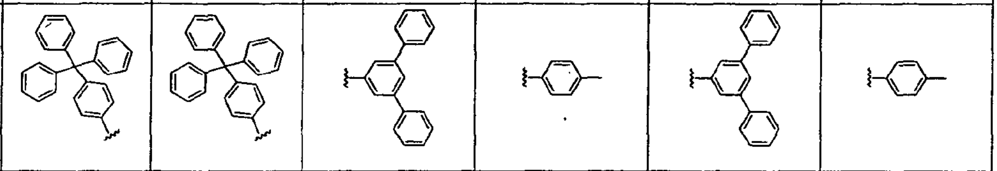
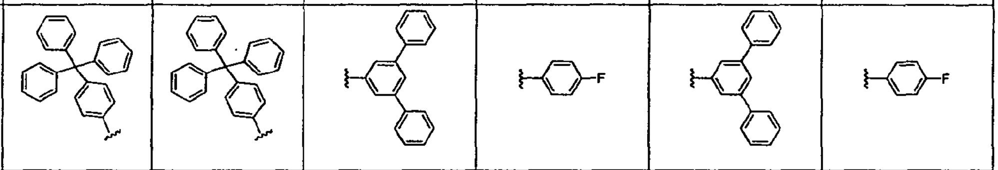
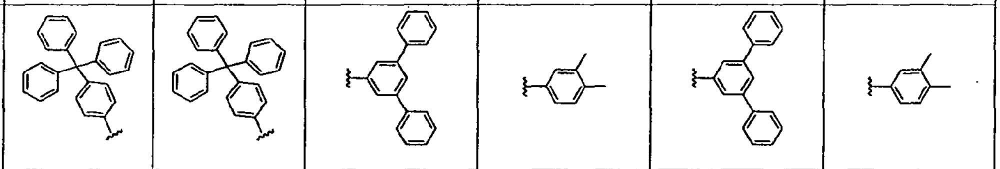
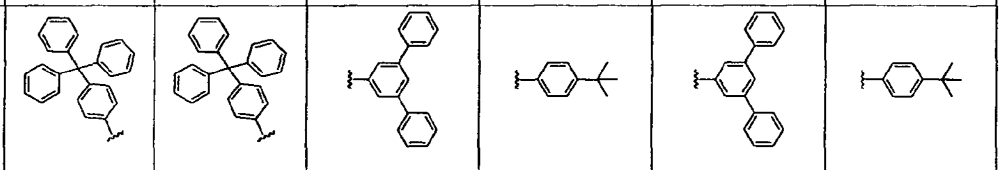
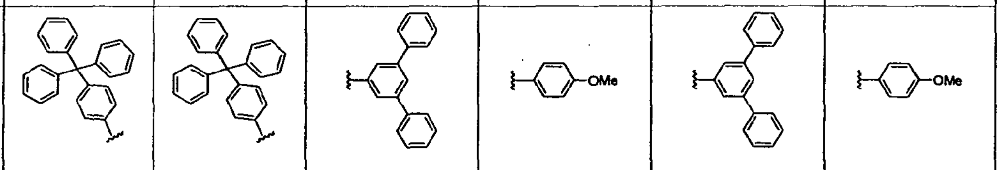
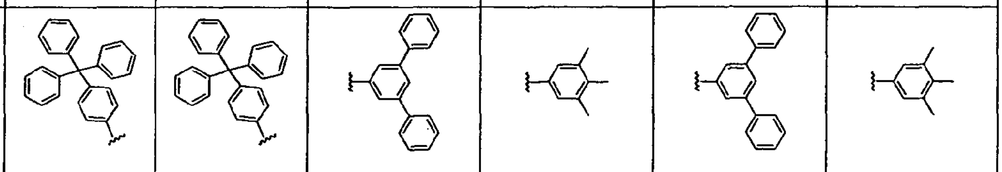
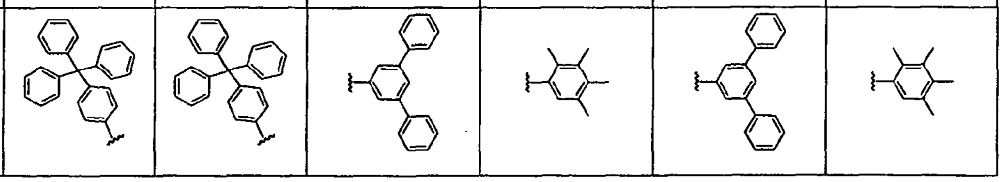
1672	
1673	
1674	
1675	
1676	
1677	
1678	
1679	
1680	
1681	

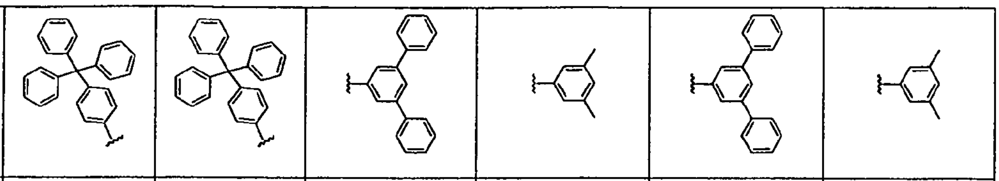
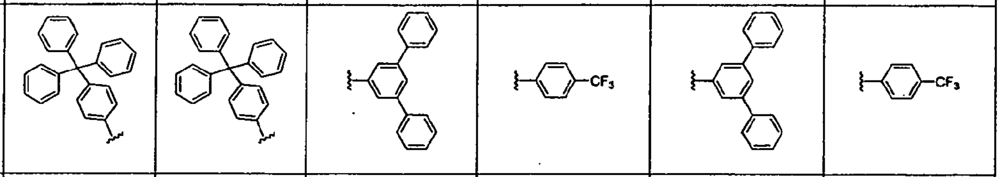
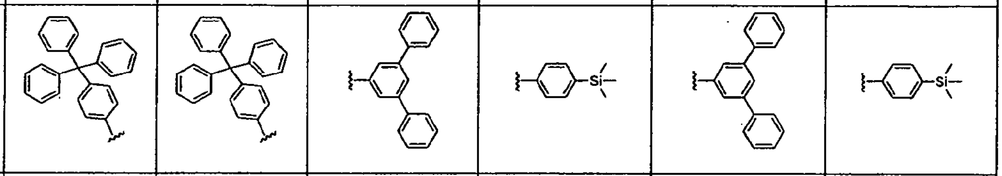
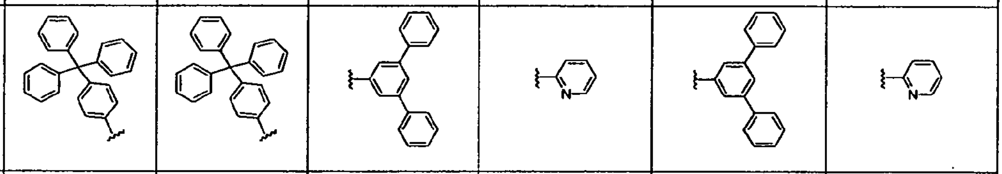
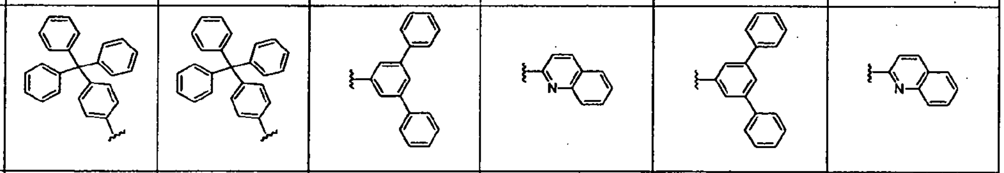
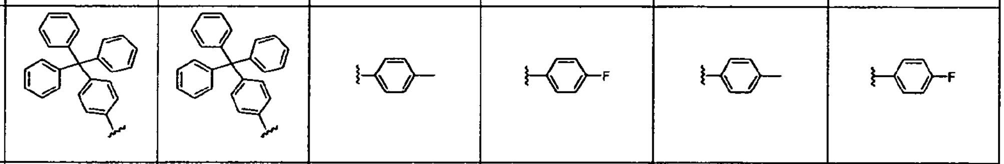
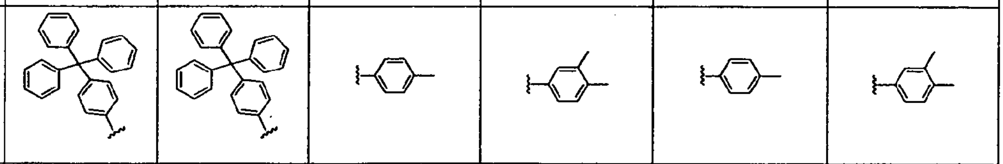
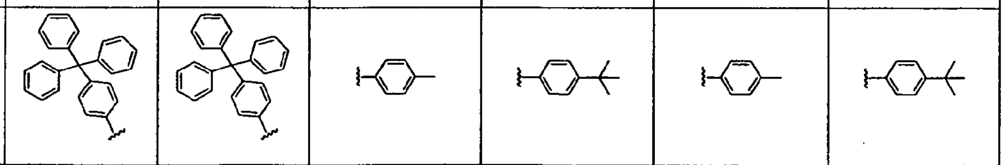
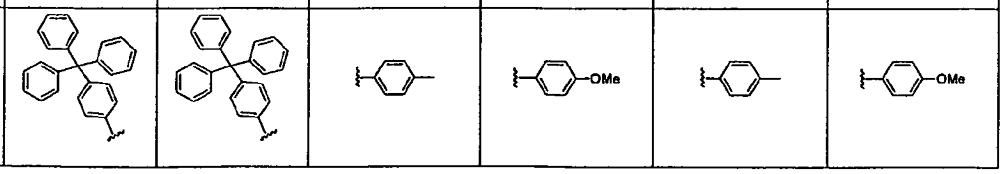
1682	
1683	
1684	
1685	
1686	
1687	
1688	
1689	
1690	
1691	

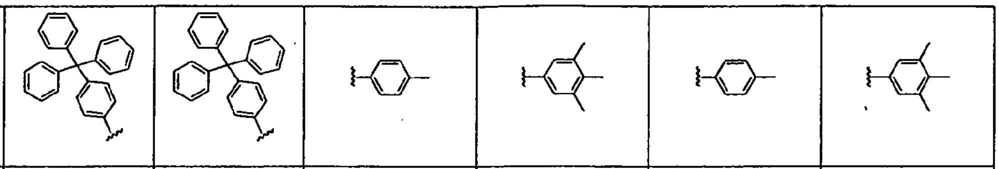
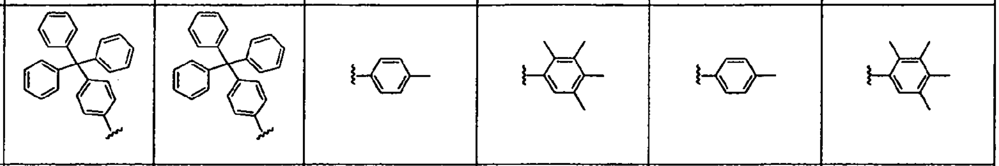
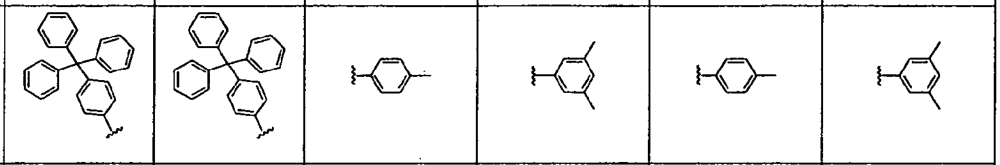
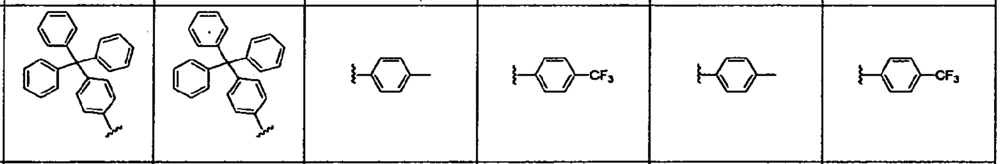
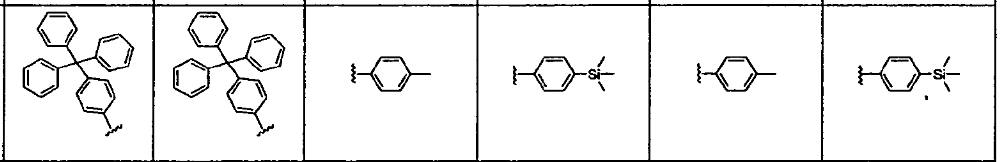
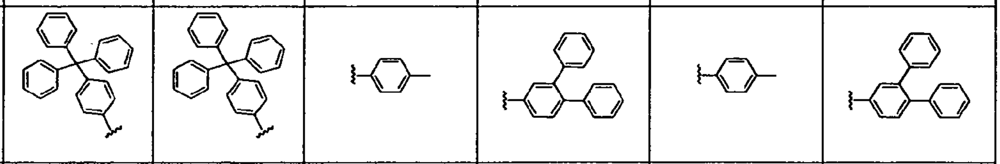
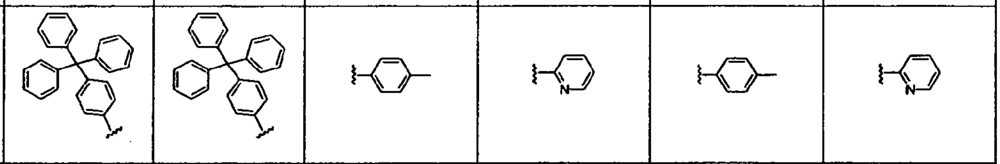
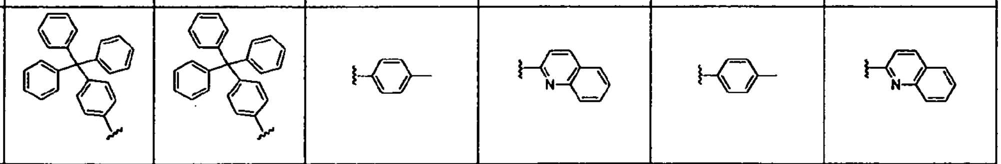
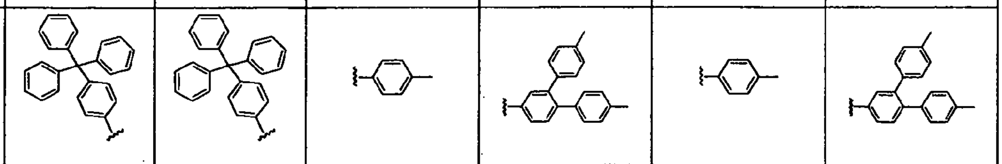
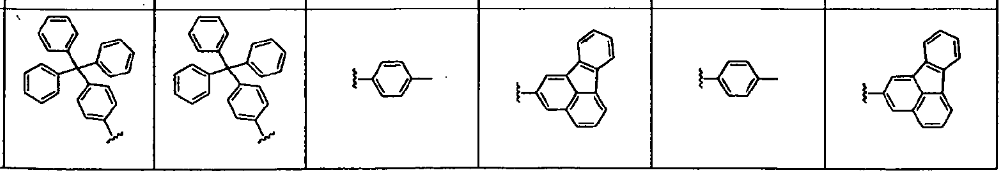
1692	
1693	
1694	
1695	
1696	
1697	
1698	
1699	
1700	
1701	

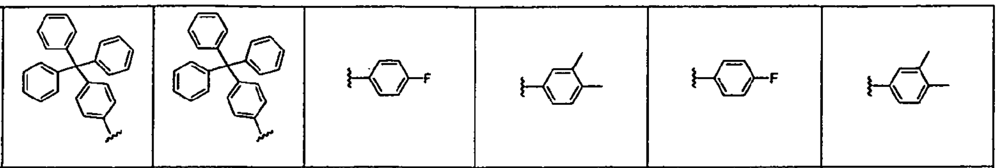
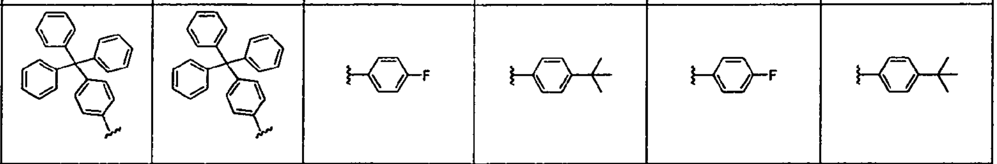
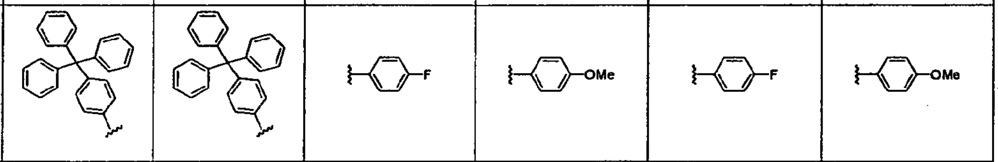
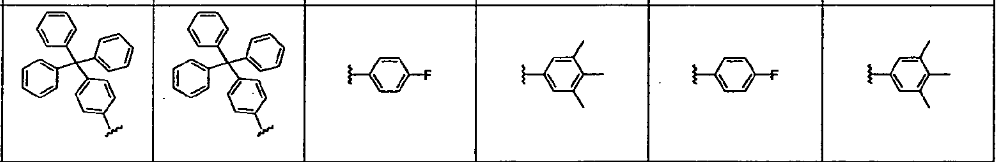
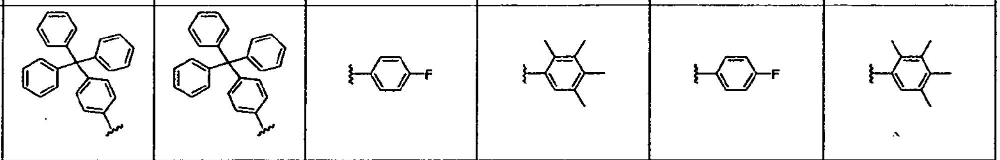
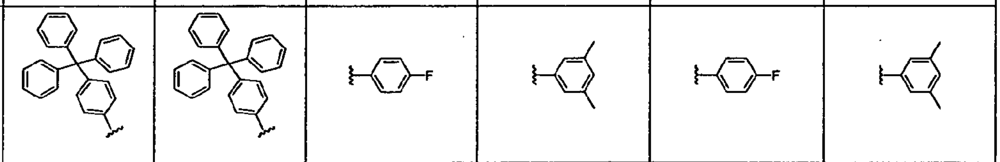
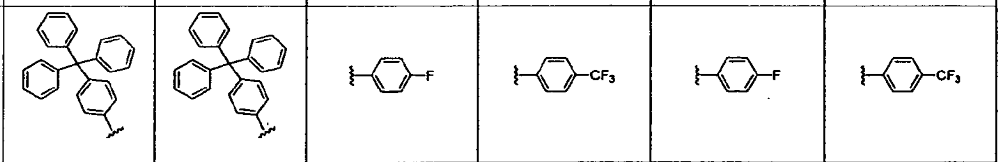
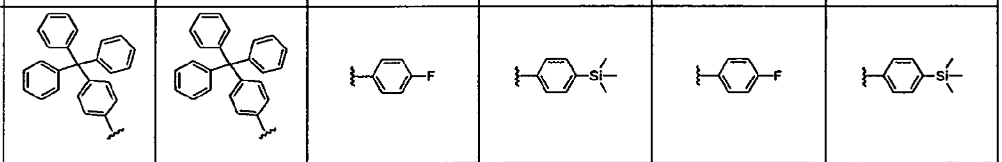
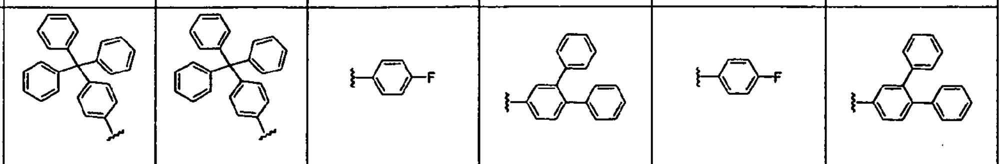
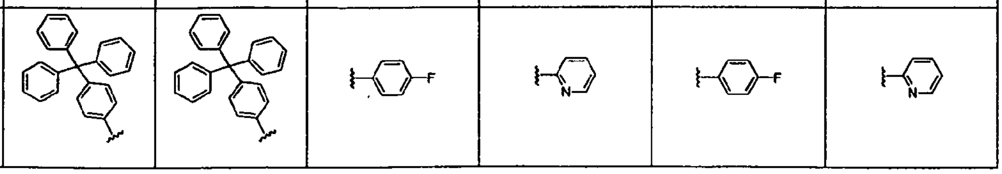
1702			
1703			
1704			
1705			
1706			
1707			
1708			
1709			
1710			
1711			

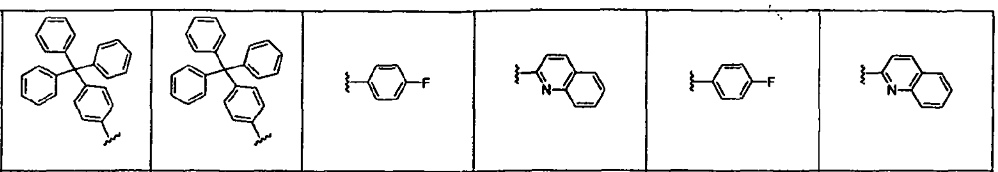
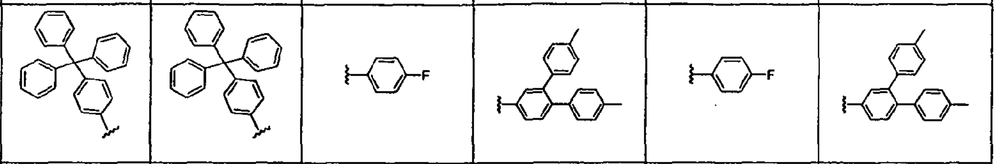
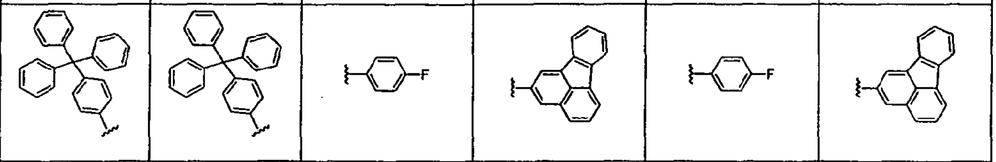
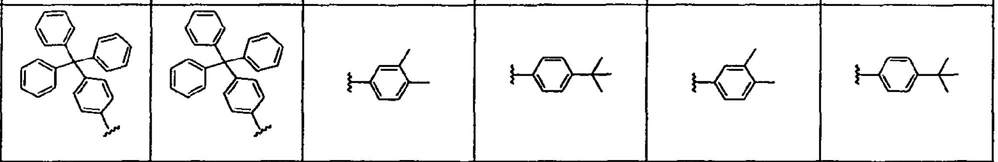
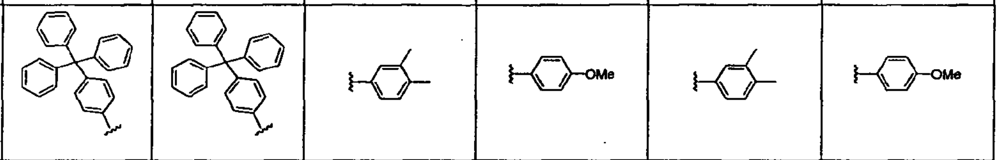
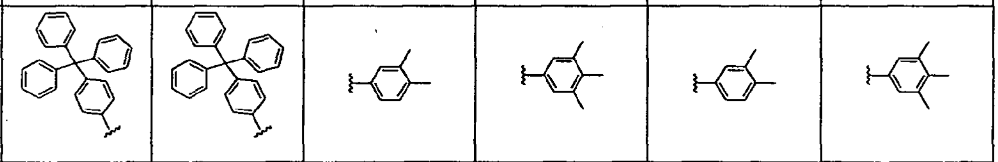
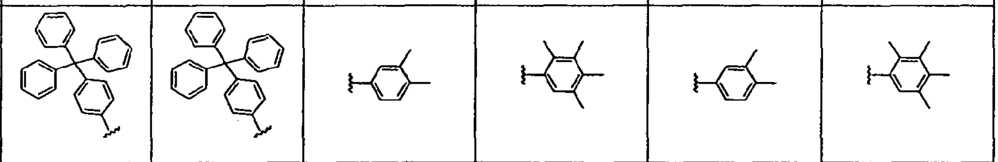
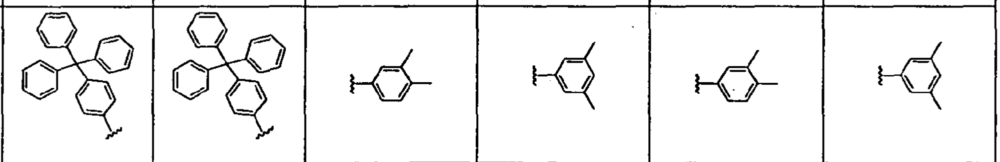
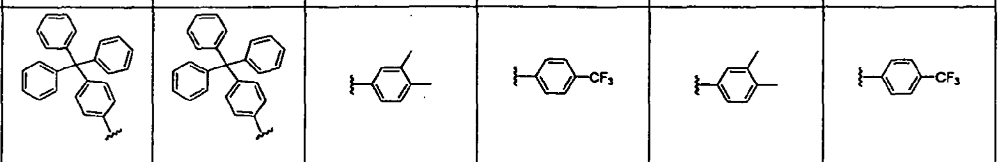
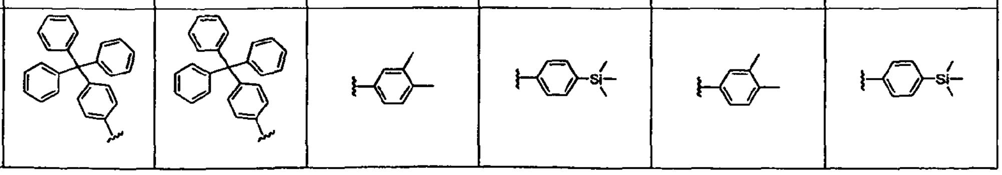
1712	
1713	
1714	
1715	
1716	
1717	
1718	
1719	
1720	
1721	

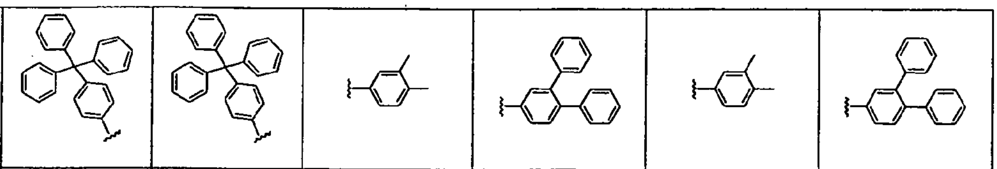
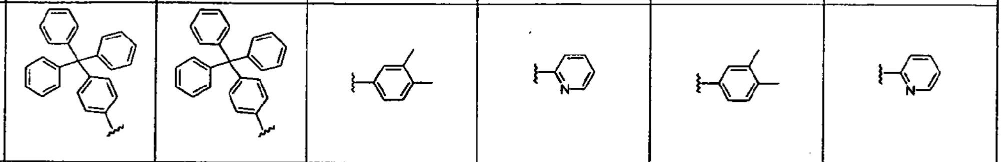
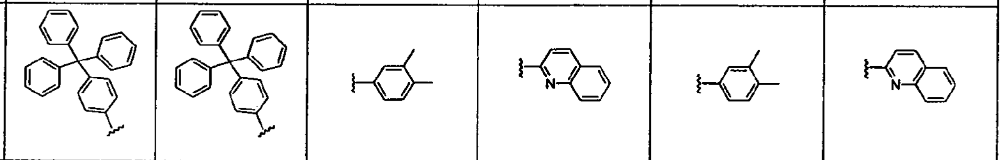
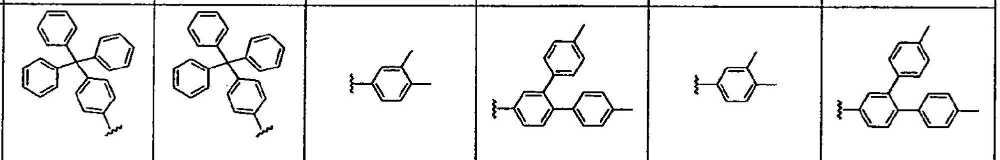
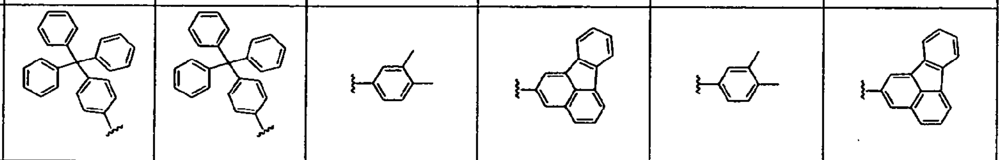
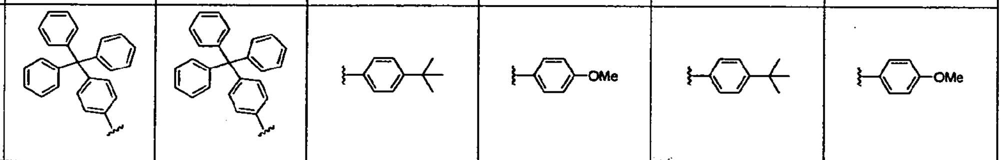
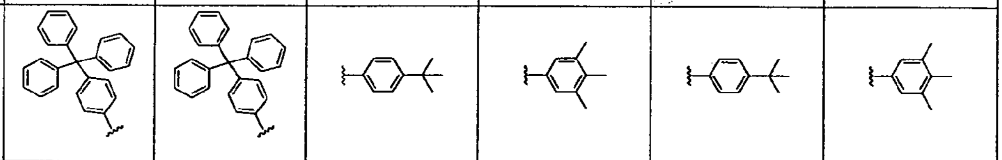
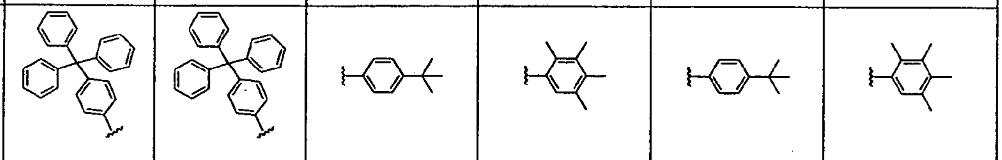
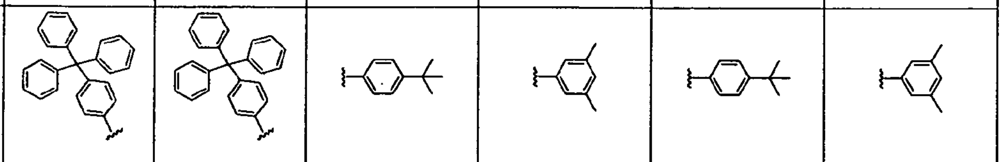
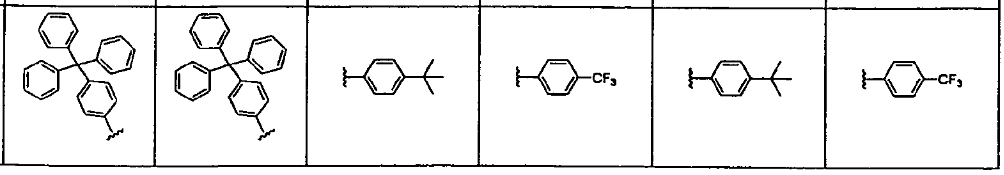
1722	
1723	
1724	
1725	
1726	
1727	
1728	
1729	
1730	

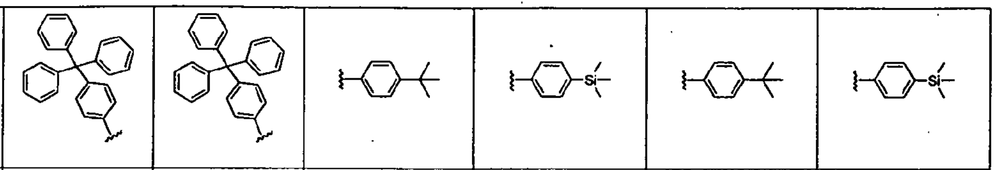
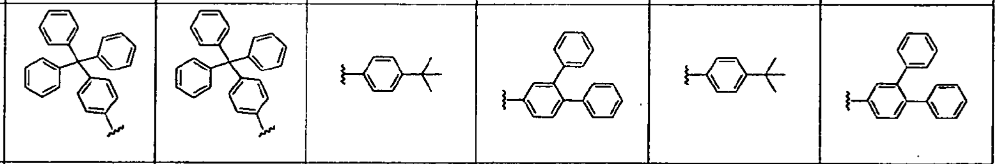
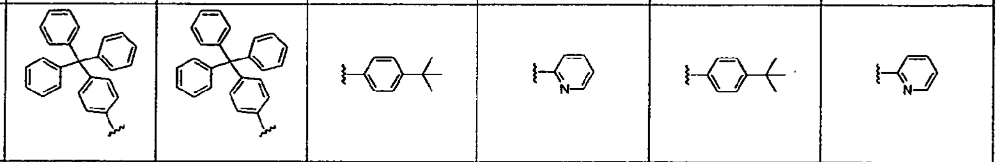
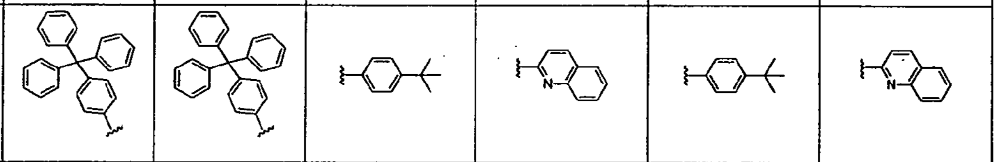
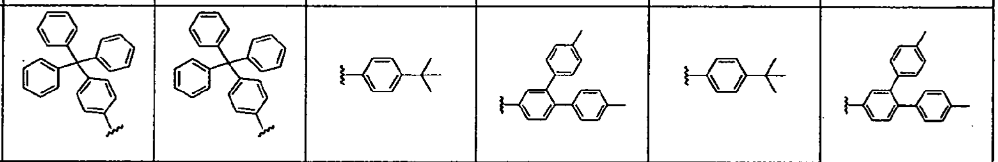
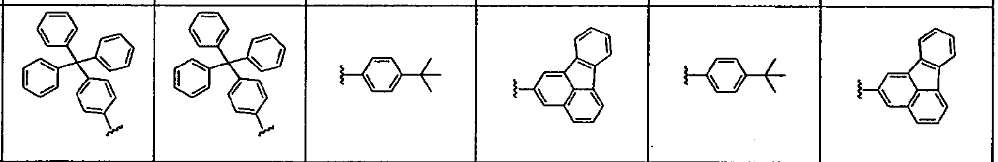
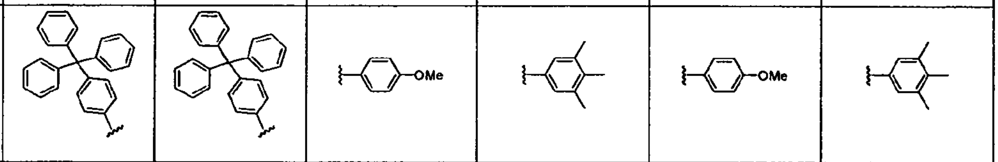
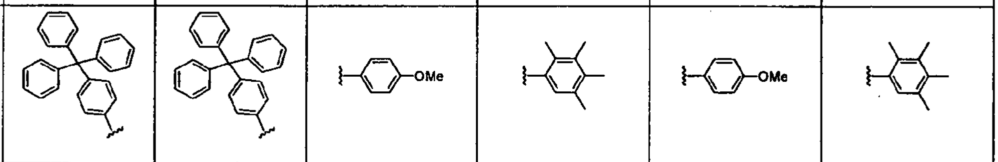
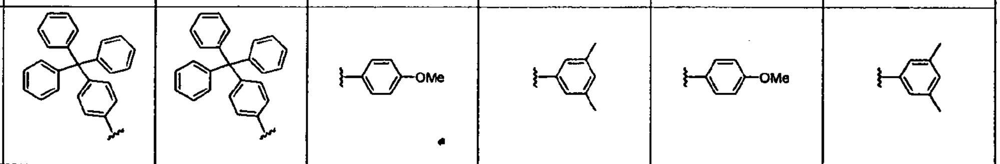
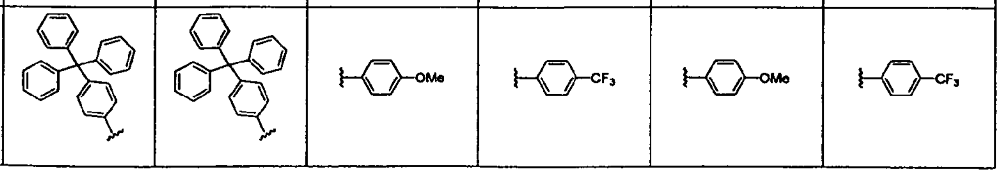
1731	
1732	
1733	
1734	
1735	
1736	
1737	
1738	
1739	

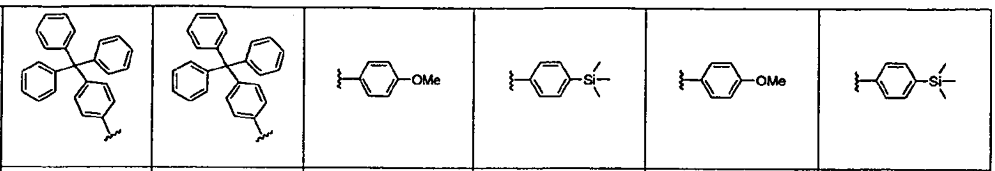
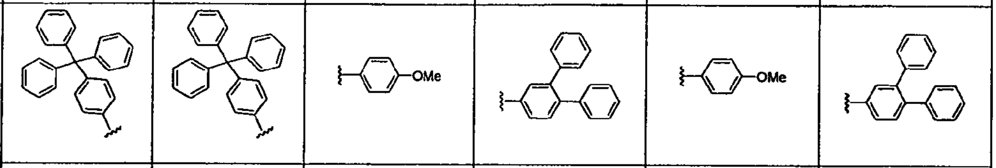
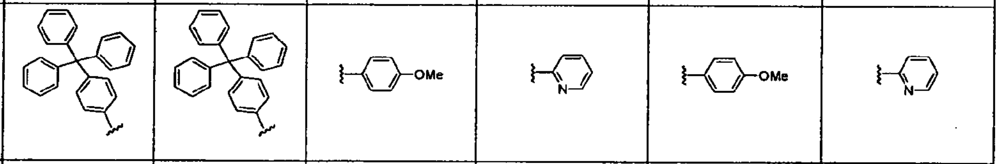
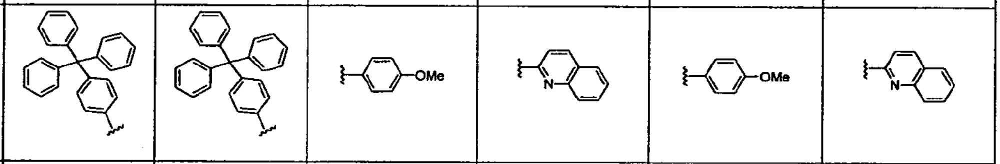
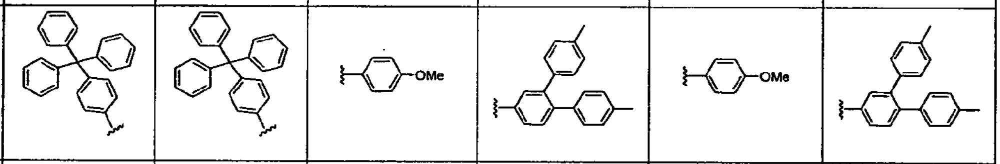
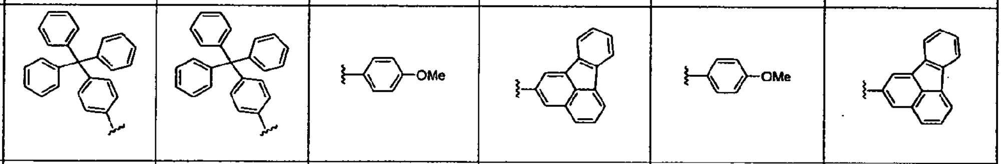
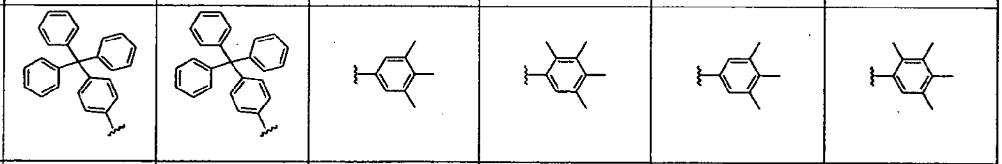
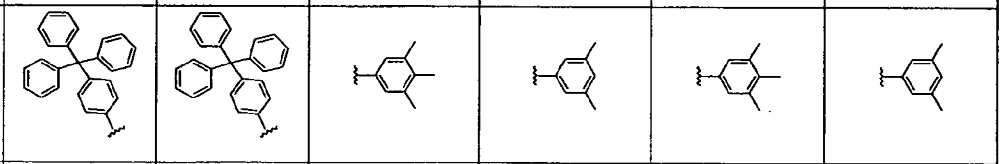
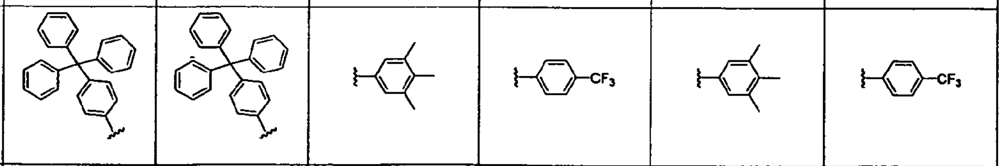
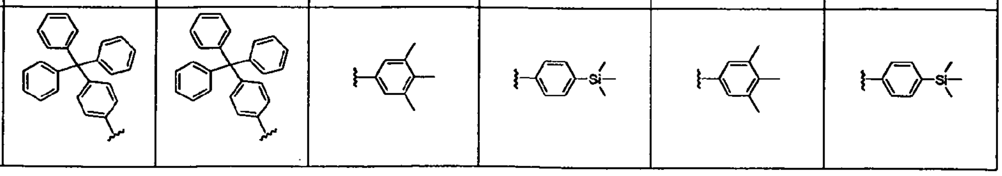
1740	
1741	
1742	
1743	
1744	
1745	
1746	
1747	
1748	
1749	

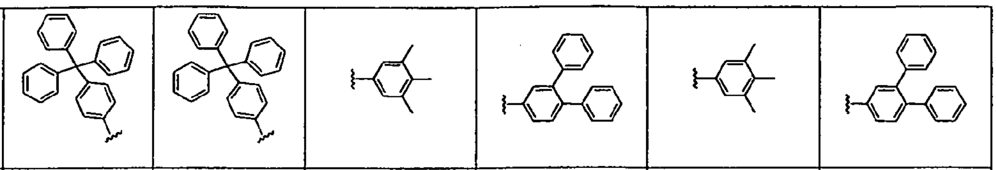
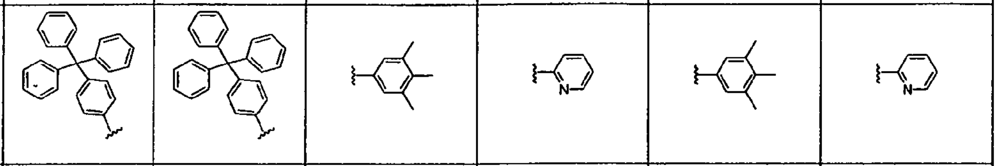
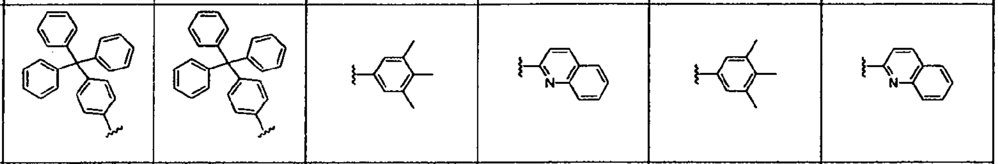
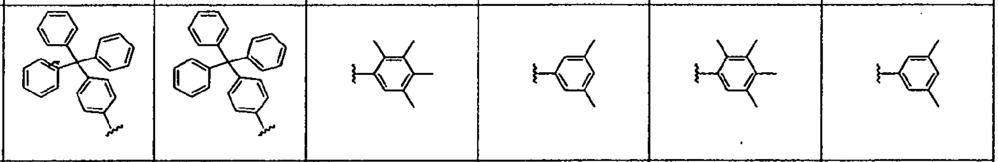
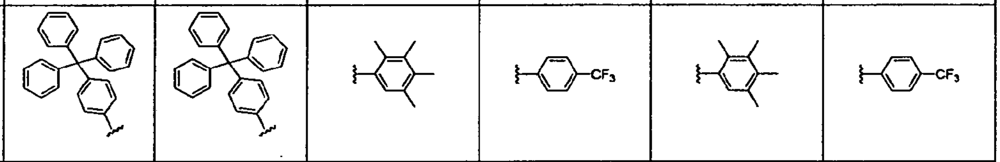
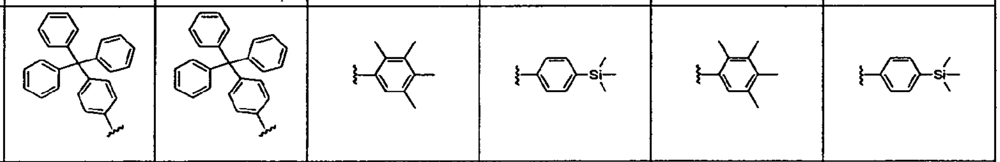
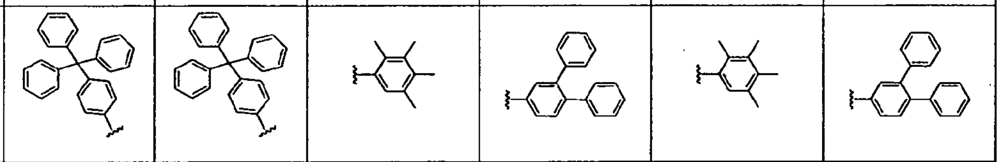
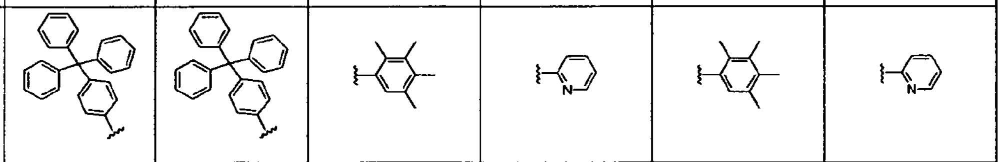
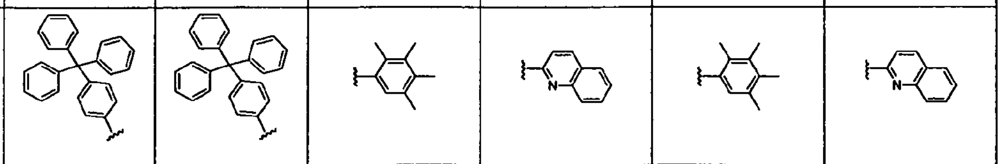
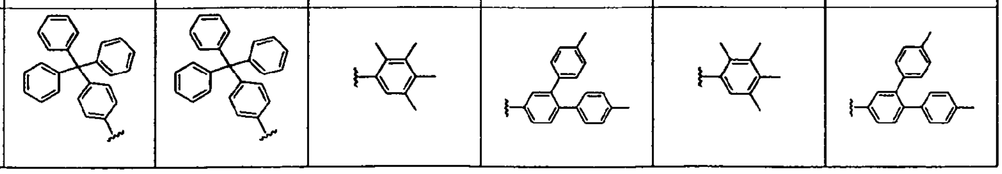
1750	
1751	
1752	
1753	
1754	
1755	
1756	
1757	
1758	
1759	

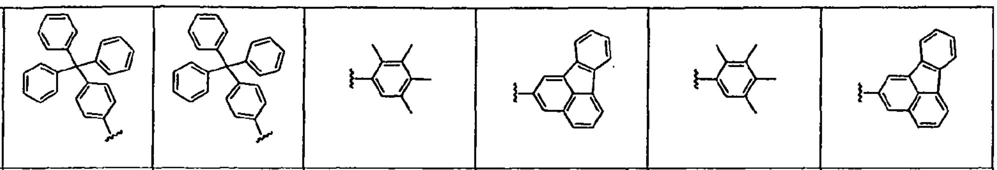
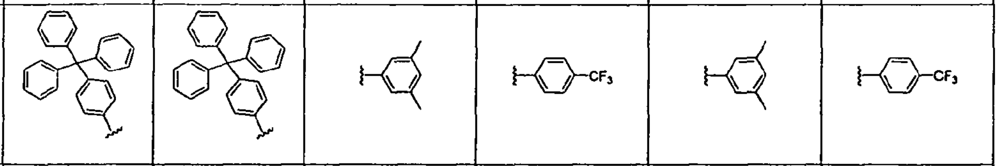
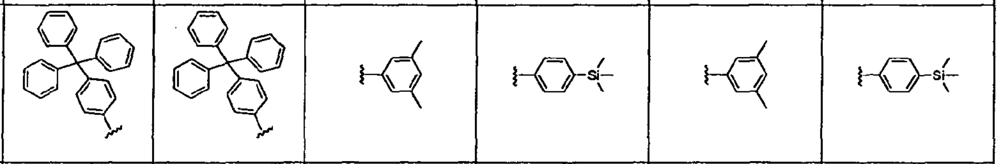
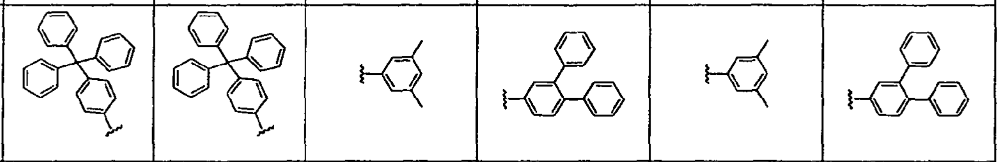
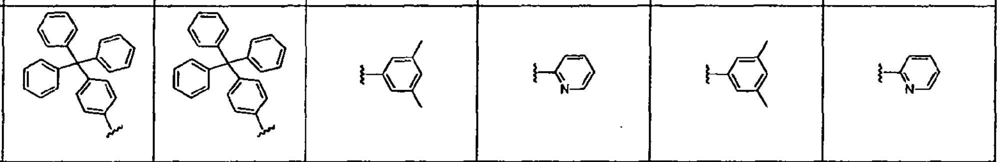
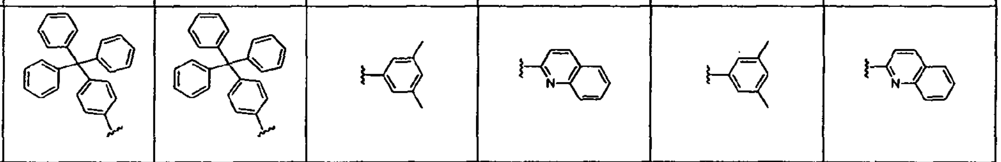
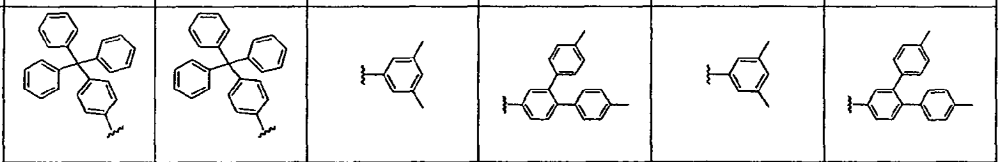
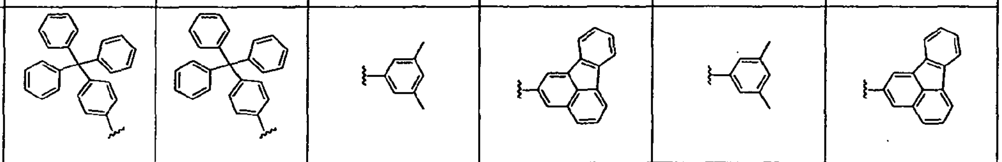
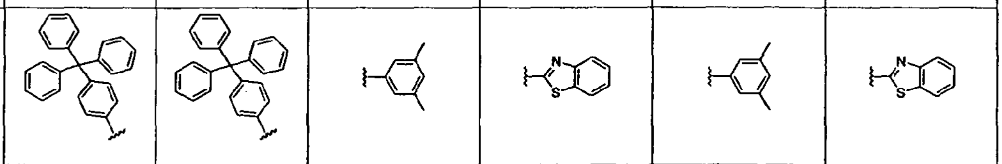
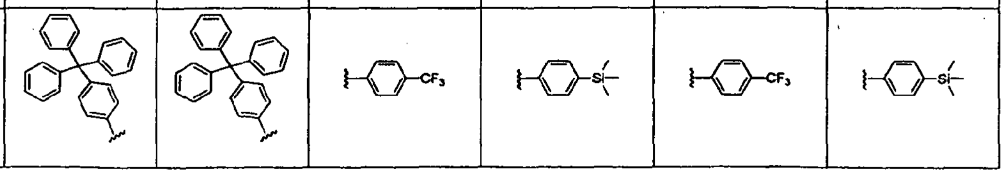
1760	
1761	
1762	
1763	
1764	
1765	
1766	
1767	
1768	
1769	

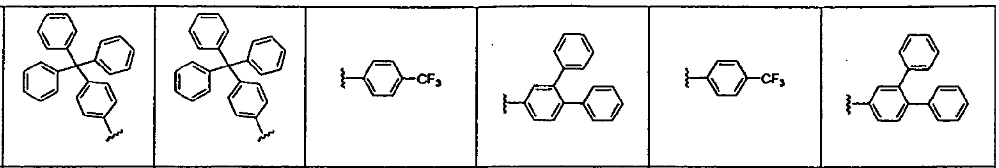
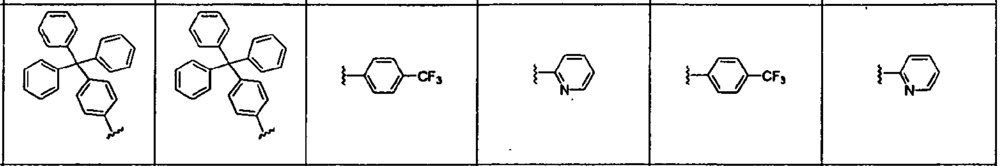
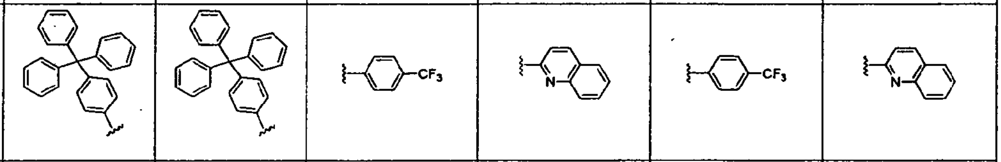
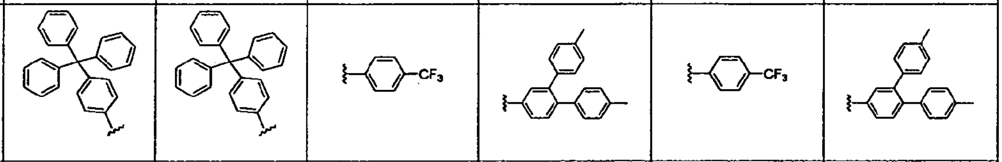
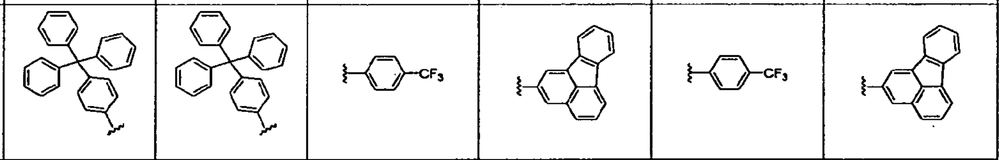
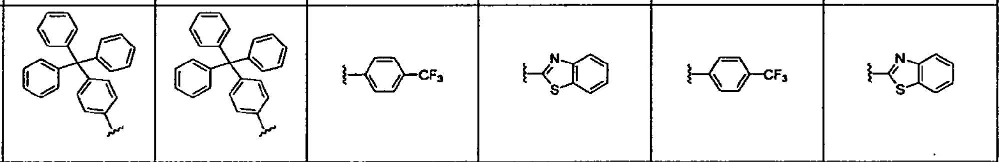
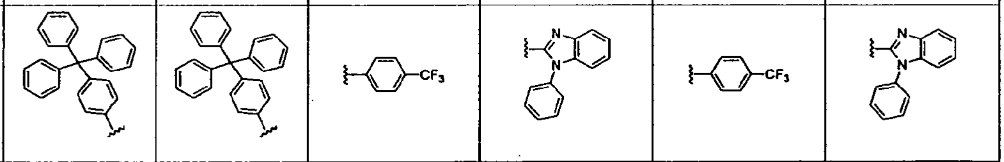
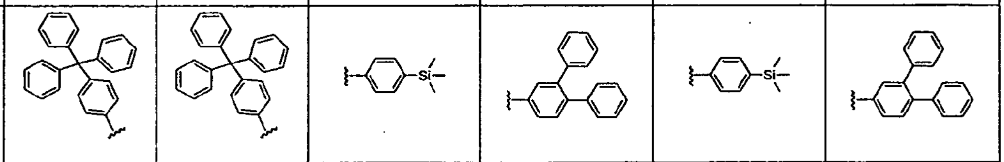
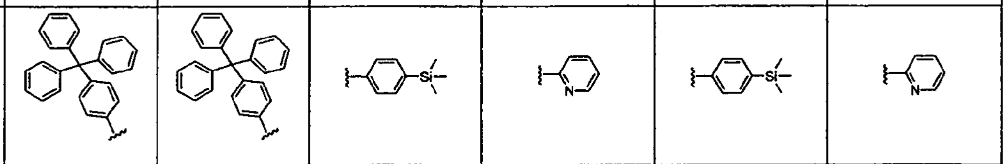
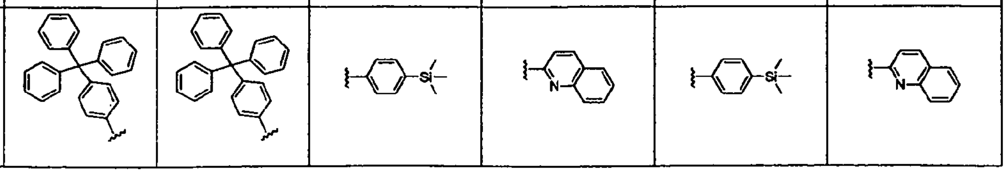
1770	
1771	
1772	
1773	
1774	
1775	
1776	
1777	
1778	
1779	

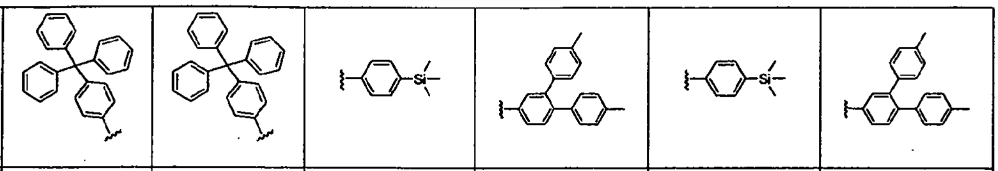
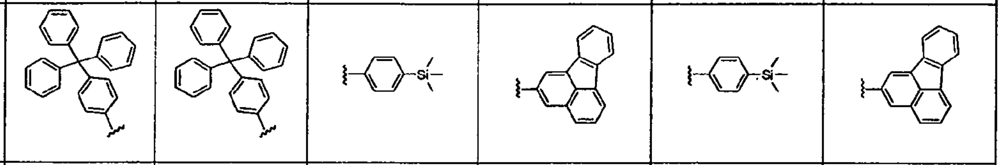
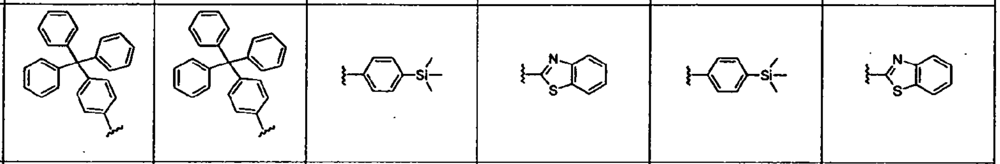
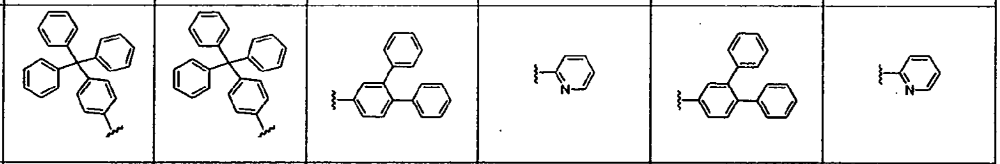
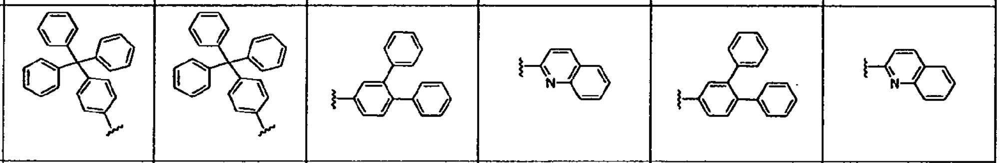
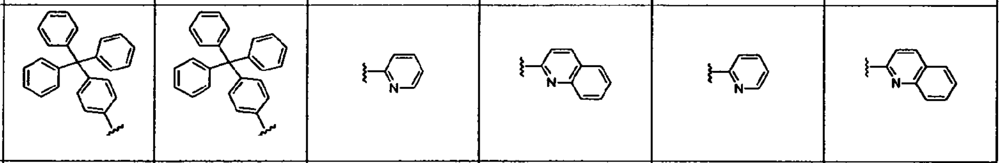
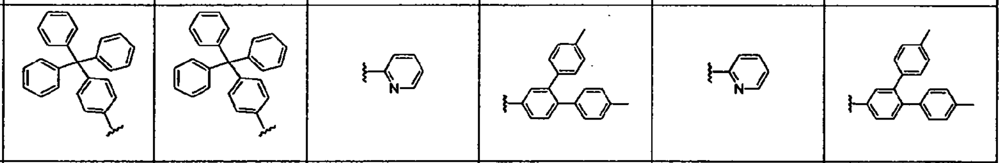
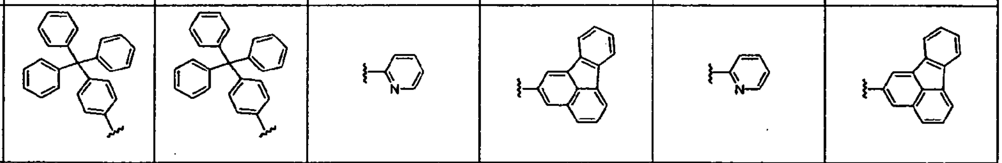
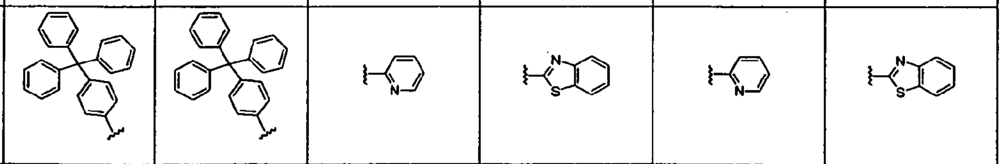
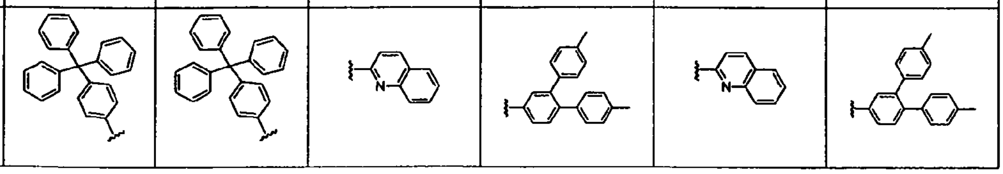
1780	
1781	
1782	
1783	
1784	
1785	
1786	
1787	
1788	
1789	

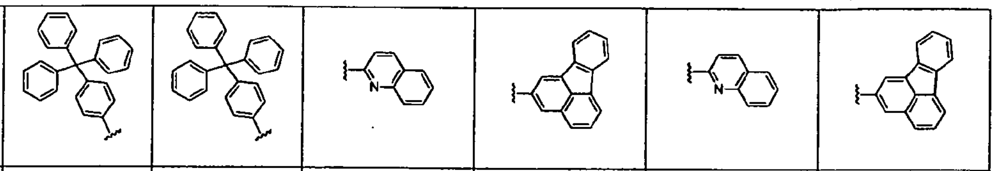
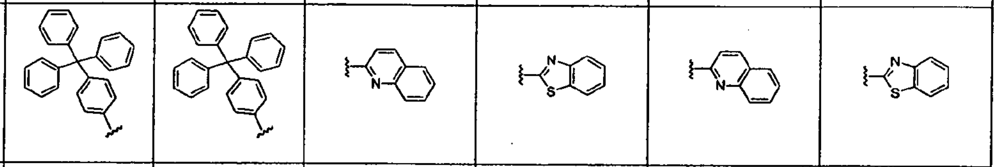
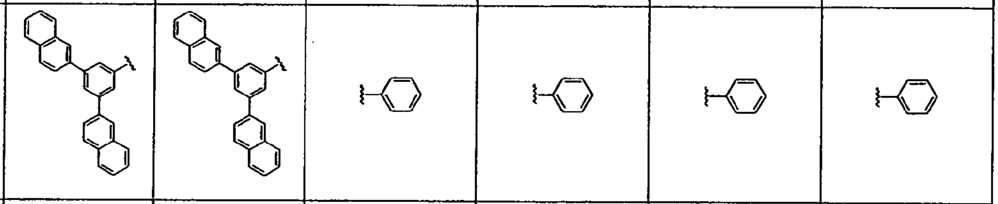
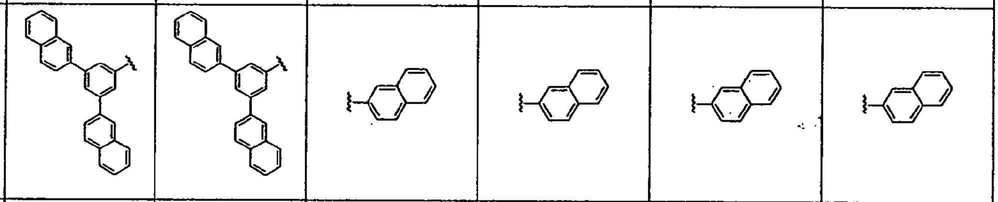
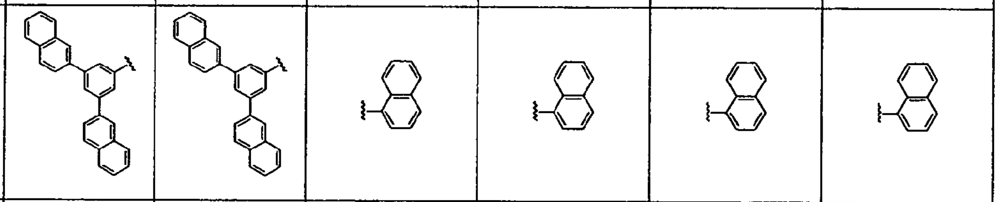
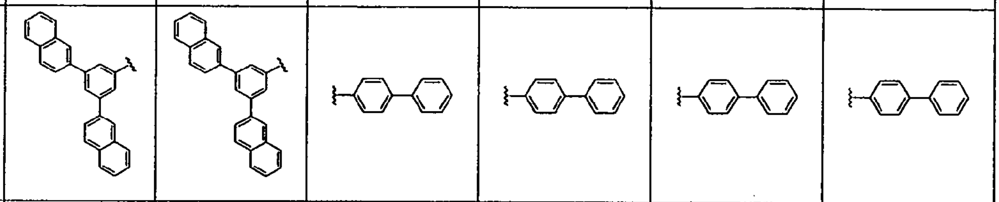
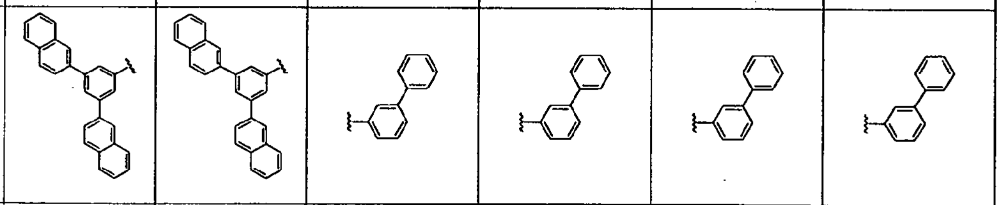
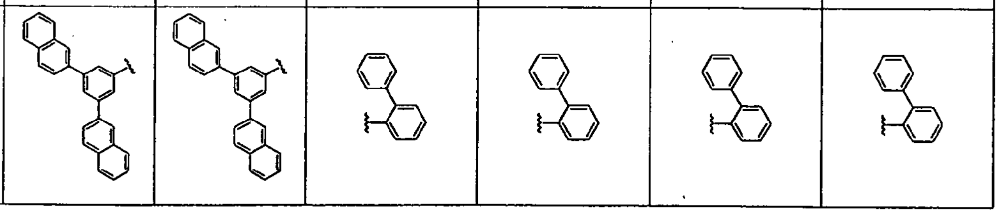
1790	
1791	
1792	
1793	
1794	
1795	
1796	
1797	
1798	
1799	

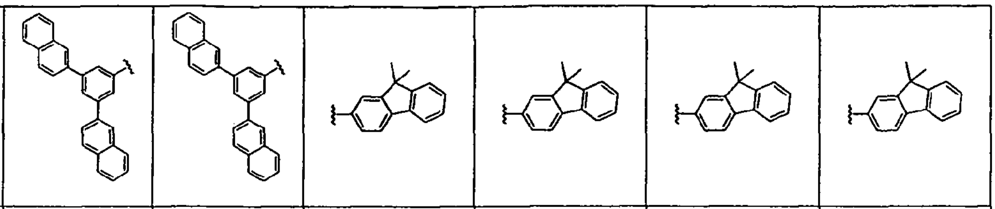
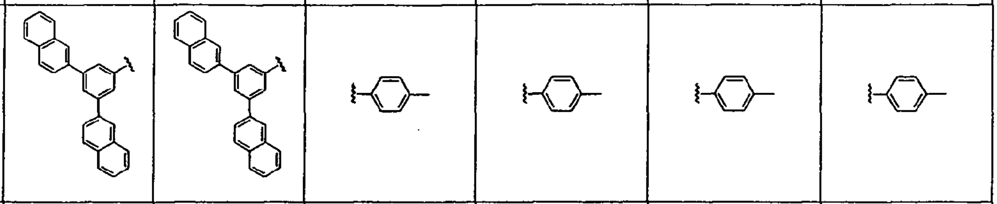
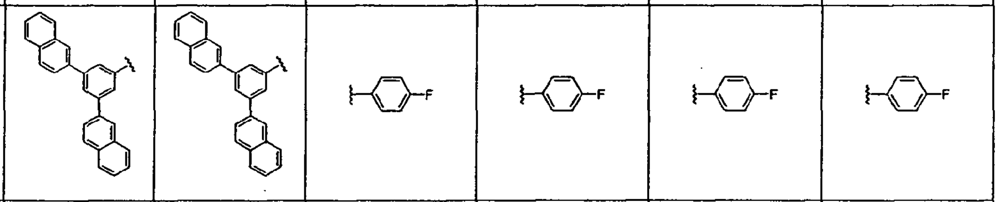
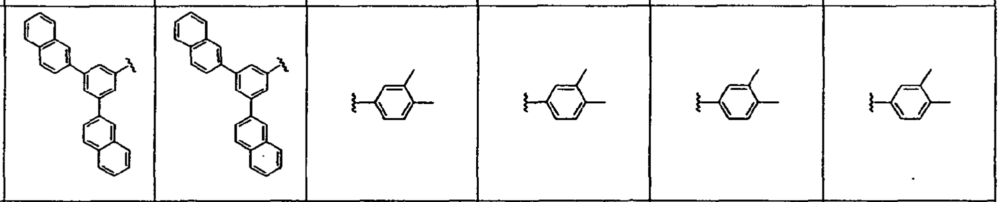
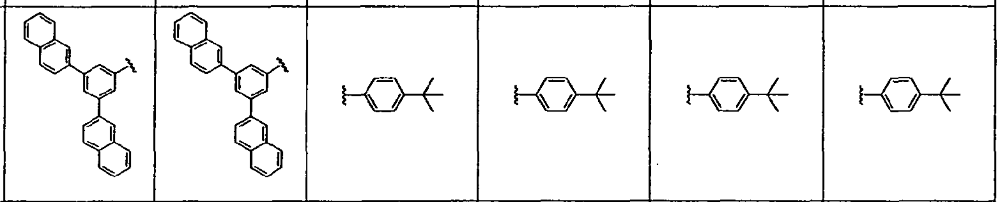
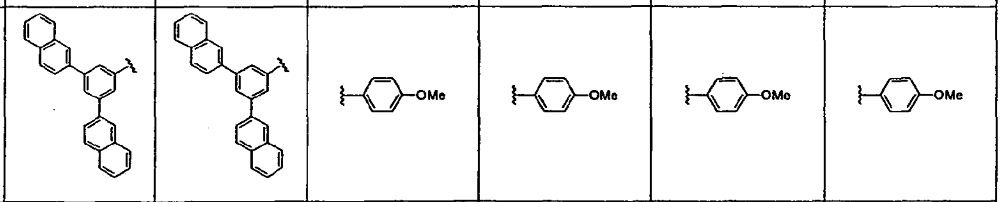
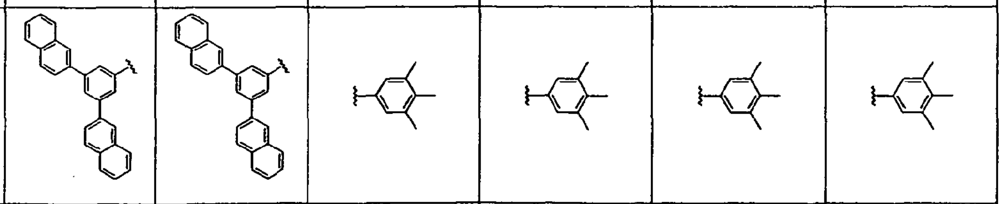
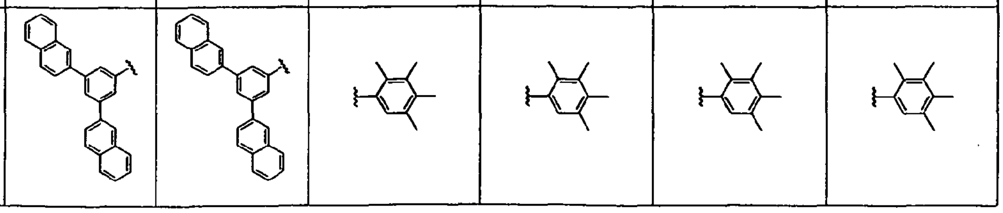
1800	
1801	
1802	
1803	
1804	
1805	
1806	
1807	
1808	
1809	

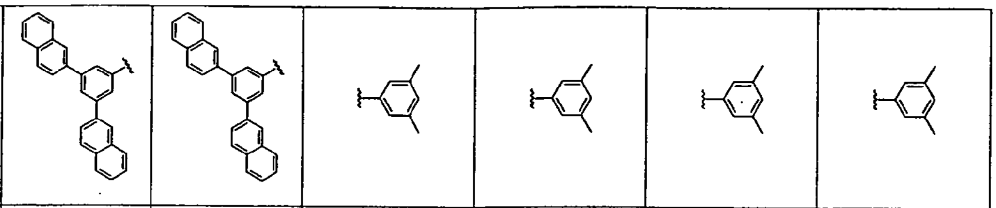
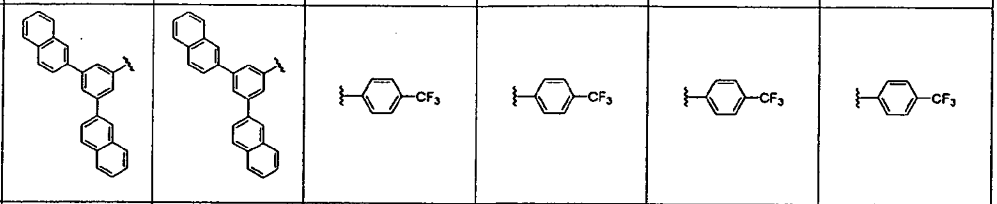
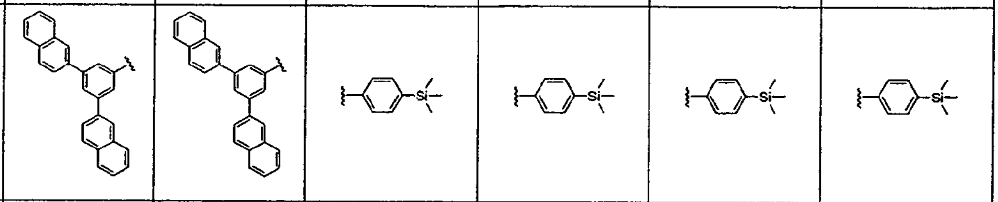
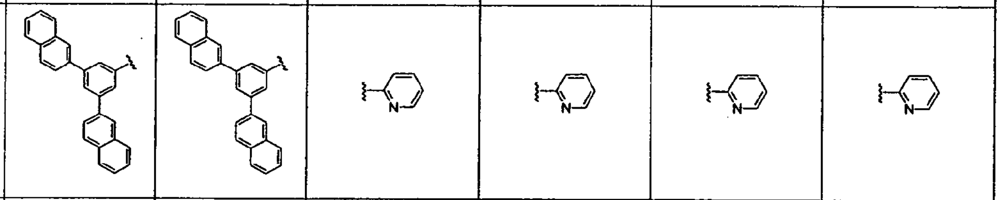
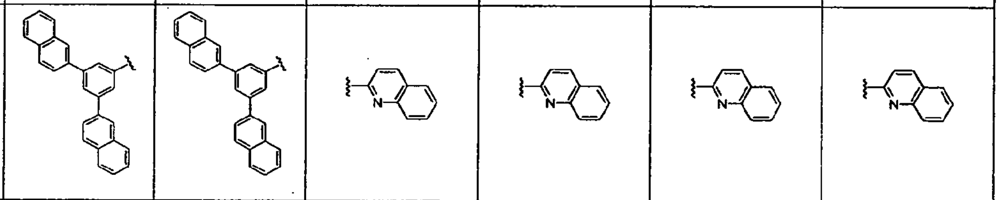
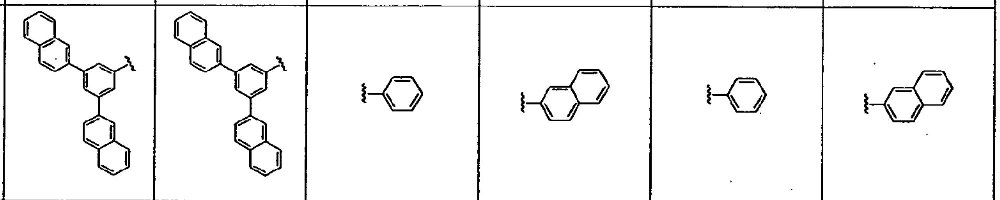
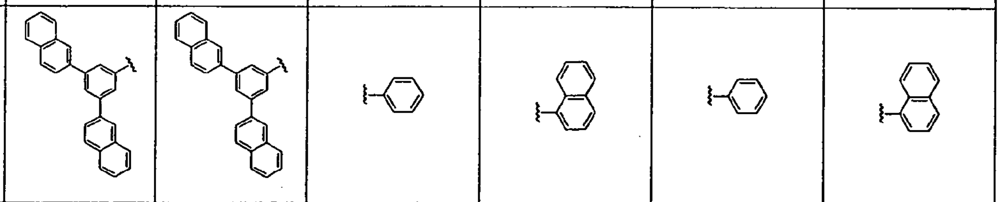
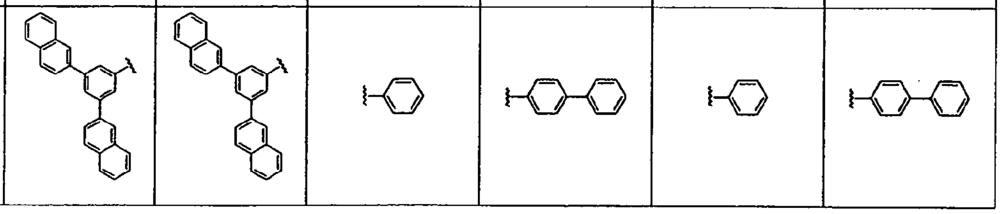
1810	
1811	
1812	
1813	
1814	
1815	
1816	
1817	
1818	
1819	

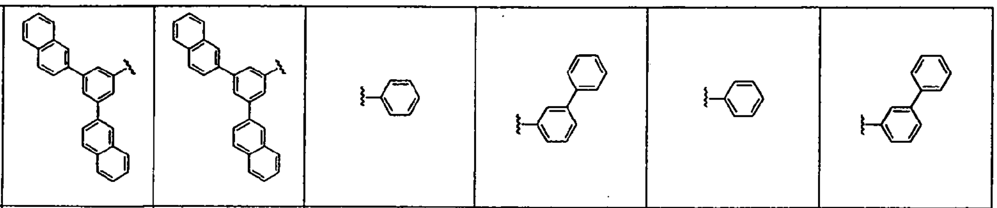
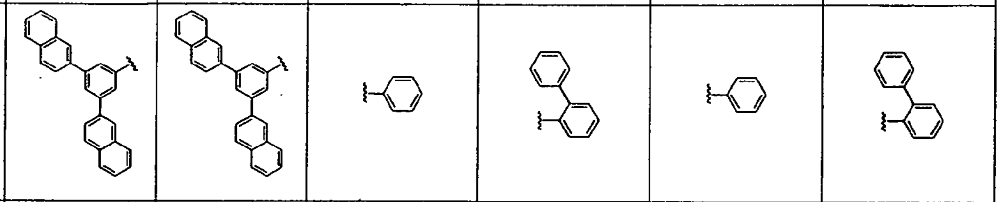
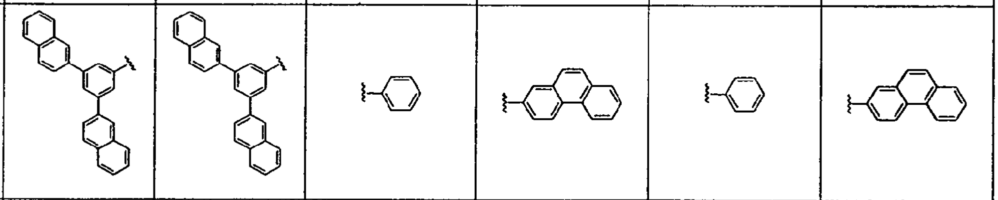
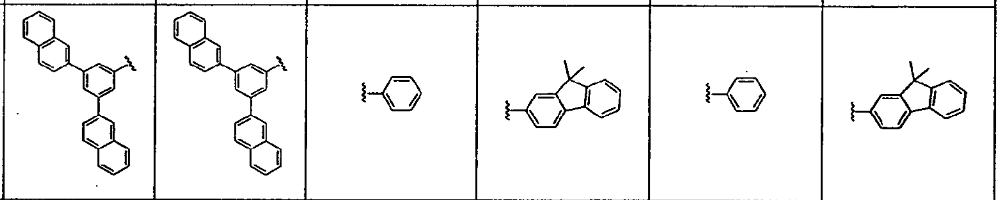
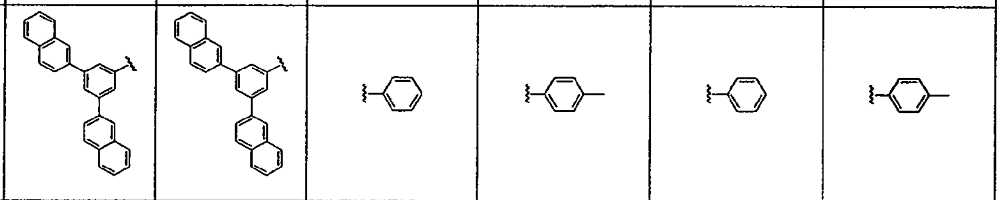
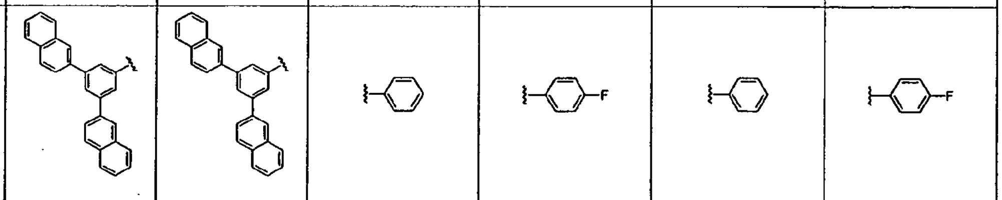
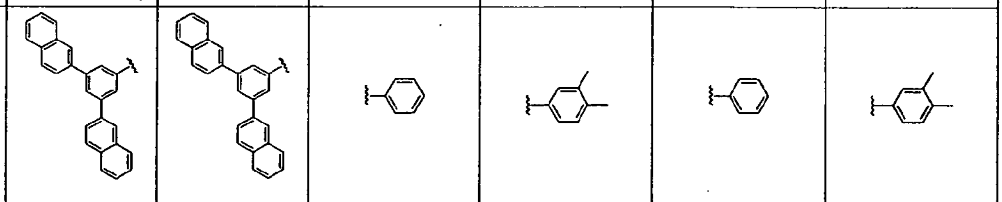
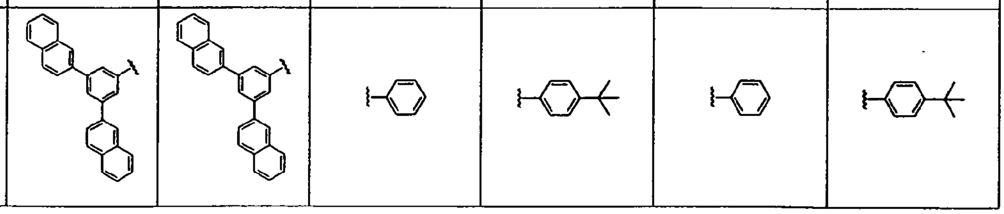
1820	
1821	
1822	
1823	
1824	
1825	
1826	
1827	
1828	
1829	

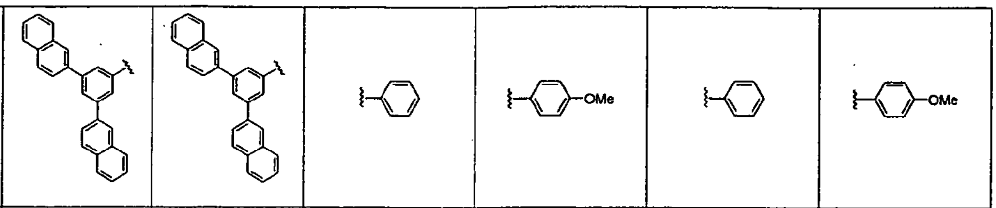
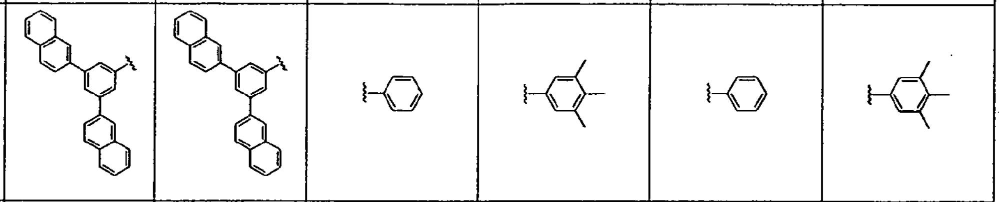
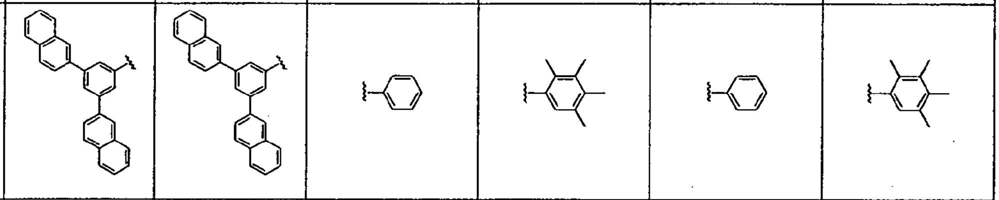
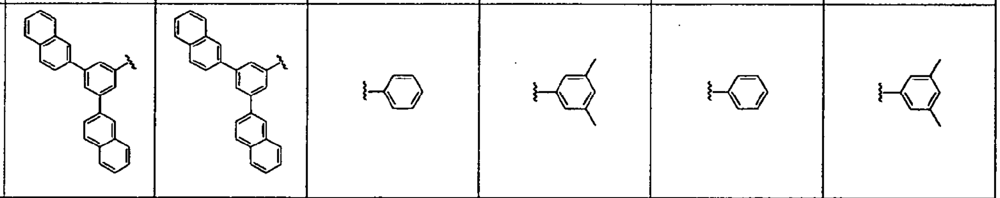
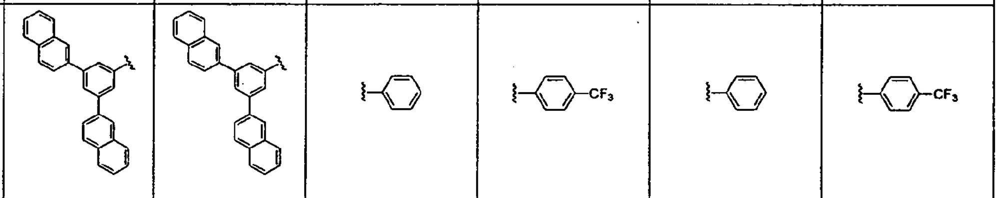
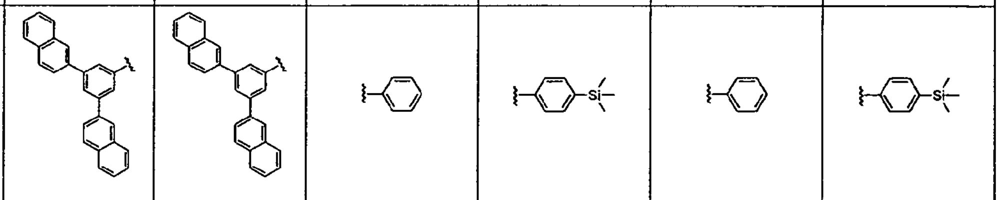
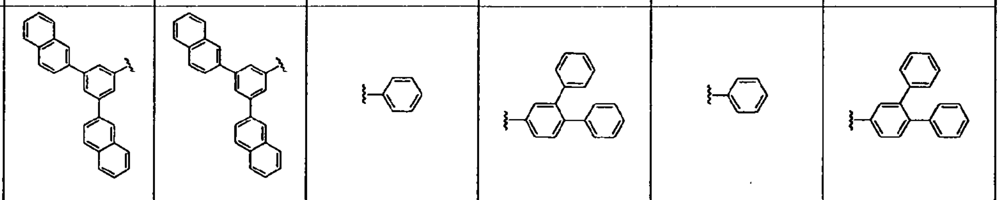
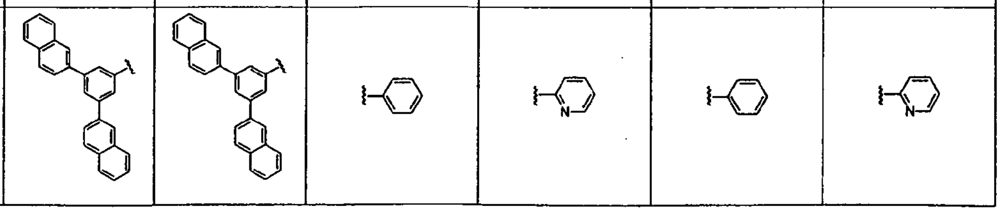
1830	
1831	
1832	
1833	
1834	
1835	
1836	
1837	
1838	
1839	

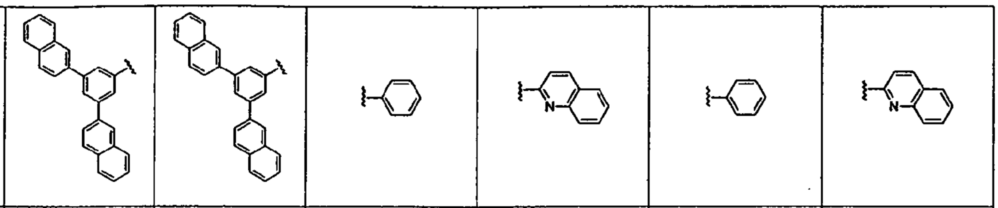
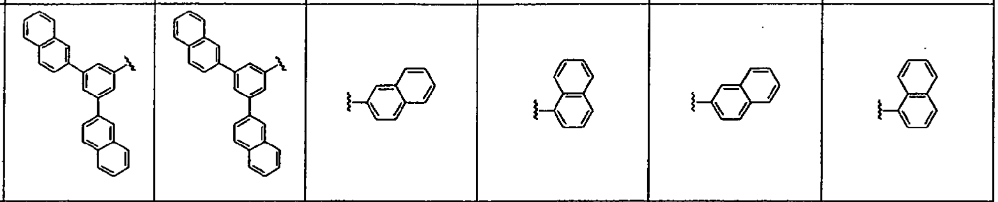
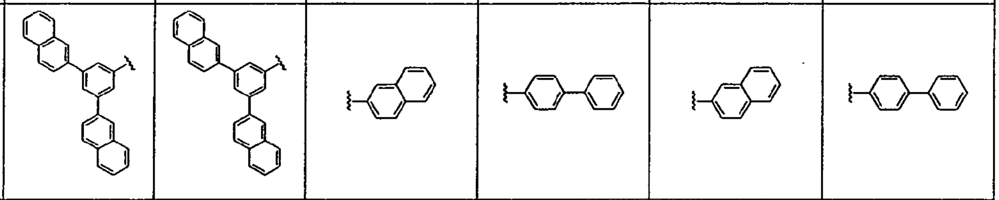
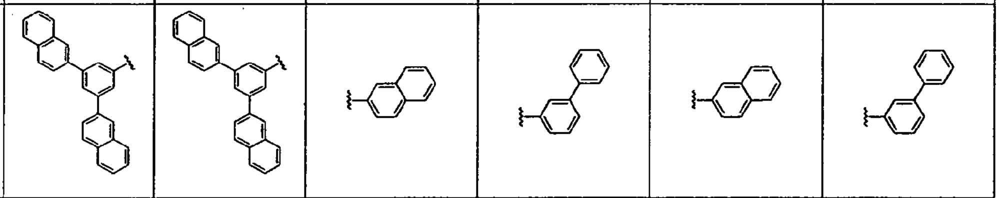
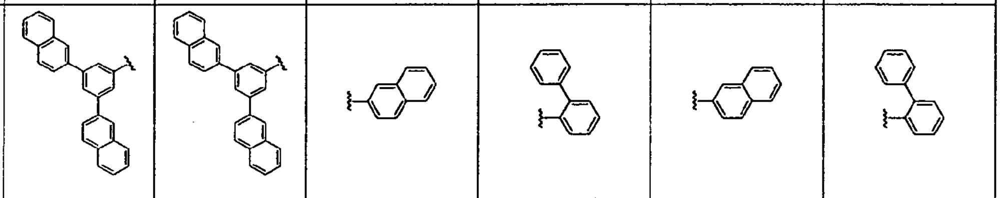
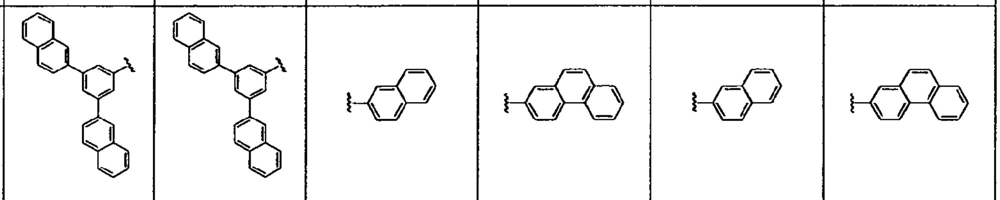
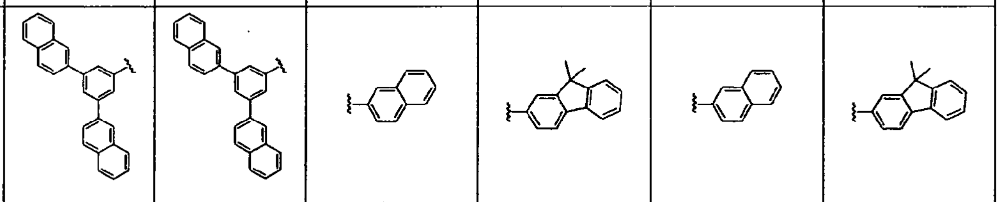
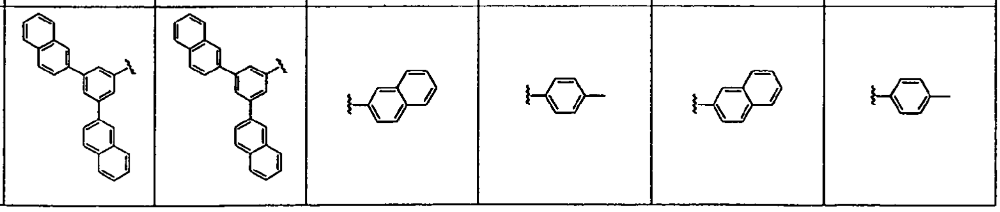
1840	
1841	
1842	
1843	
1844	
1845	
1846	
1847	

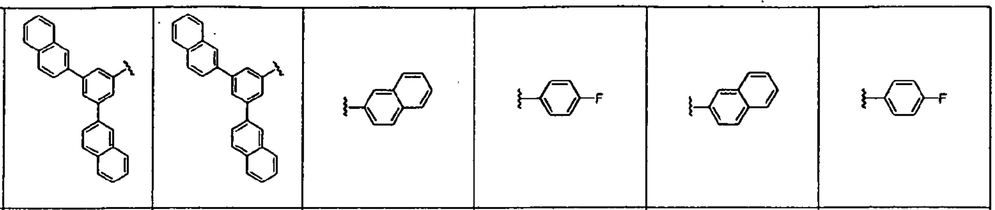
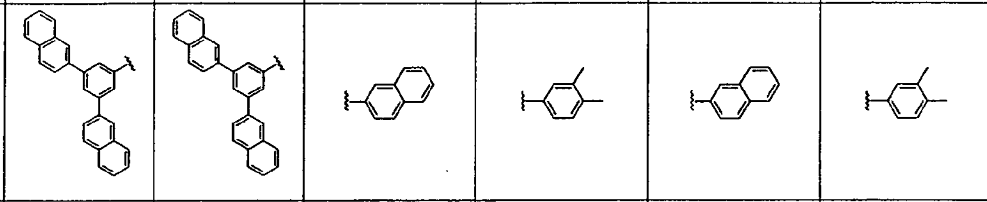
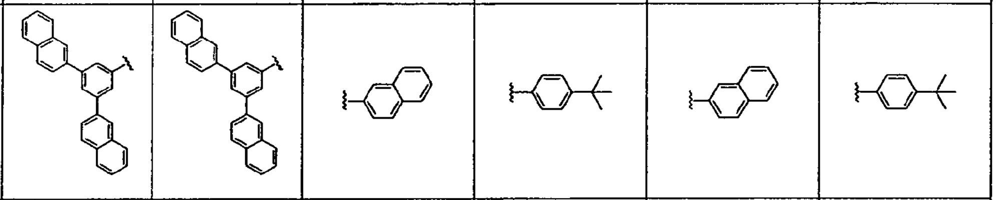
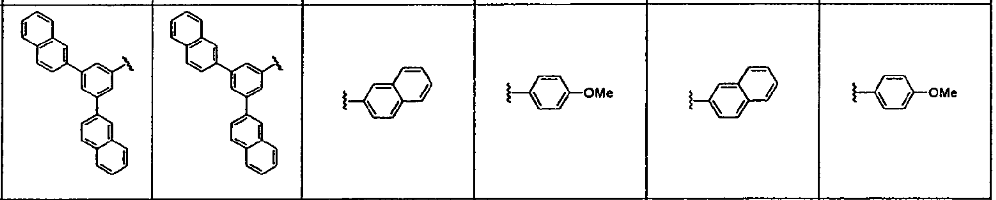
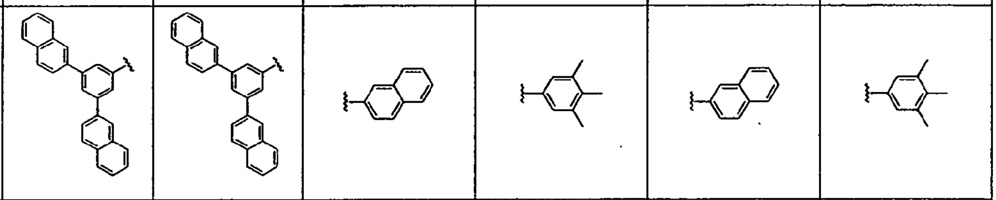
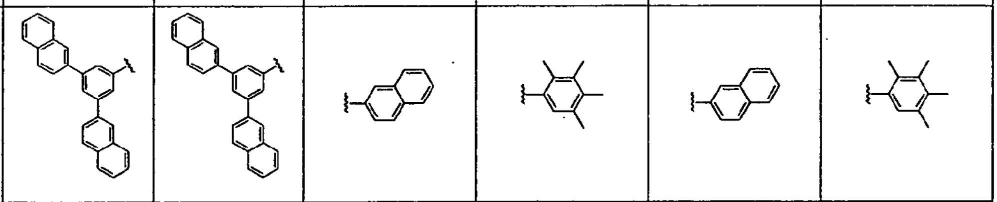
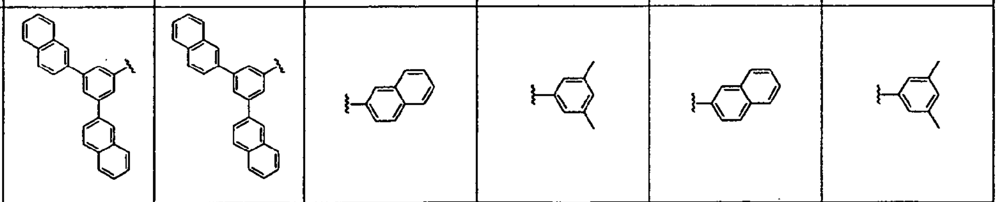
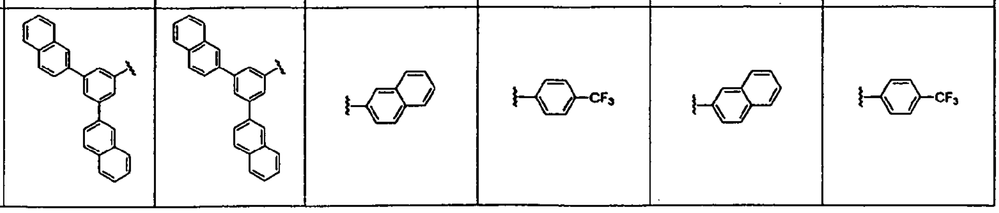
1848	
1849	
1850	
1851	
1852	
1853	
1854	
1855	

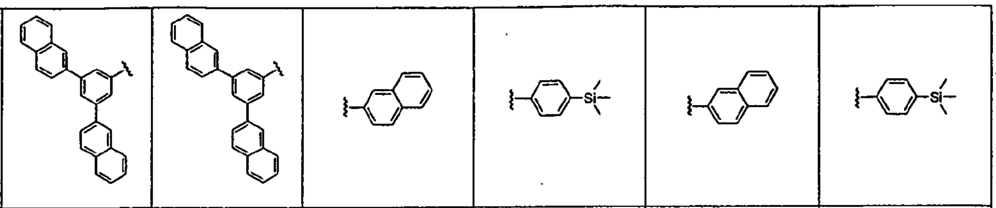
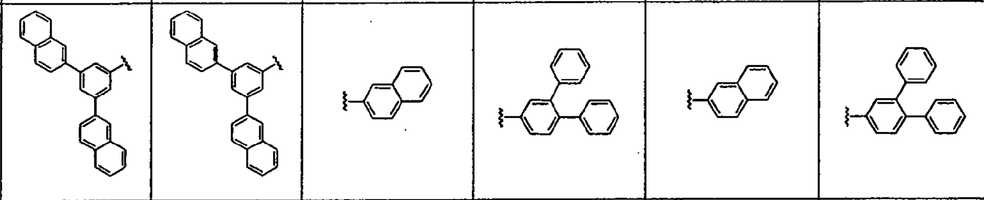
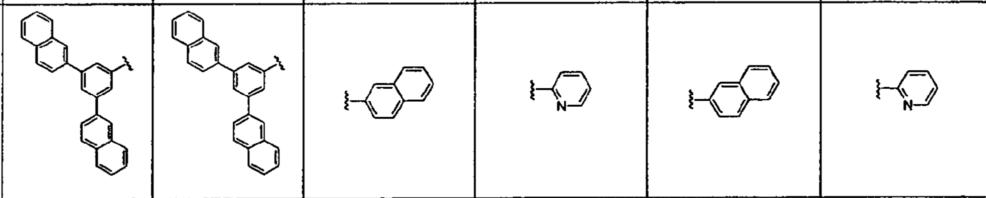
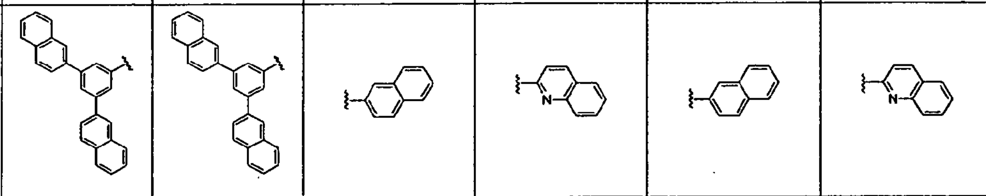
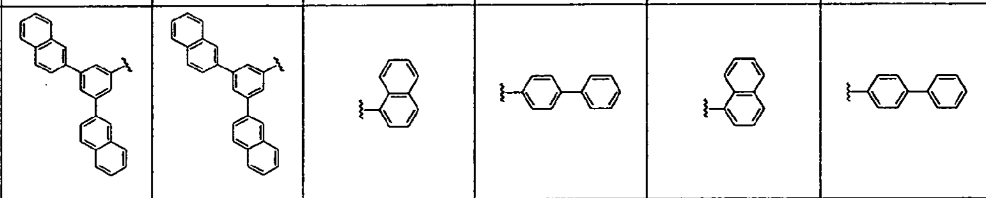
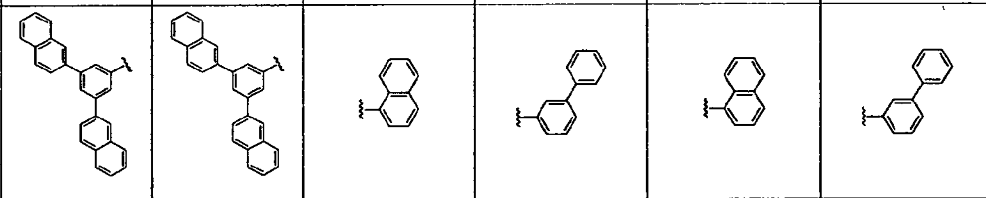
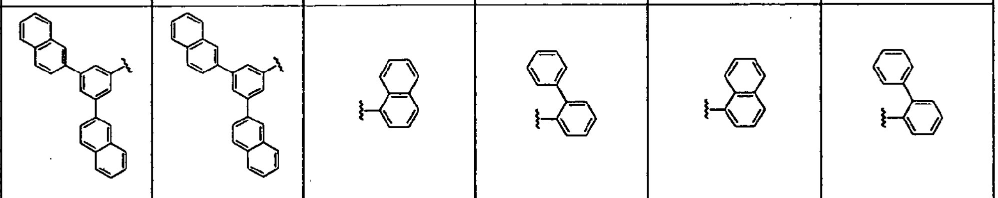
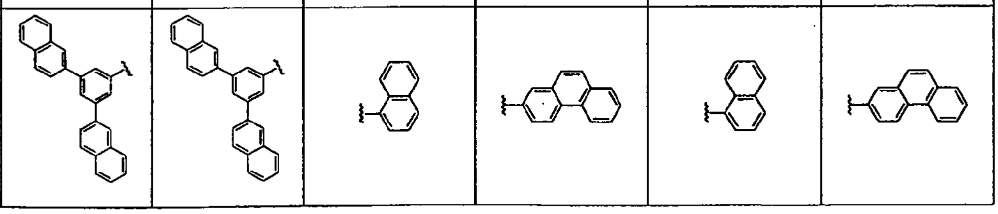
1856	
1857	
1858	
1859	
1860	
1861	
1862	
1863	

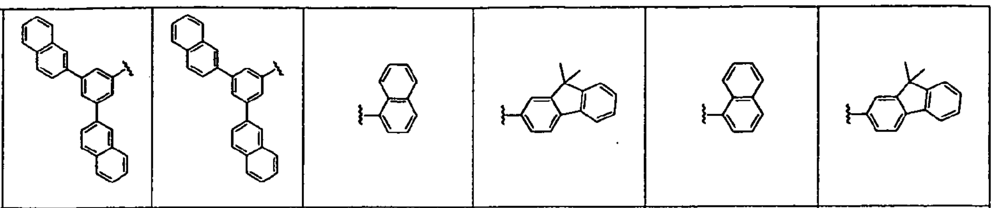
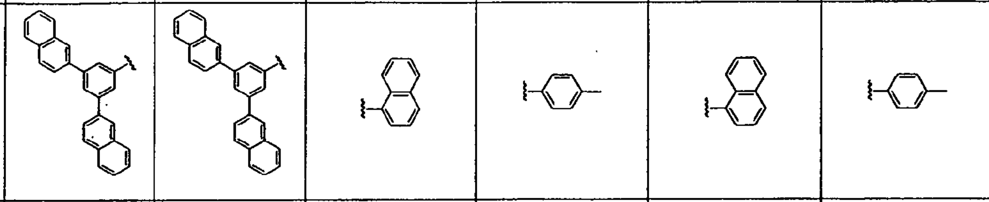
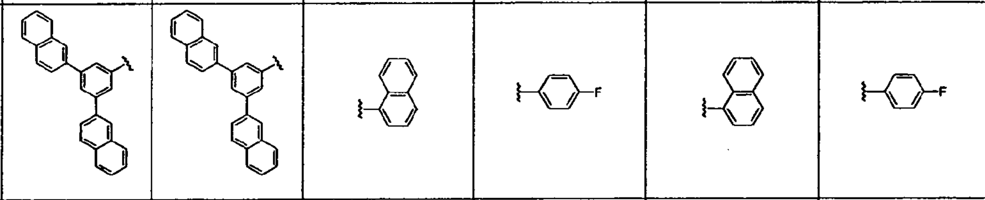
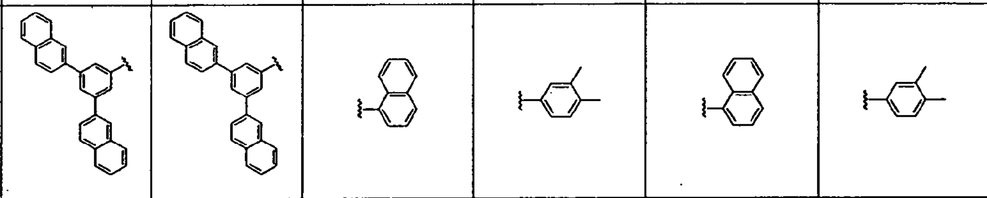
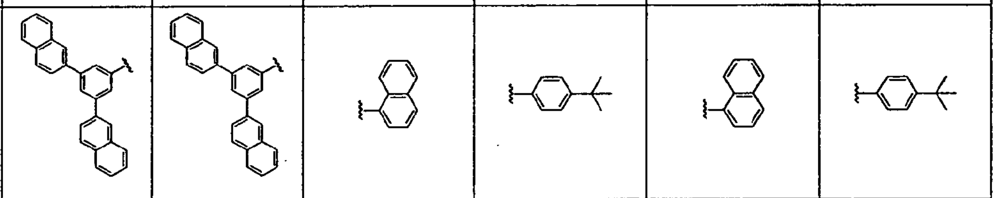
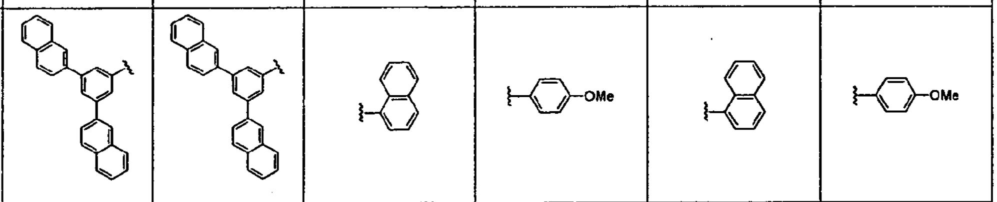
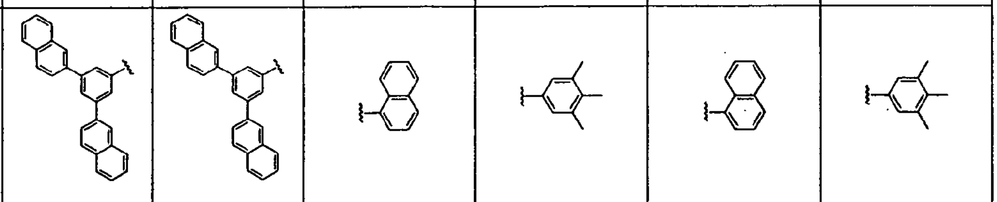
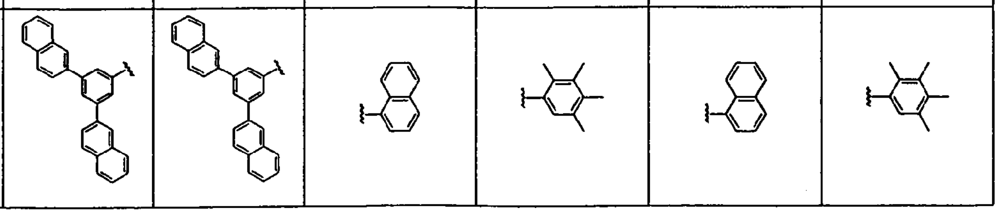
1864	
1865	
1866	
1867	
1868	
1869	
1870	
1871	

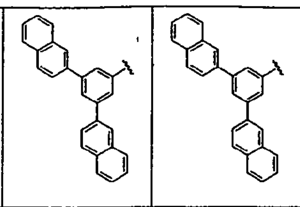
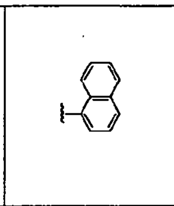
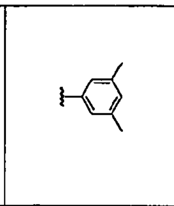
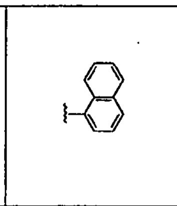
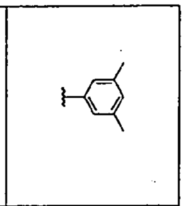
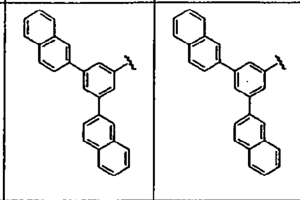
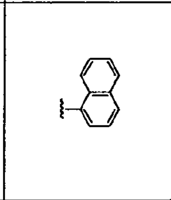
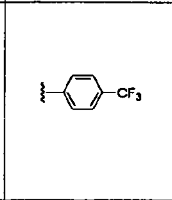
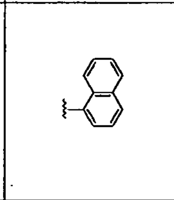
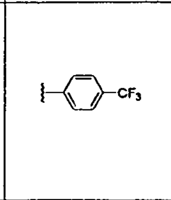
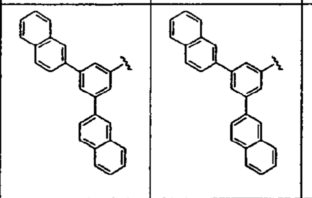
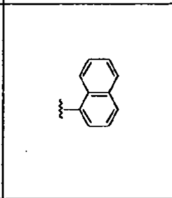
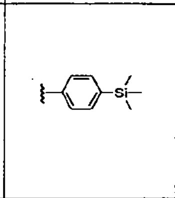
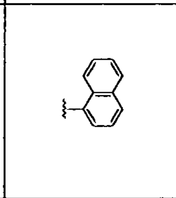
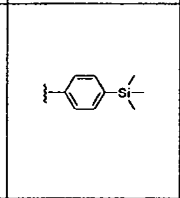
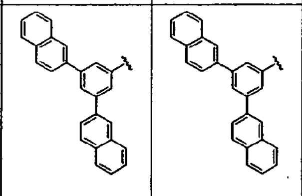
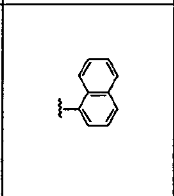
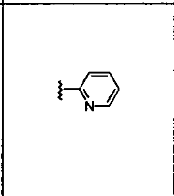
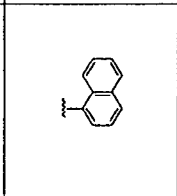
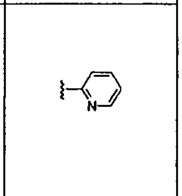
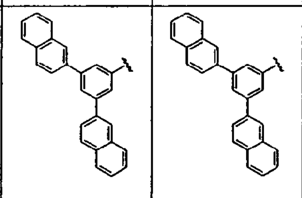
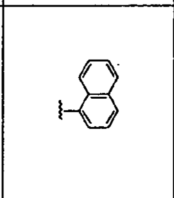
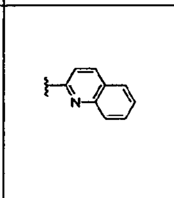
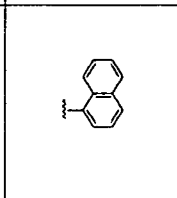
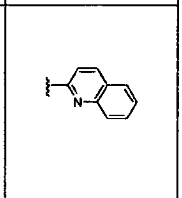
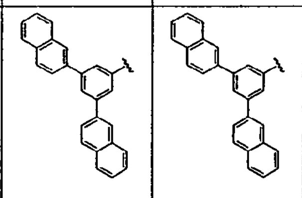
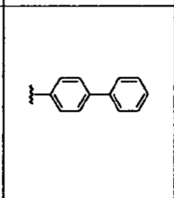
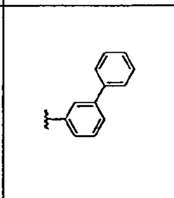
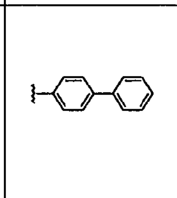
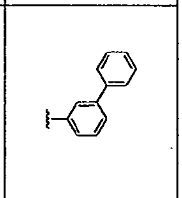
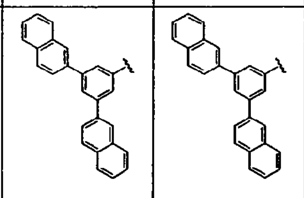
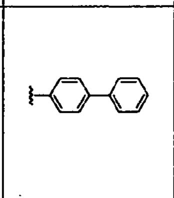
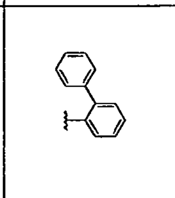
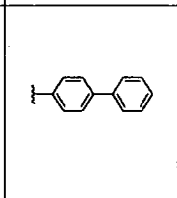
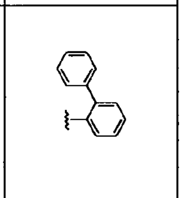
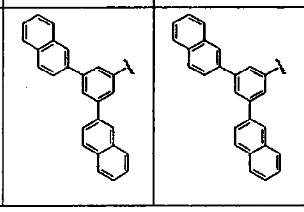
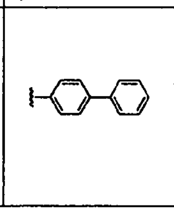
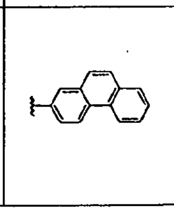
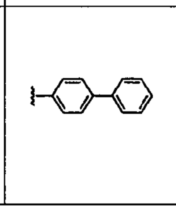
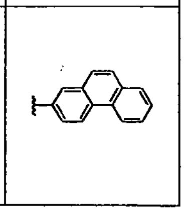
1872	
1873	
1874	
1875	
1876	
1877	
1878	
1879	

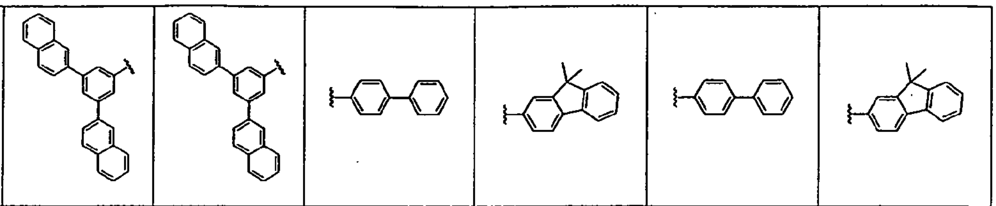
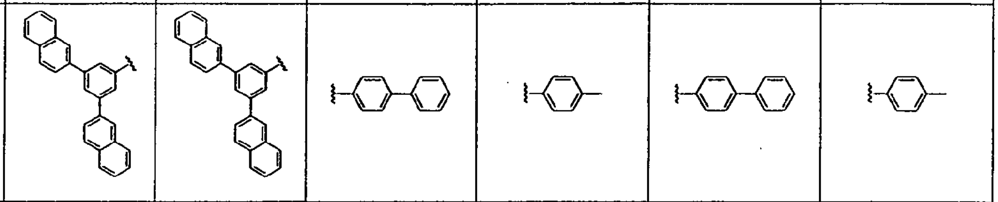
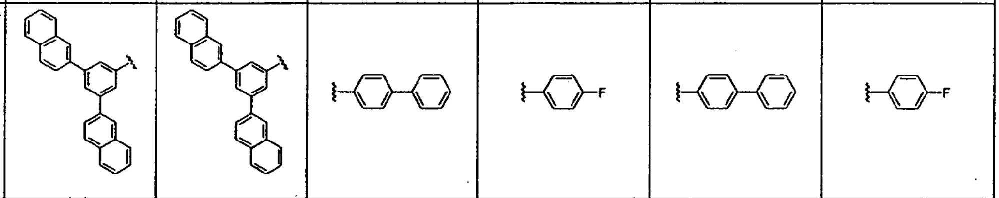
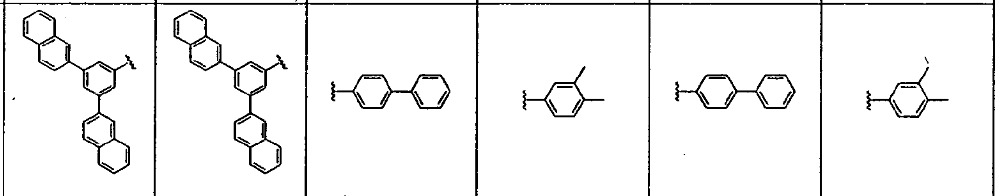
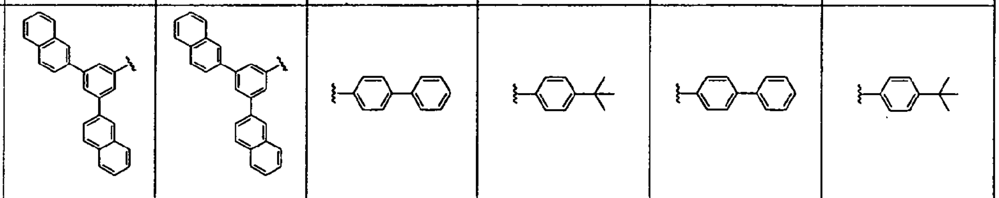
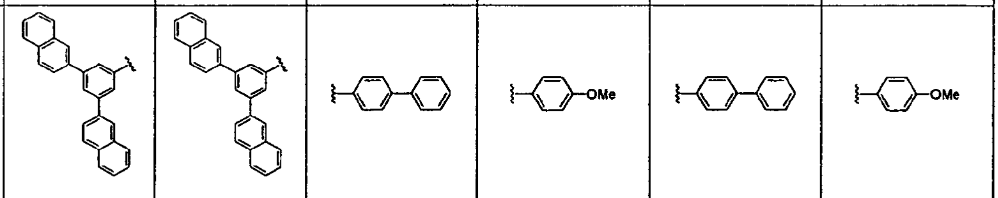
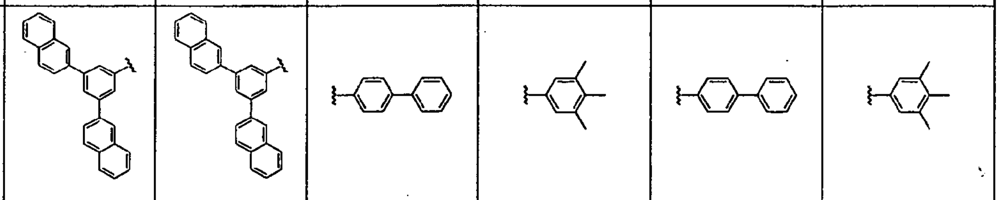
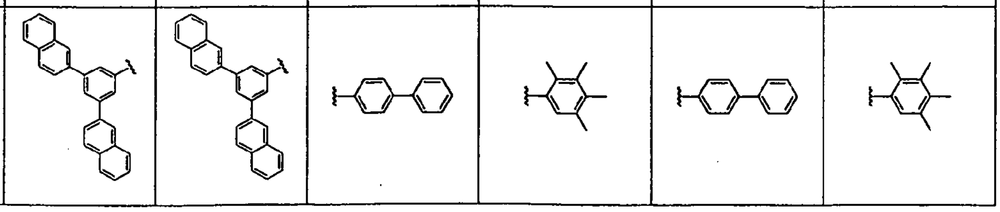
1880	
1881	
1882	
1883	
1884	
1885	
1886	
1887	

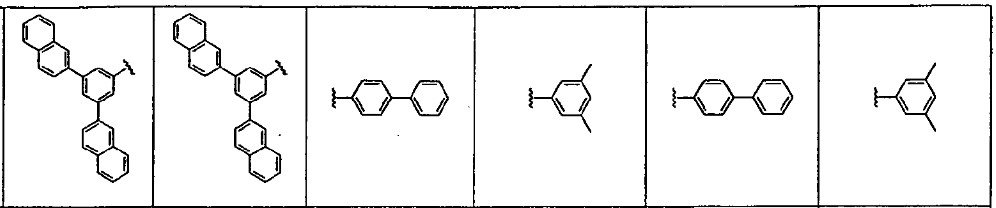
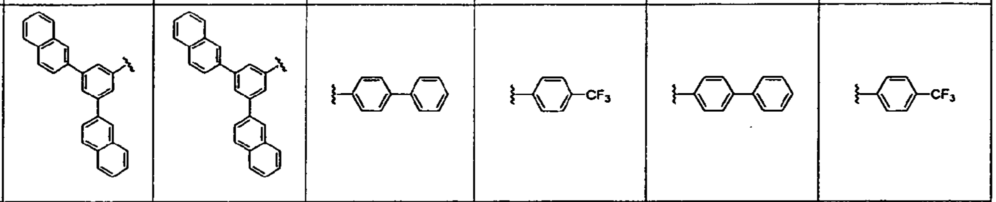
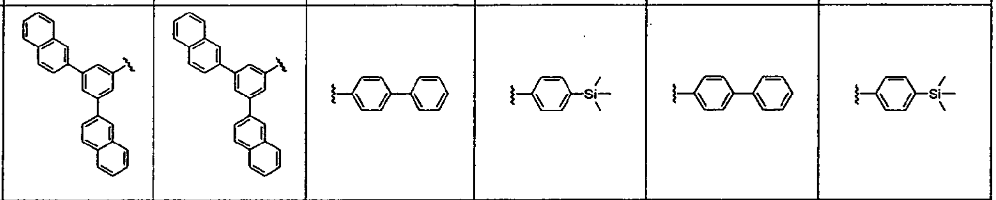
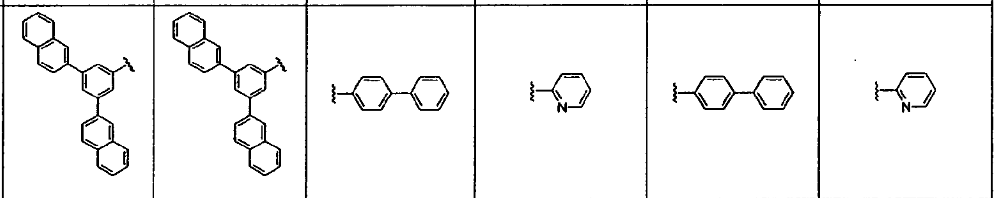
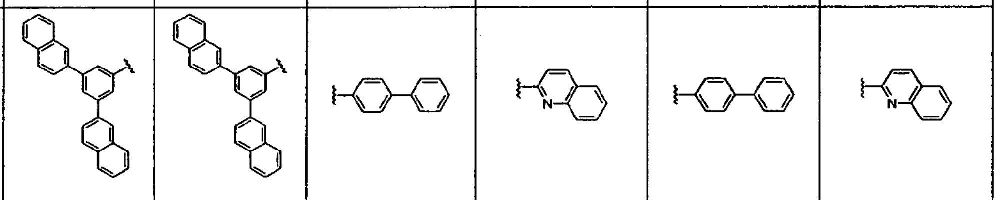
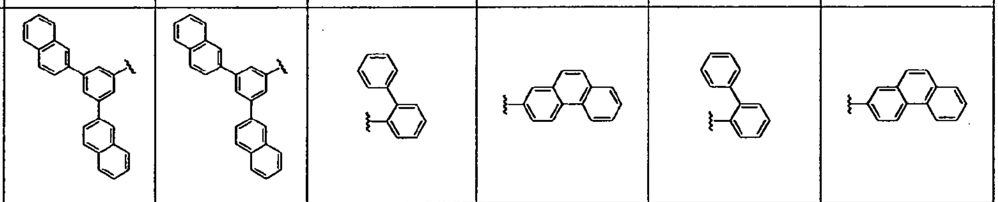
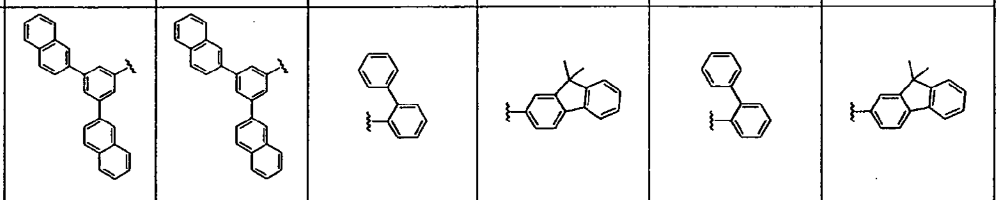
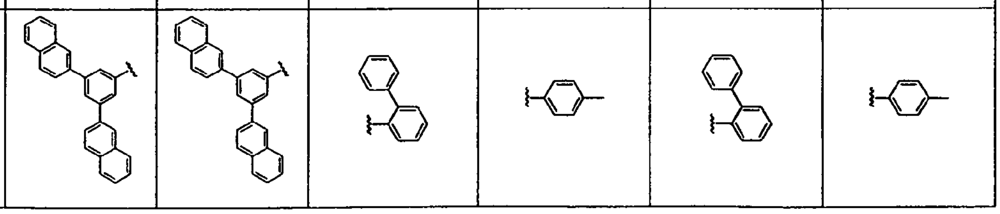
1888	
1889	
1890	
1891	
1892	
1893	
1894	
1895	

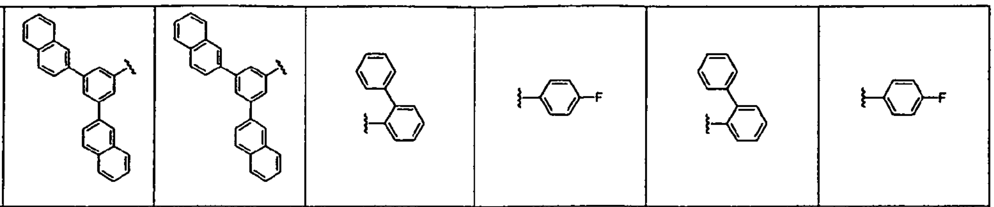
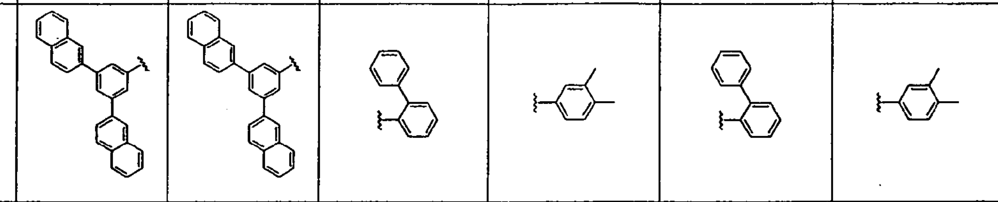
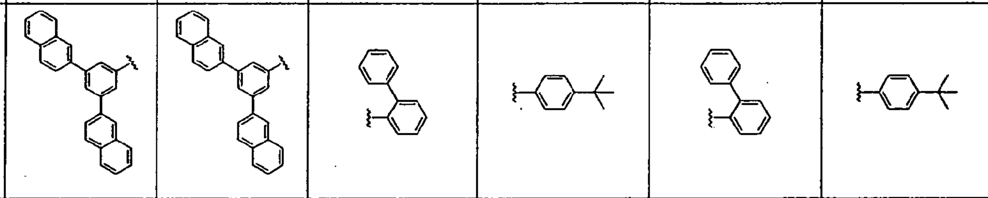
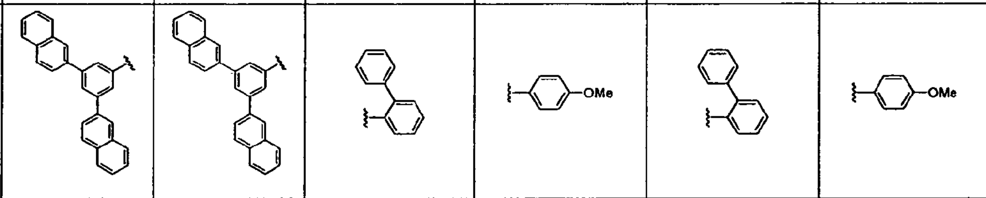
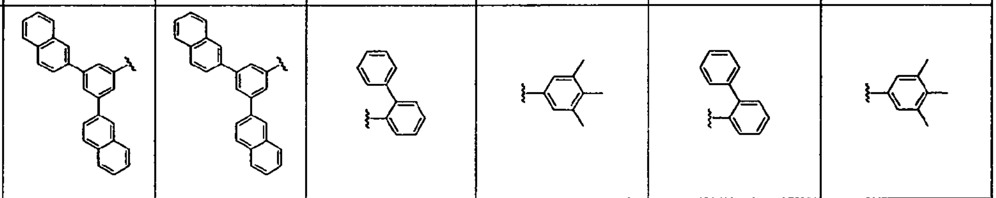
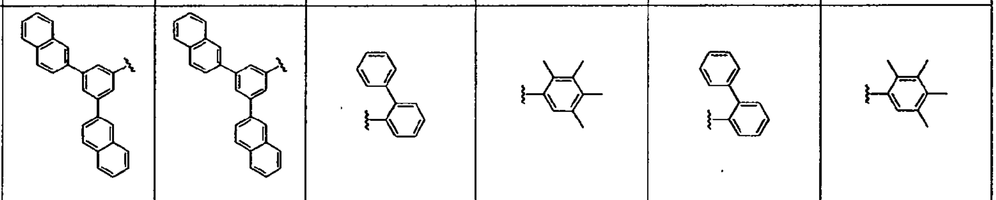
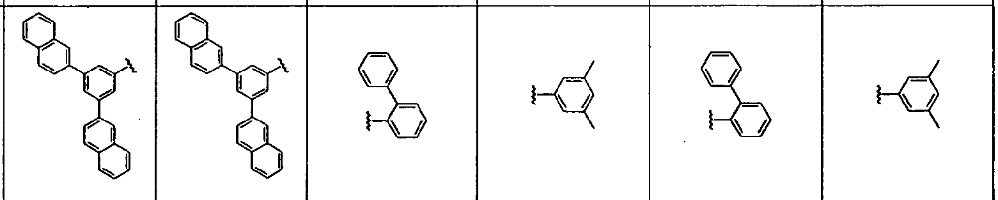
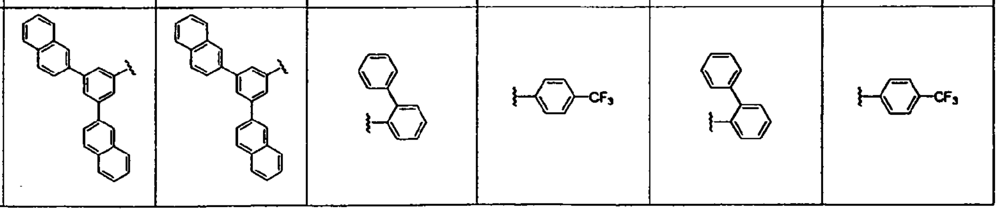
1896	
1897	
1898	
1899	
1900	
1901	
1902	
1903	

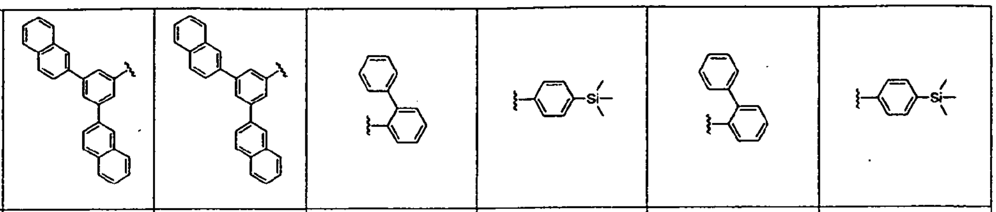
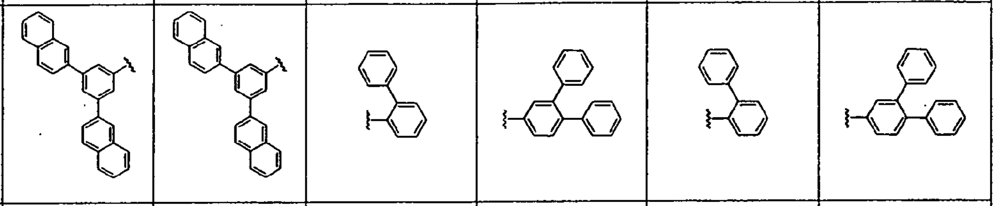
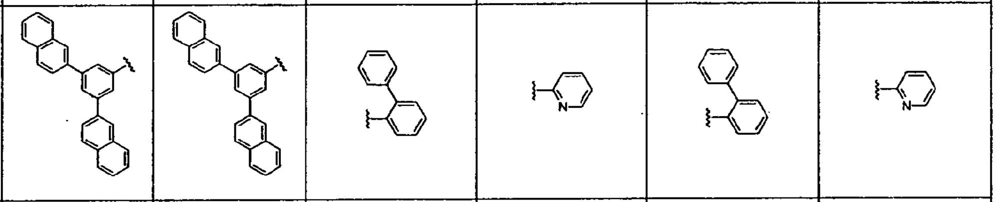
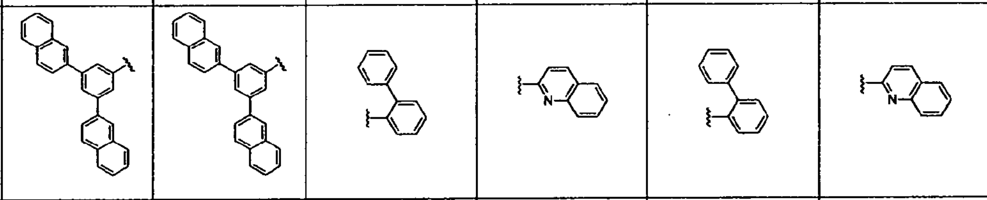
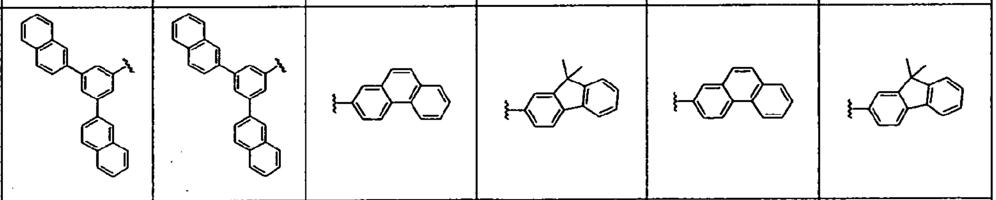
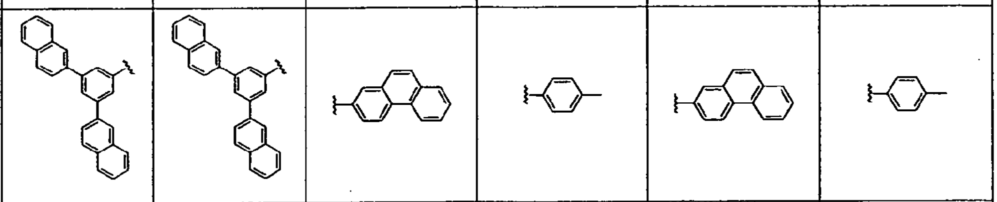
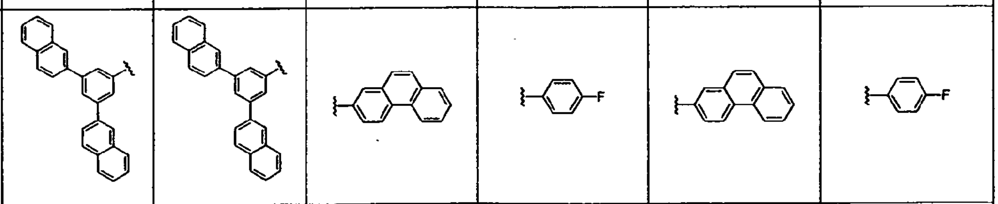
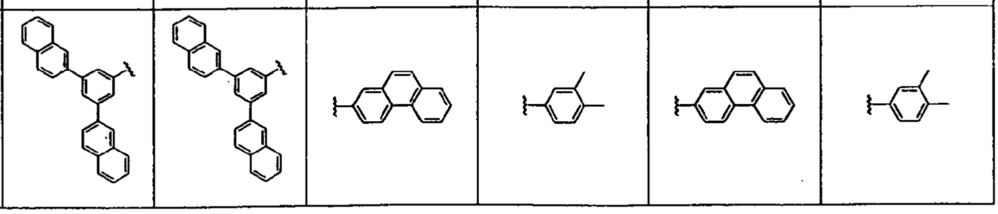
1904	
1905	
1906	
1907	
1908	
1909	
1910	
1911	

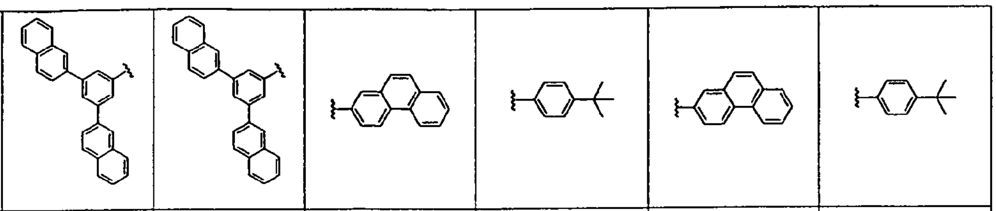
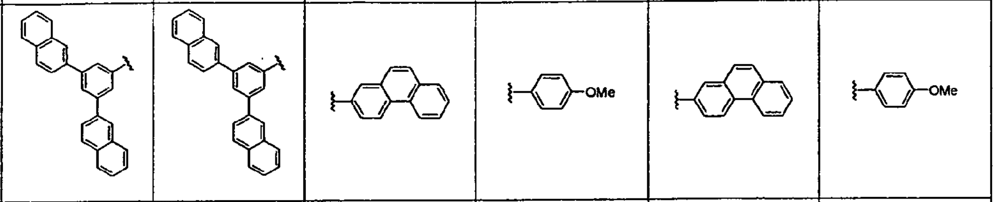
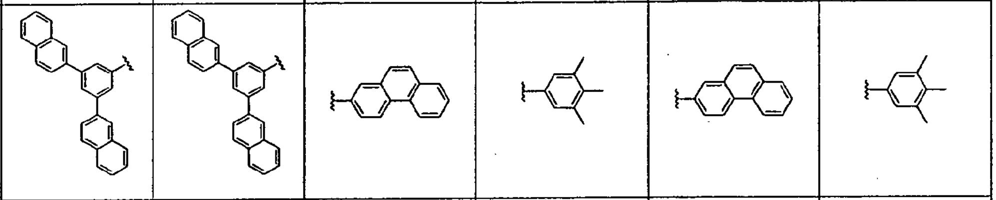
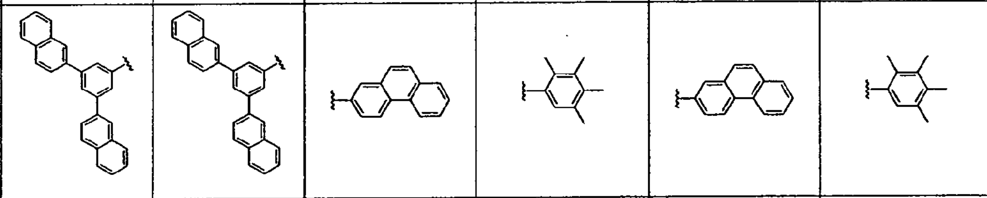
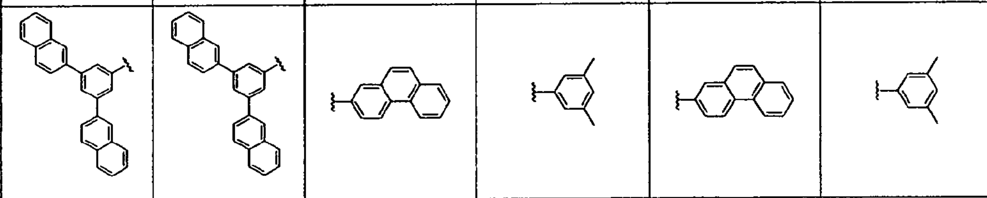
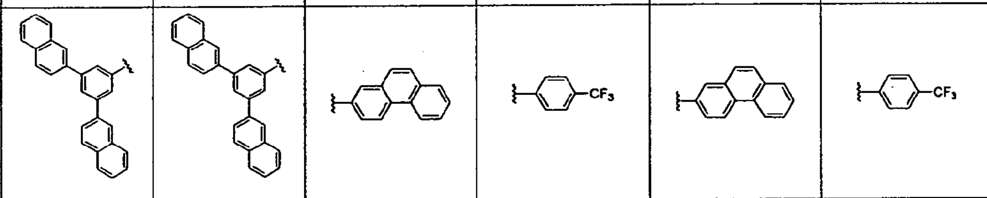
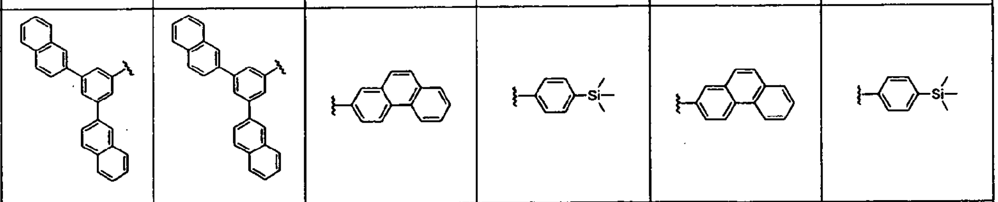
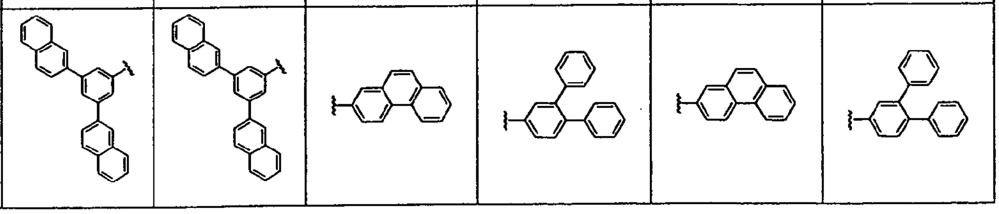
1912						
1913						
1914						
1915						
1916						
1917						
1918						
1919						

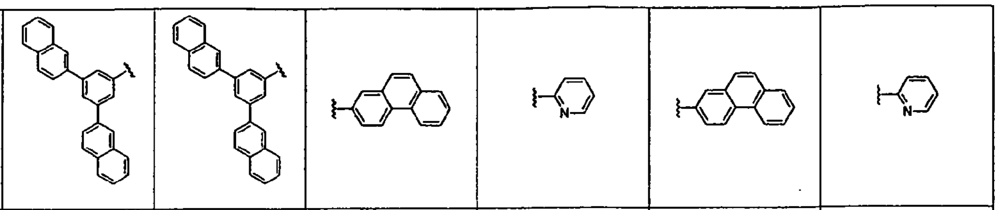
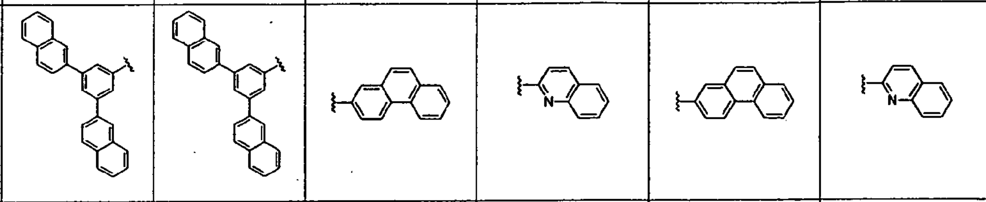
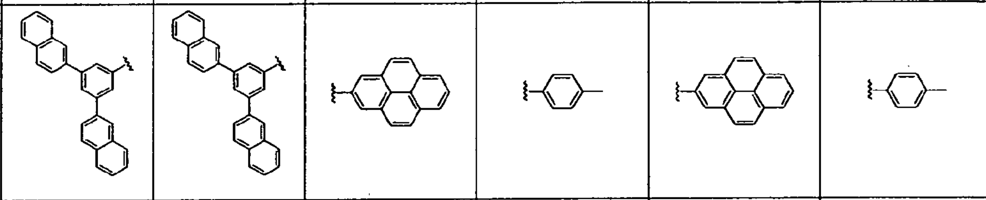
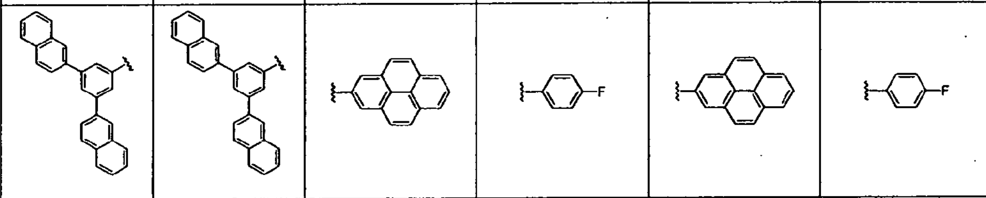
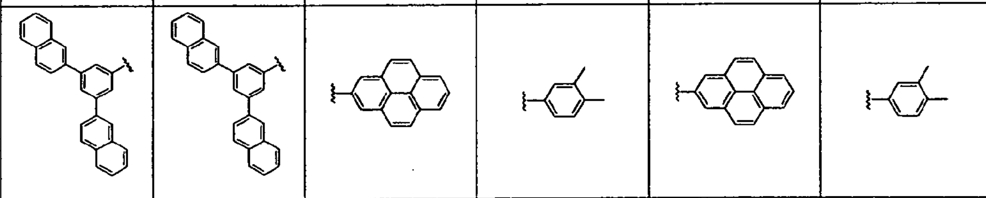
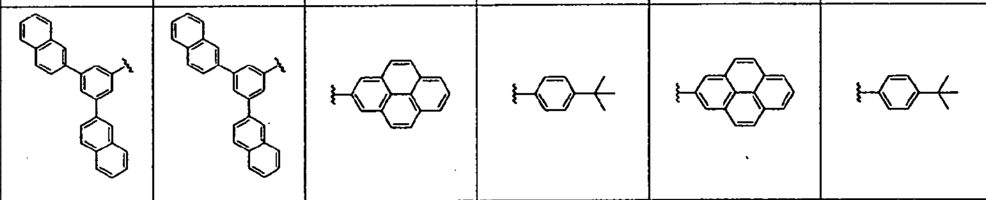
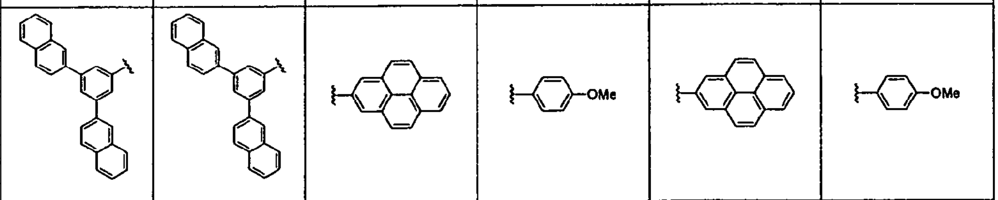
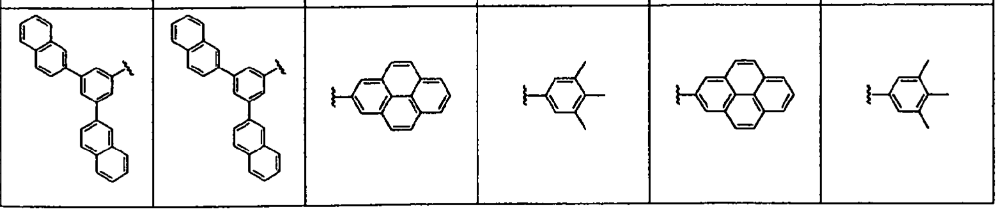
1920	
1921	
1922	
1923	
1924	
1925	
1926	
1927	

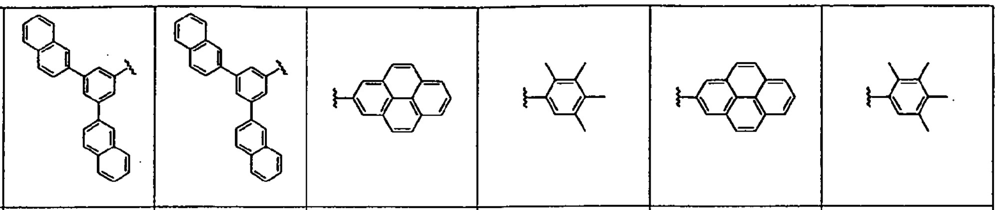
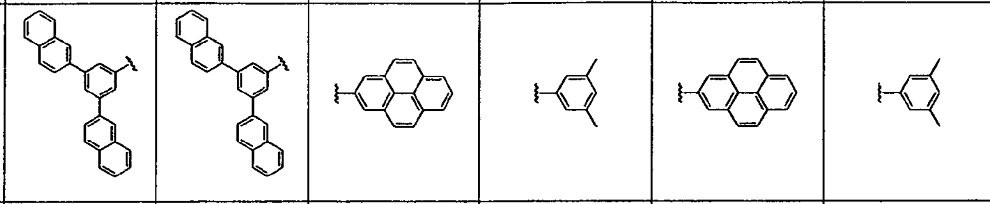
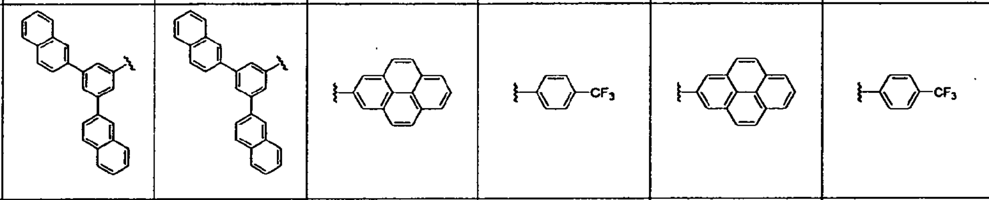
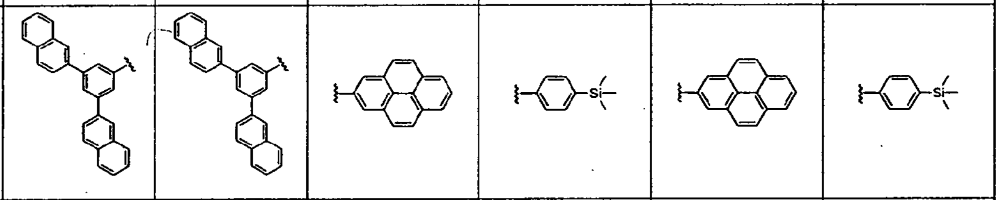
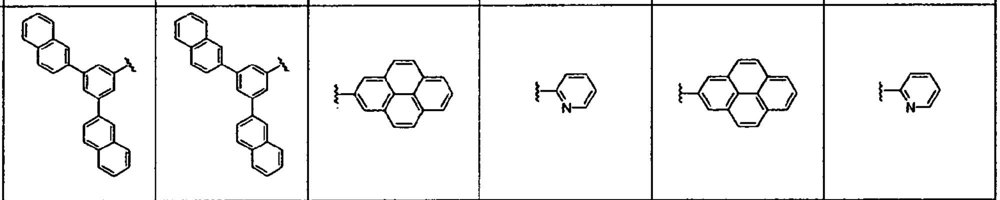
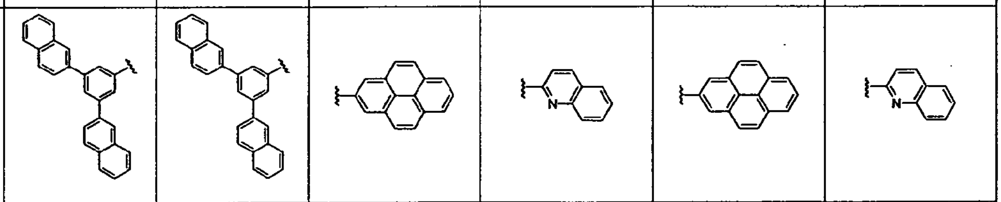
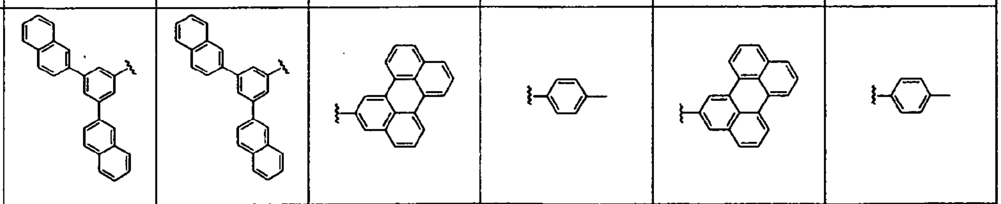
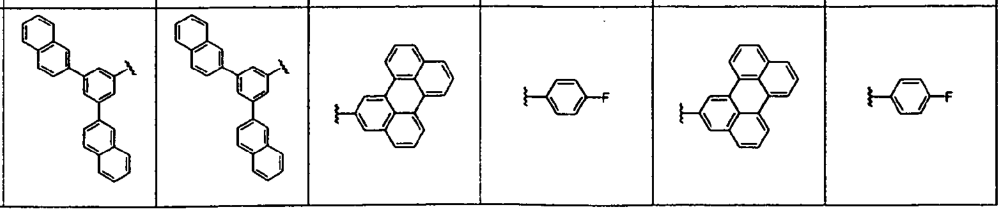
1928	
1929	
1930	
1931	
1932	
1933	
1934	
1935	

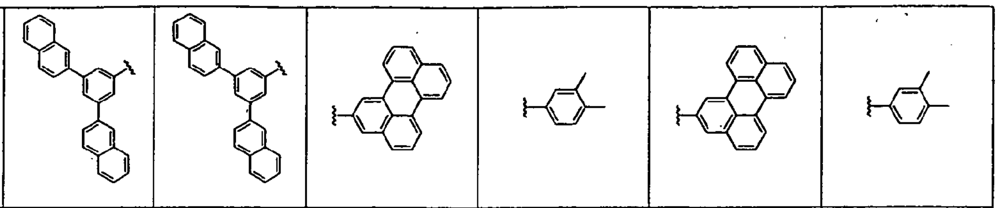
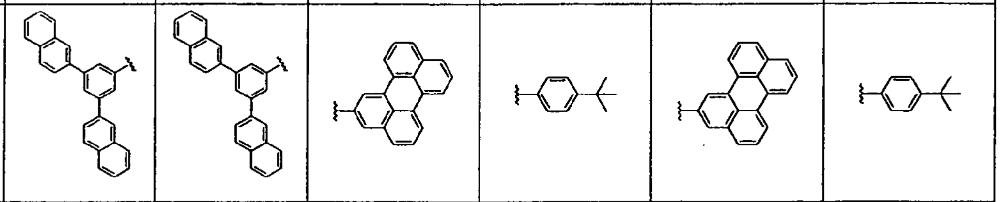
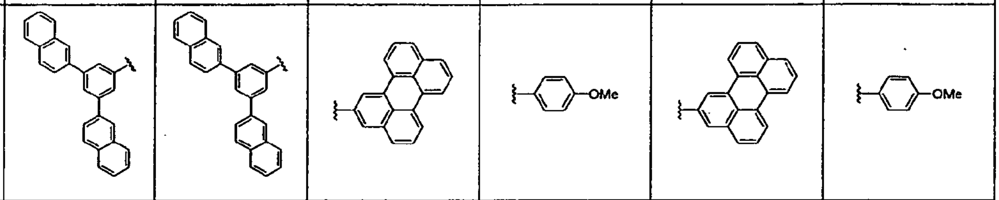
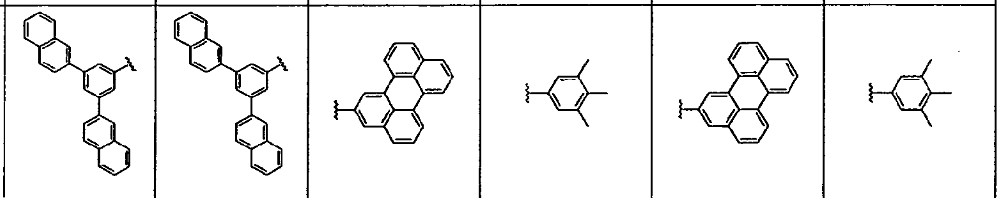
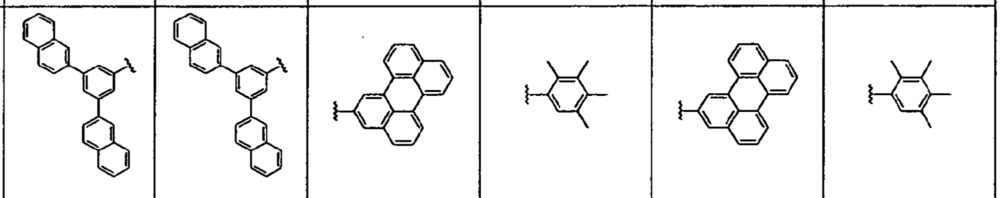
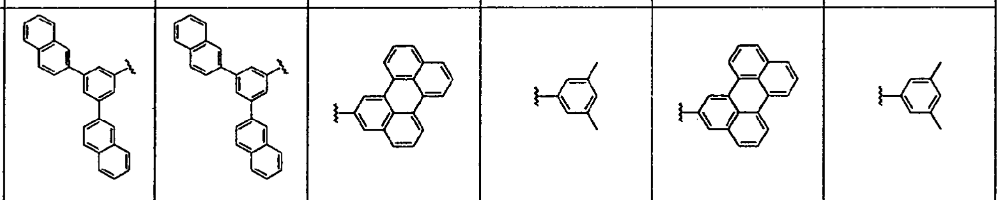
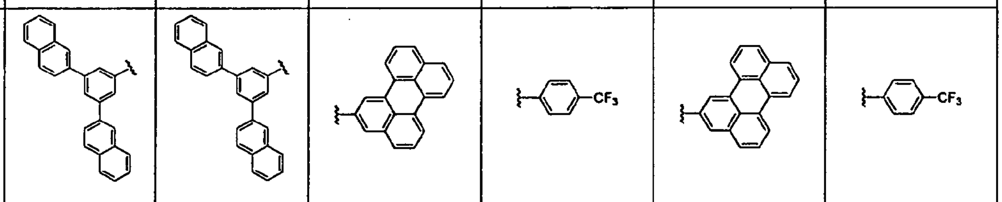
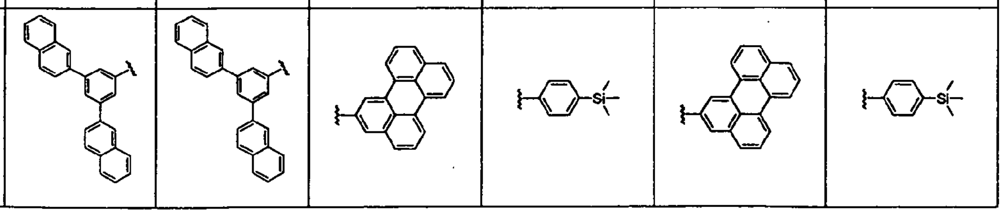
1936	
1937	
1938	
1939	
1940	
1941	
1942	
1943	

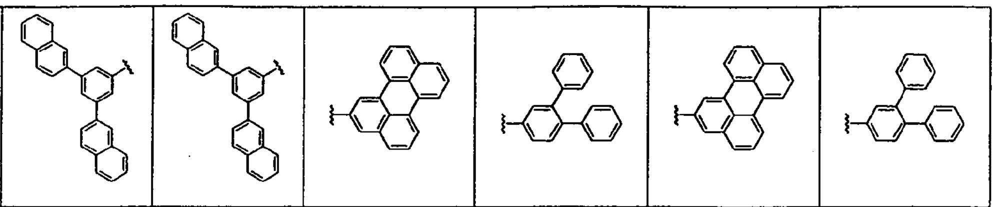
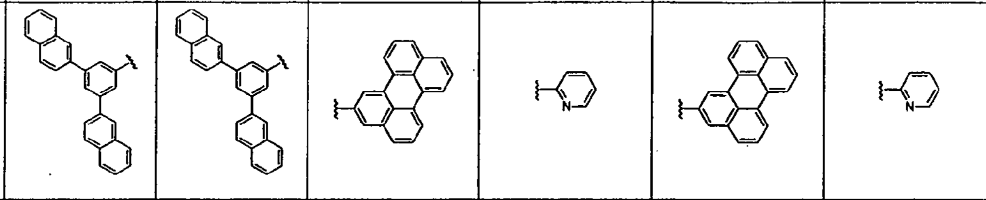
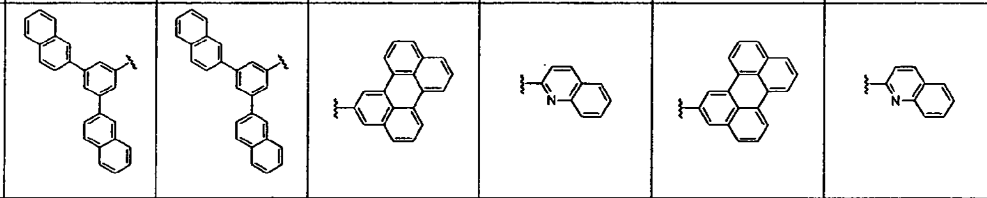
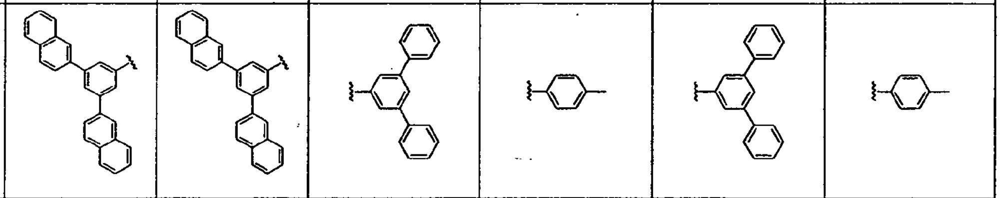
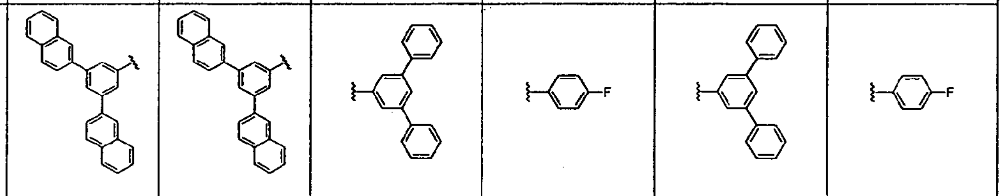
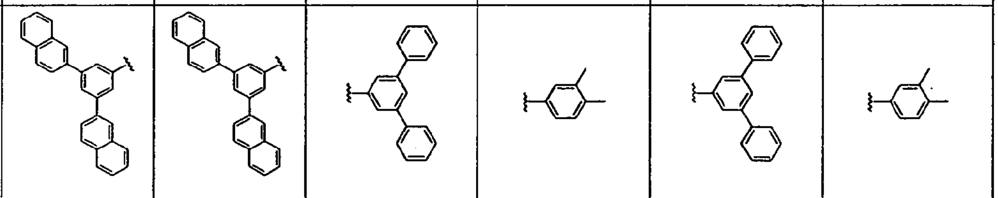
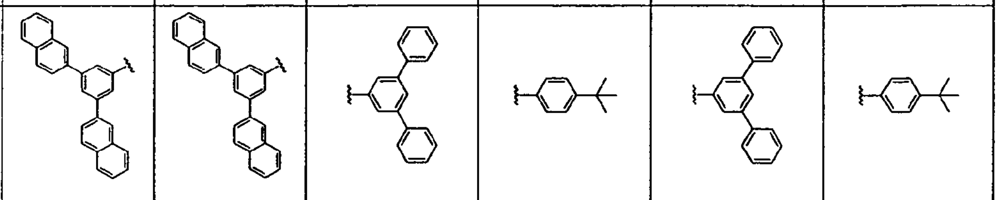
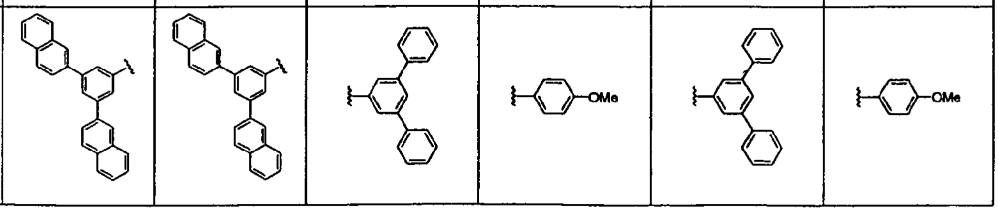
1944	
1945	
1946	
1947	
1948	
1949	
1950	
1951	

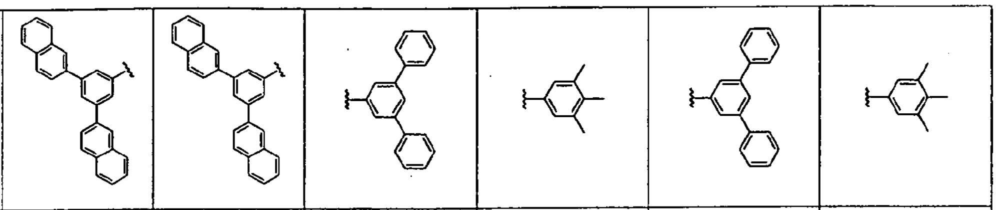
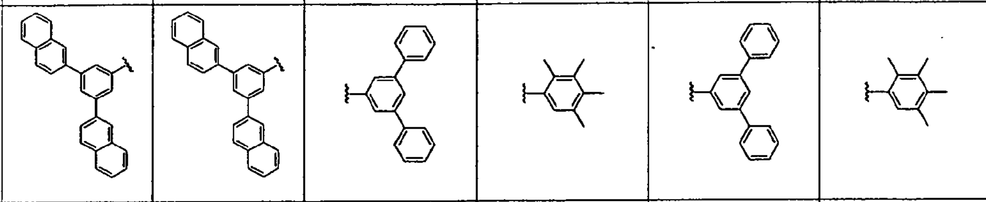
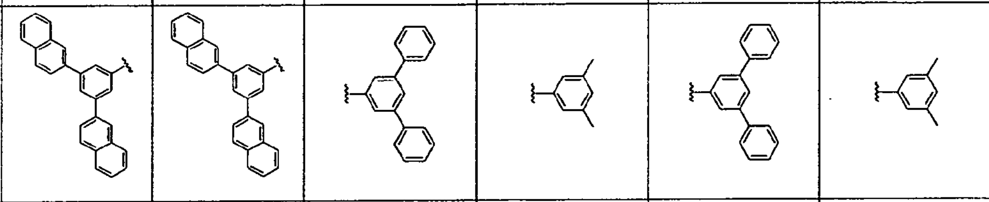
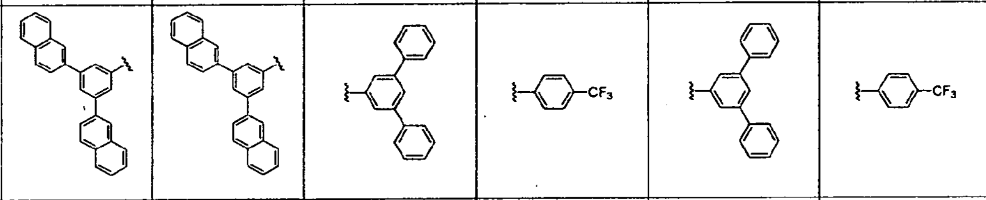
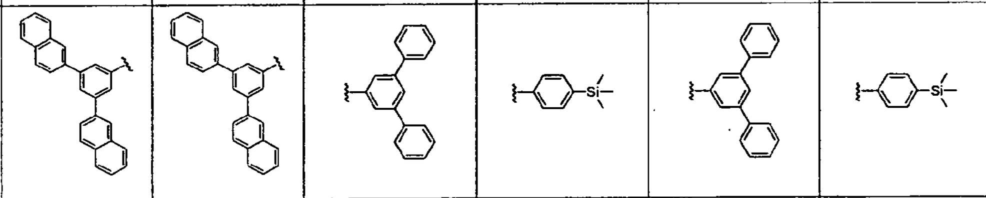
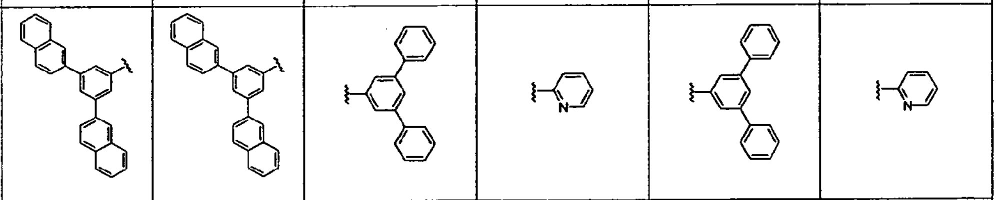
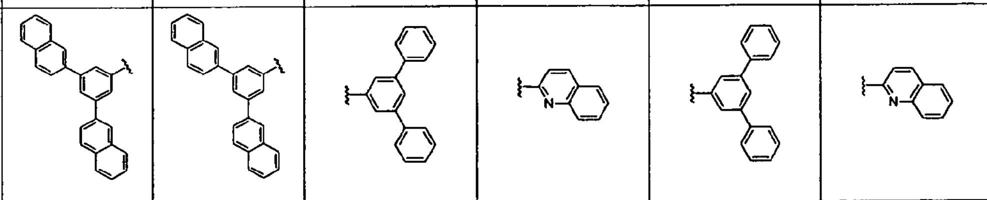
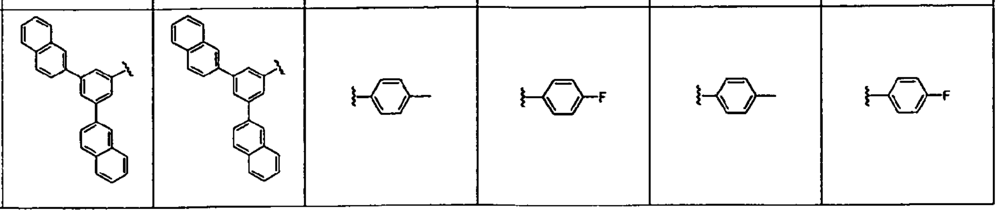
1952	
1953	
1954	
1955	
1956	
1957	
1958	
1959	

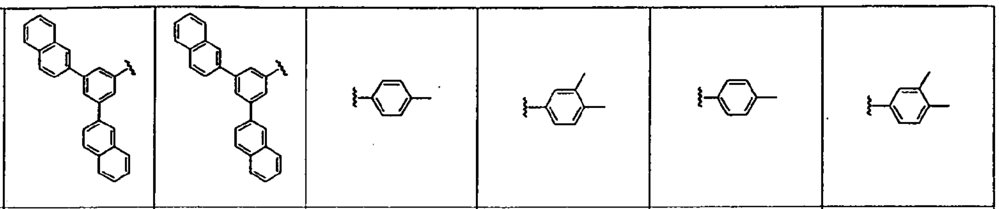
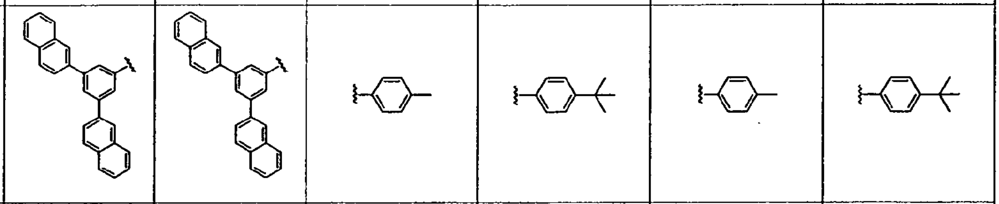
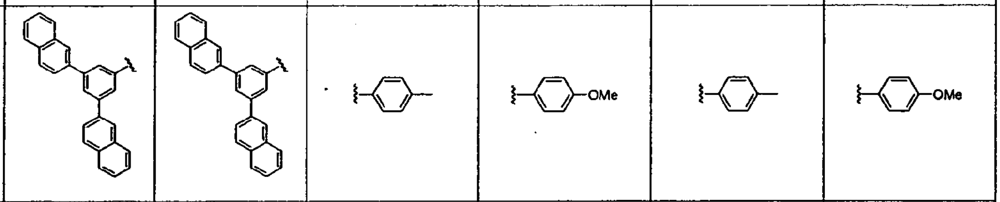
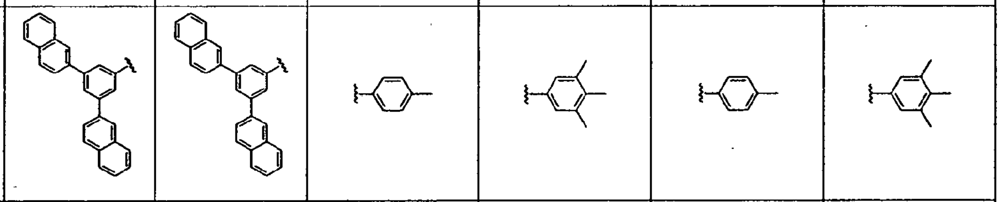
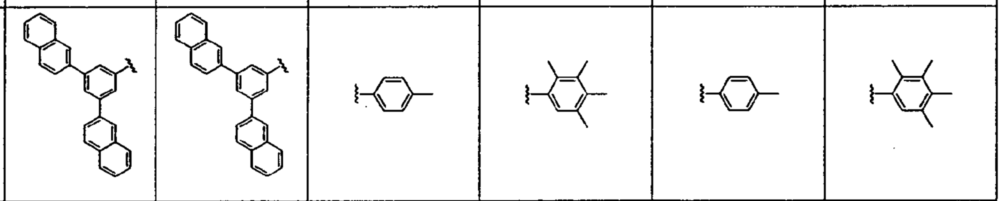
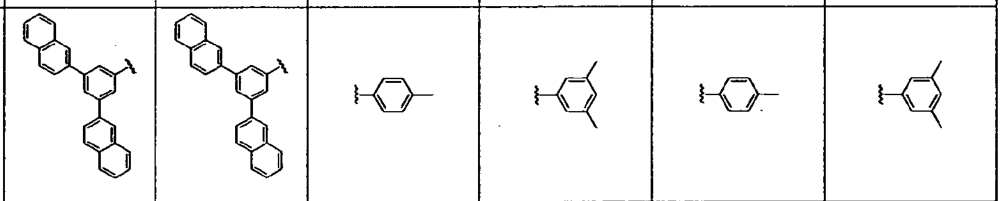
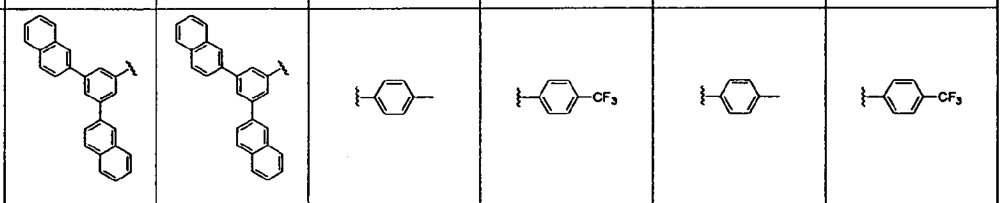
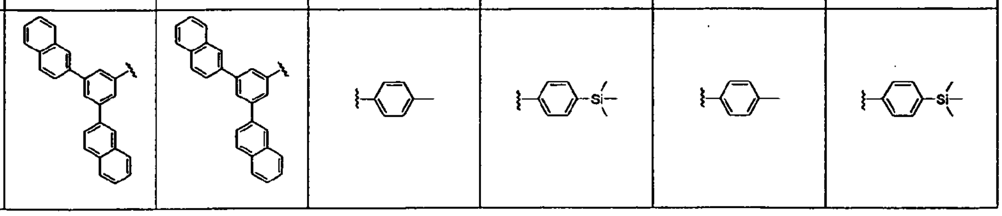
1960	
1961	
1962	
1963	
1964	
1965	
1966	
1967	

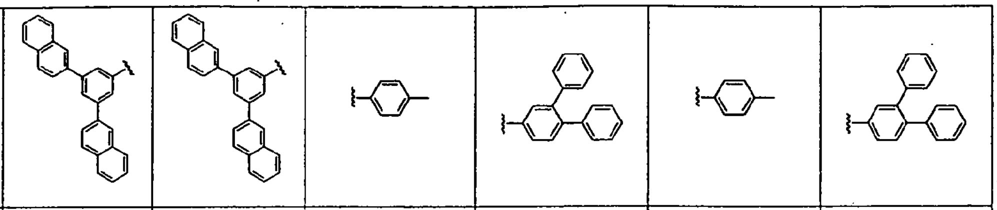
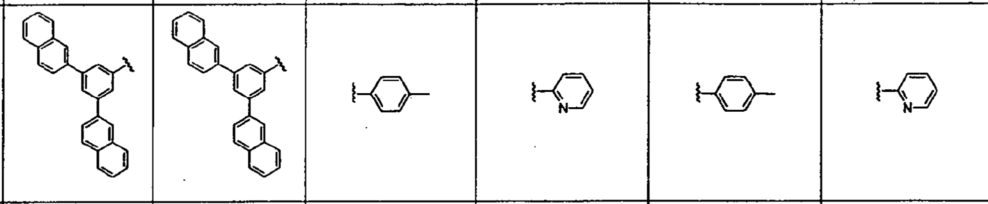
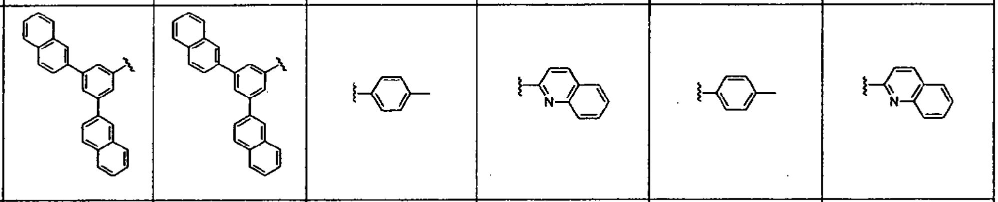
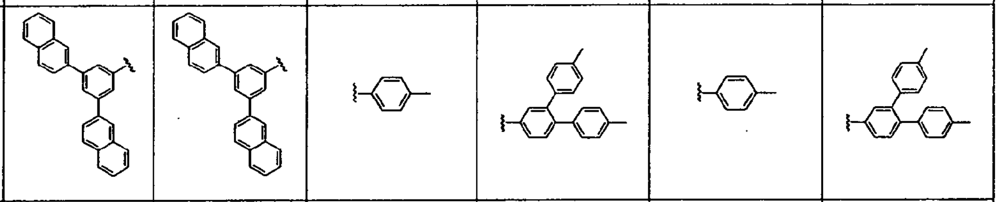
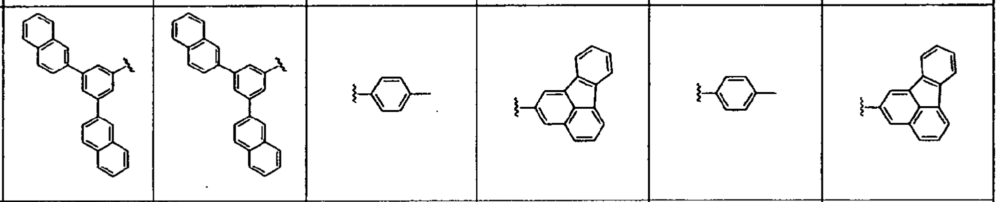
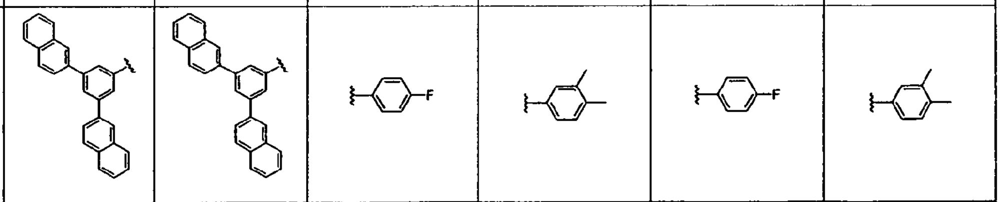
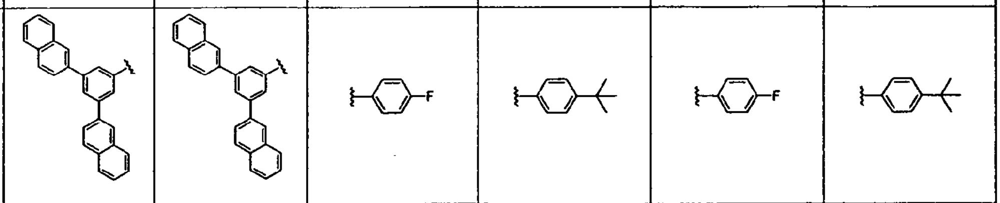
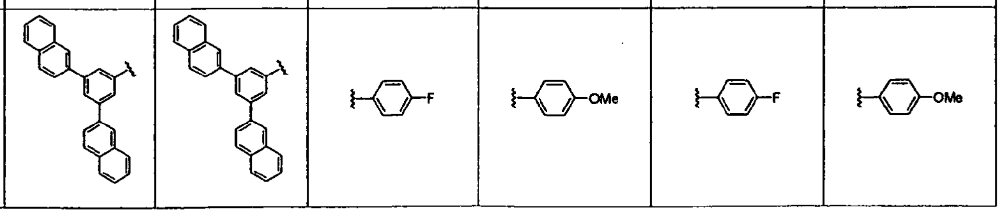
1968	
1969	
1970	
1971	
1972	
1973	
1974	
1975	

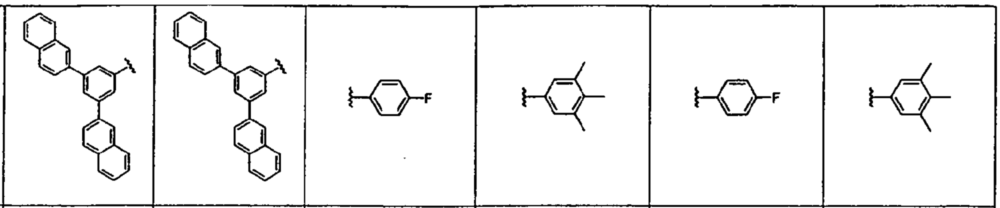
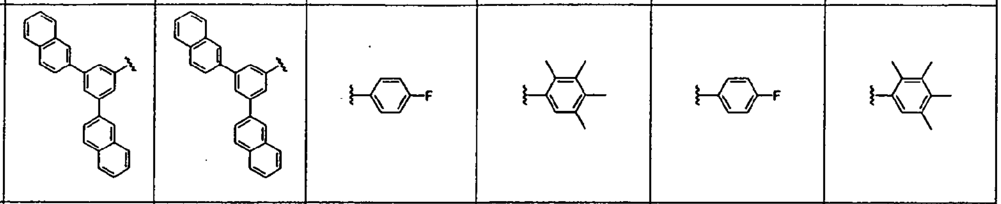
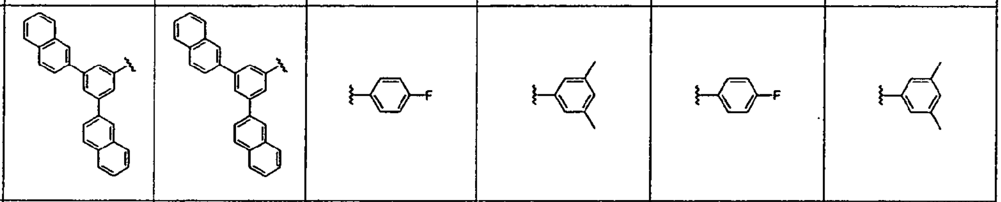
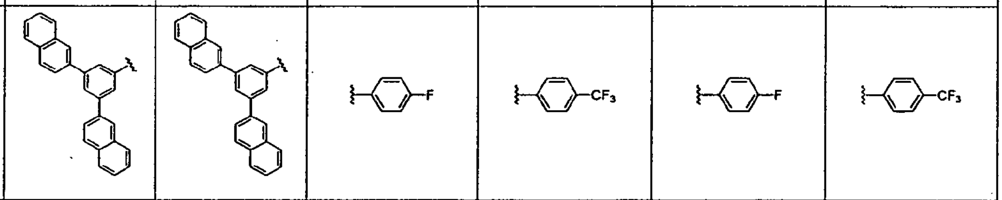
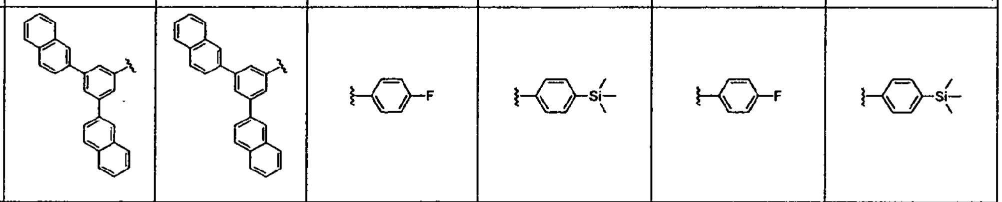
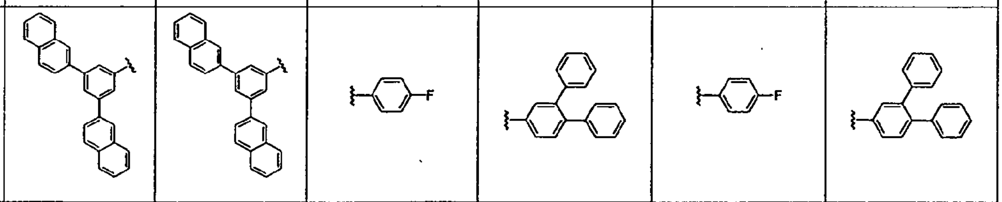
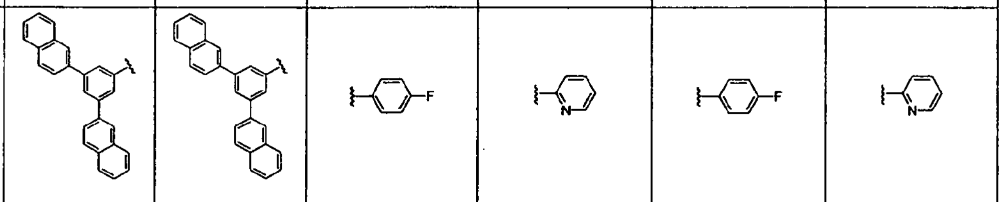
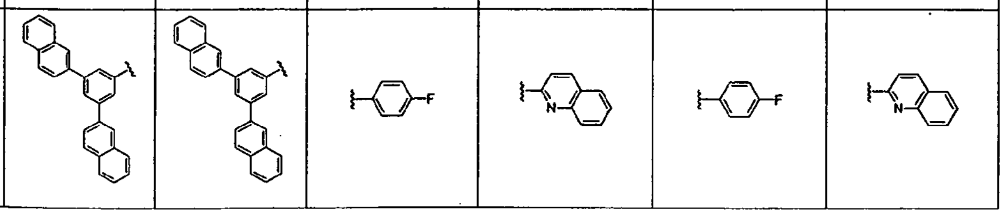
1976						
1977						
1978						
1979						
1980						
1981						
1982						
1983						

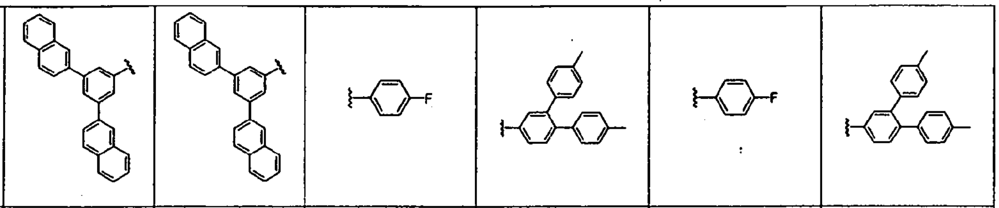
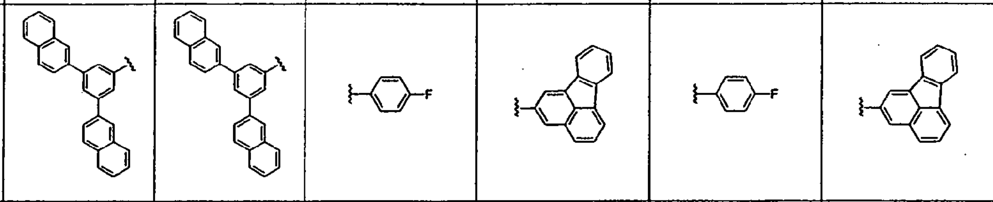
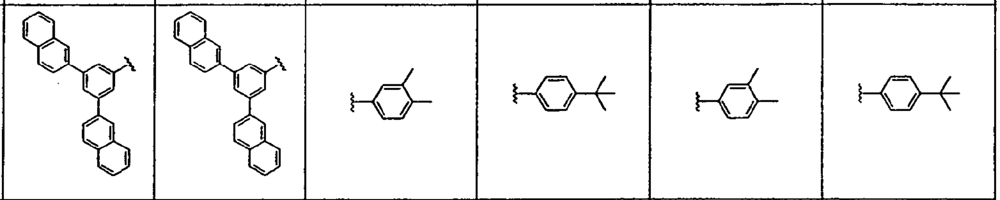
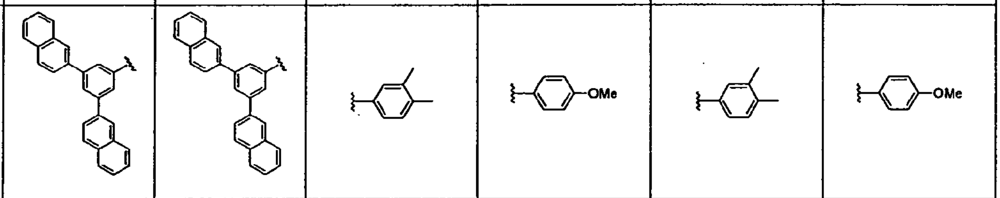
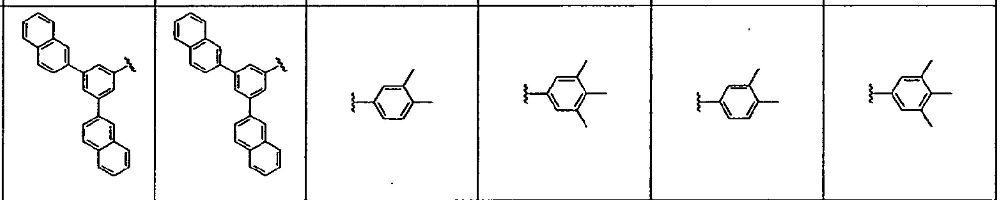
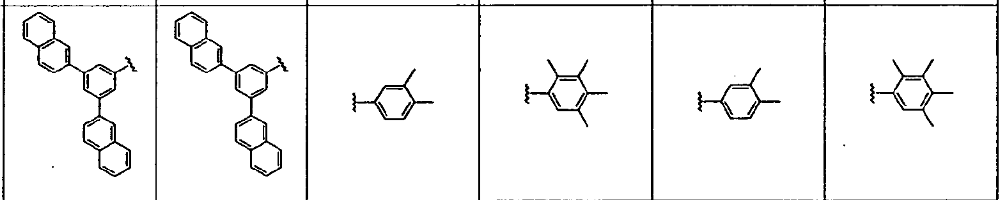
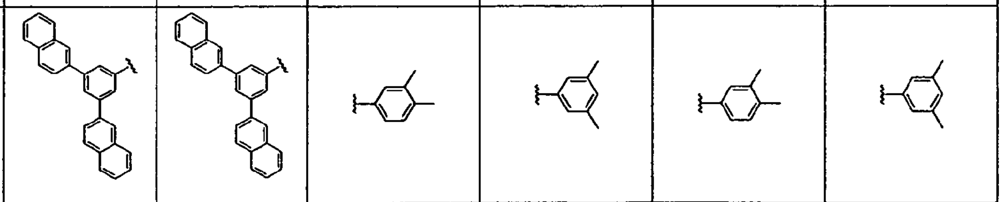
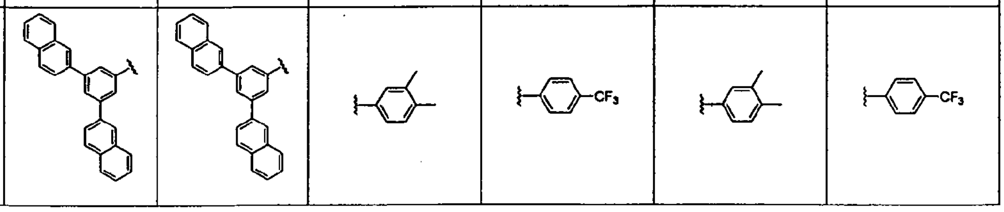
1984						
1985						
1986						
1987						
1988						
1989						
1990						
1991						

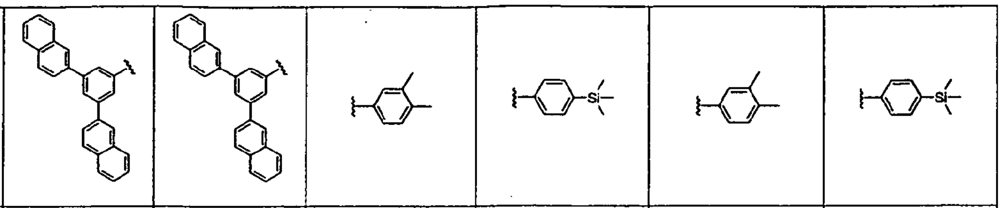
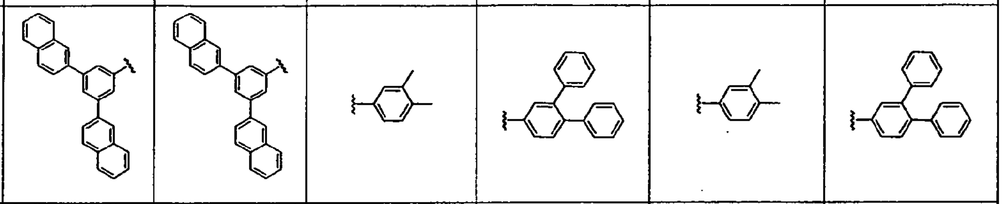
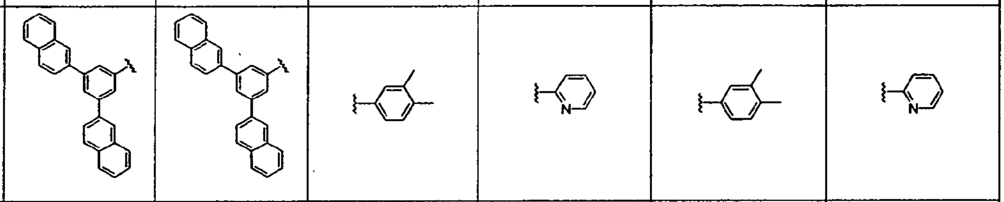
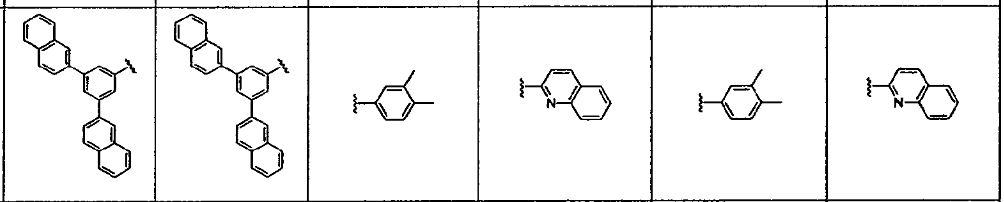
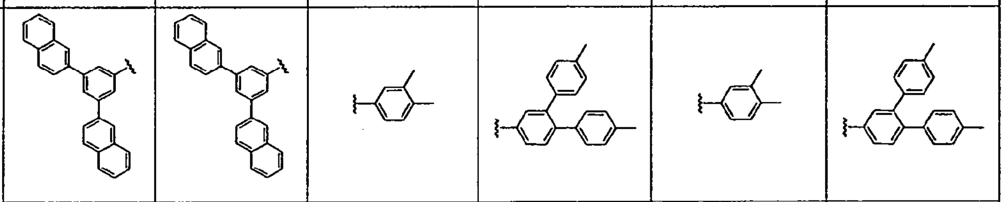
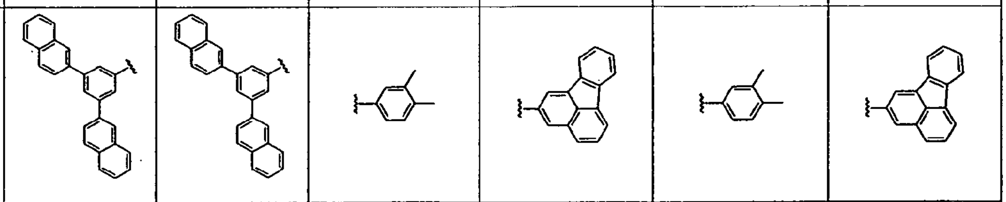
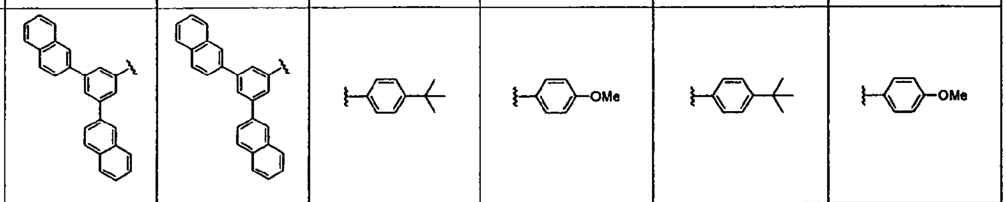
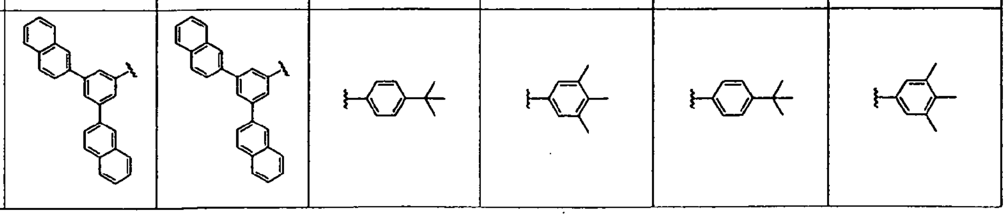
1992	
1993	
1994	
1995	
1996	
1997	
1998	
1999	

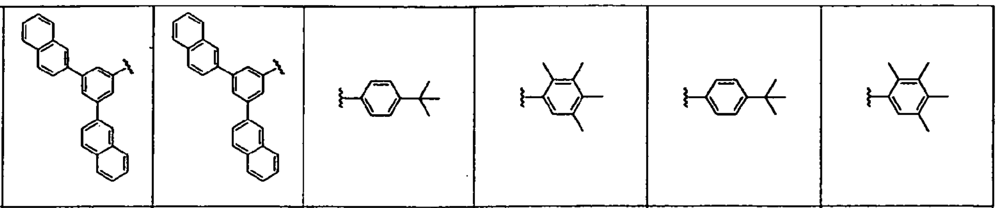
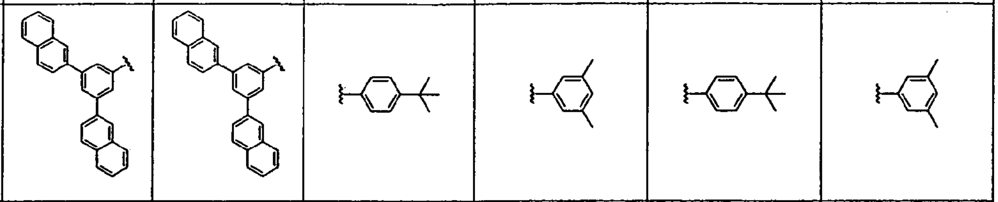
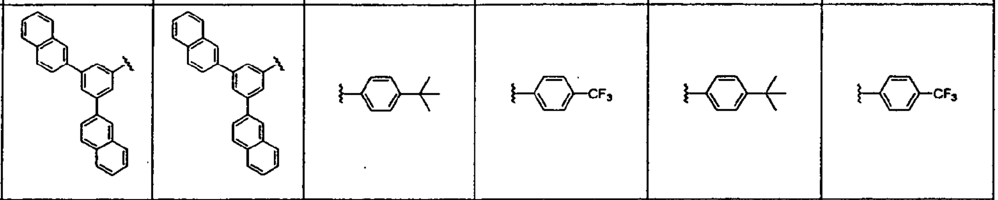
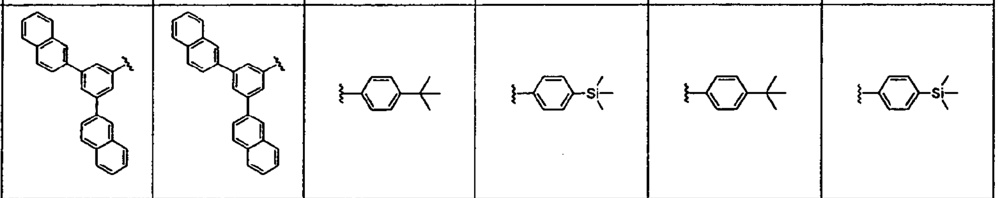
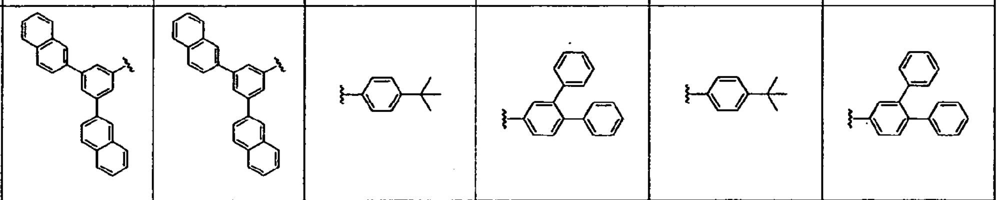
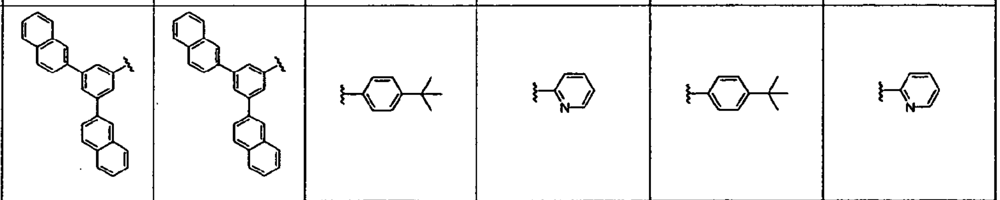
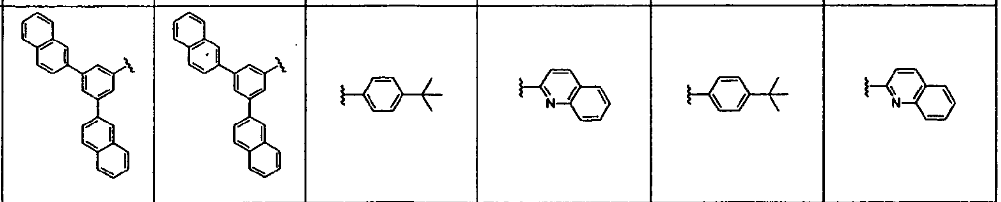
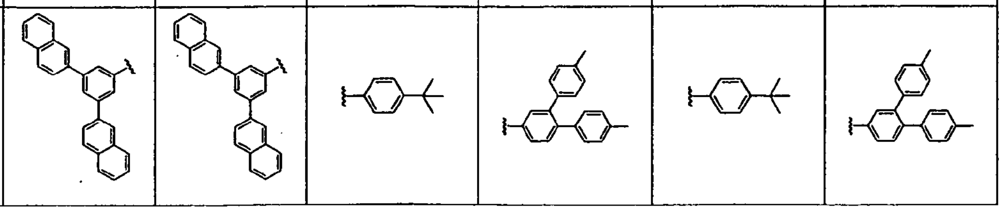
2000	
2001	
2002	
2003	
2004	
2005	
2006	
2007	

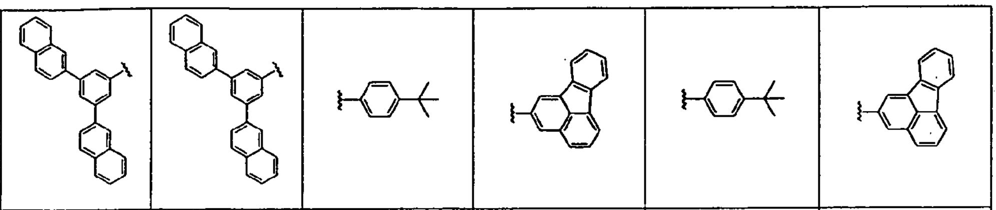
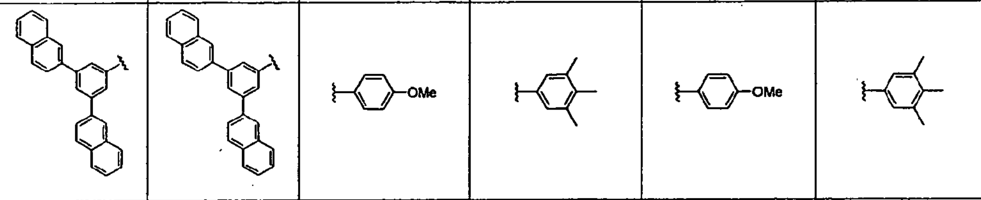
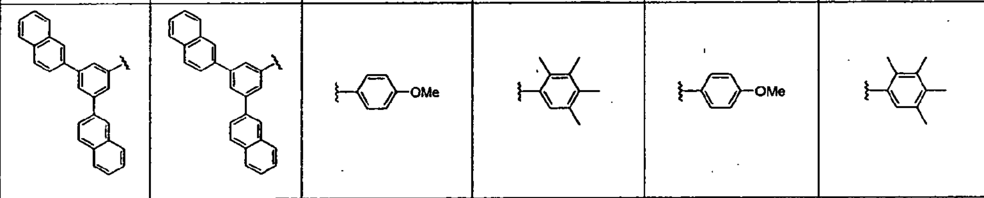
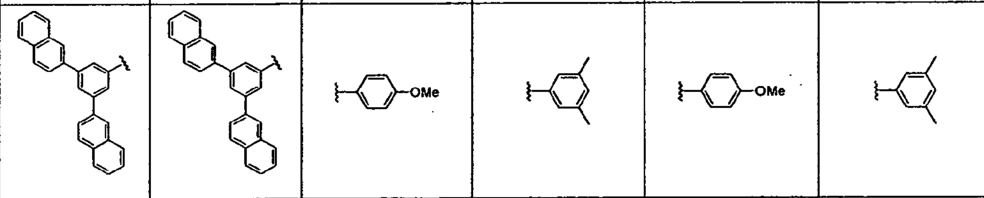
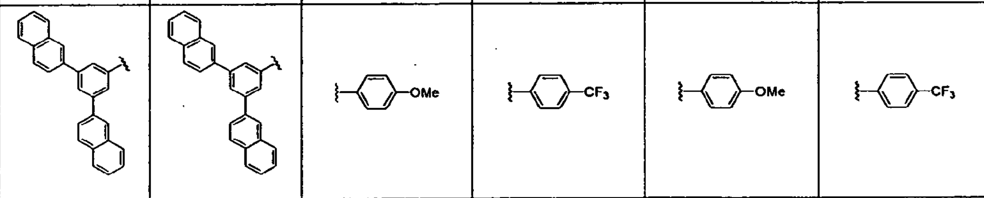
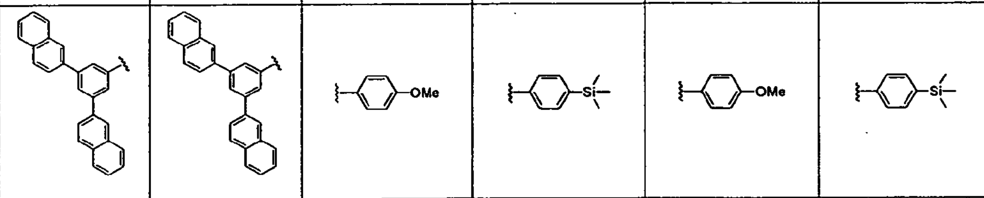
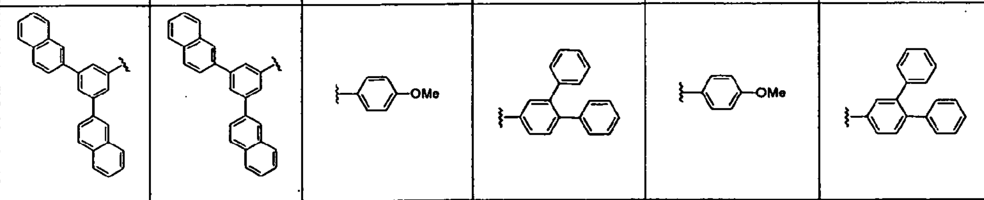
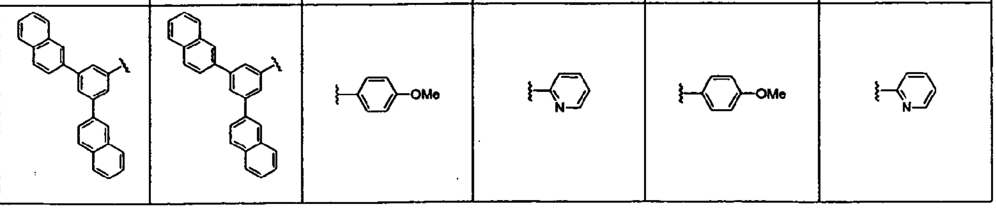
2008	
2009	
2010	
2011	
2012	
2013	
2014	
2015	

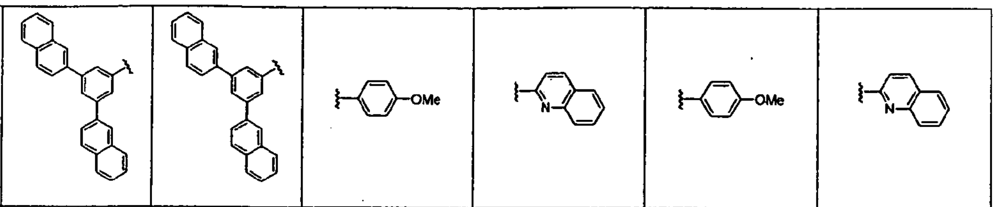
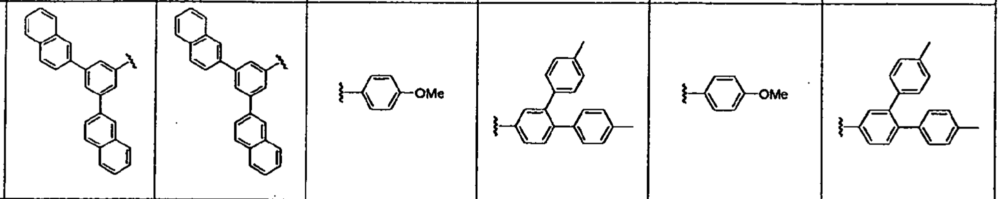
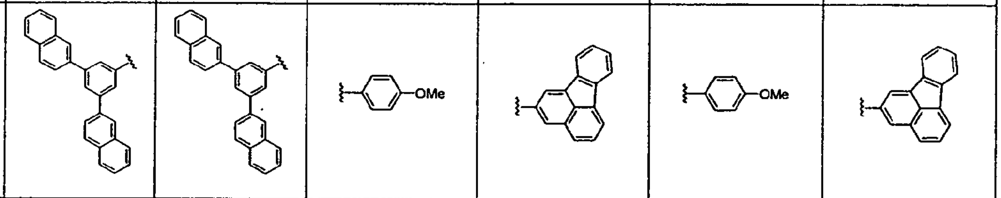
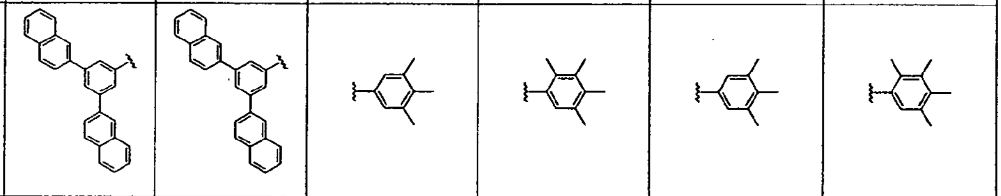
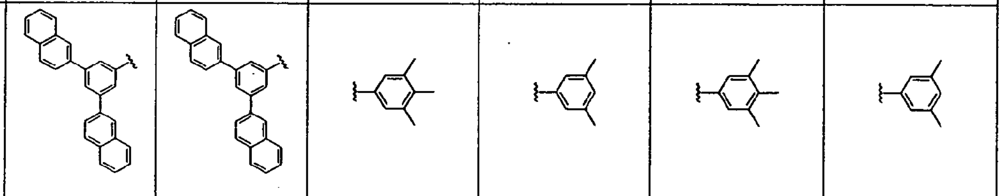
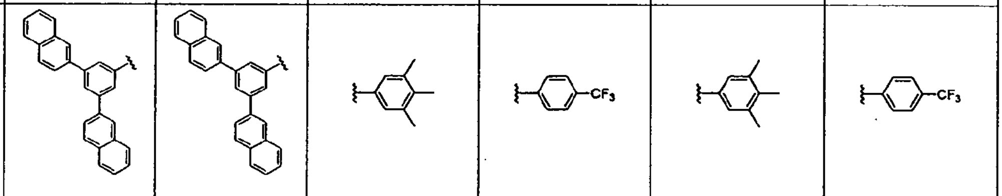
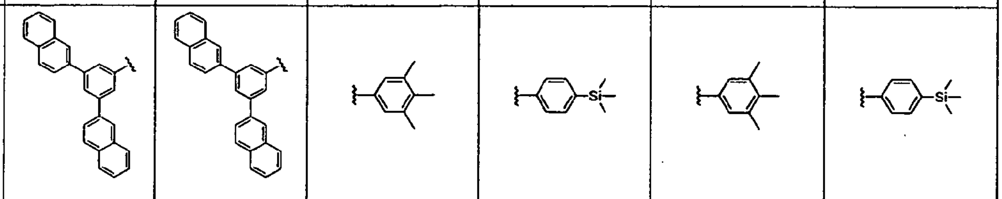
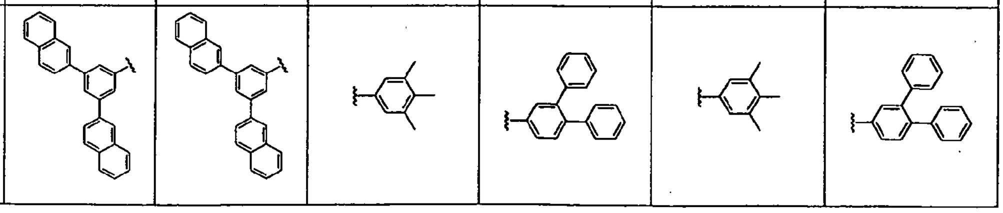
2016	
2017	
2018	
2019	
2020	
2021	
2022	
2023	

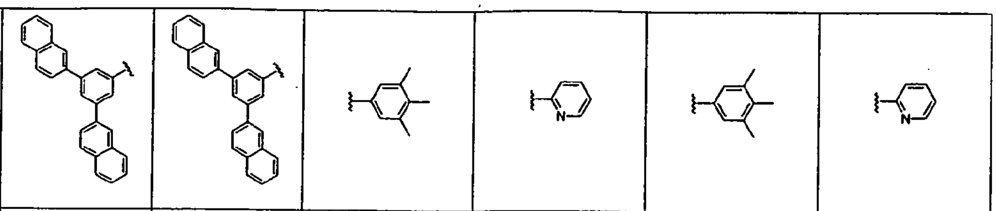
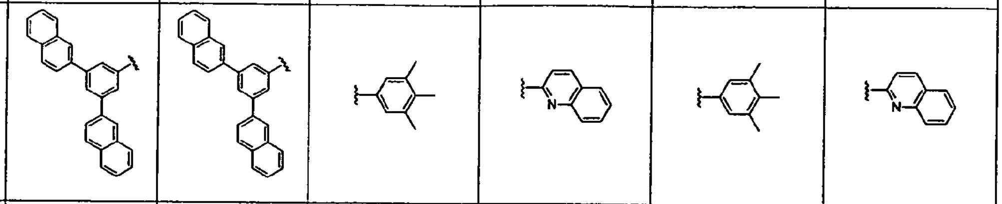
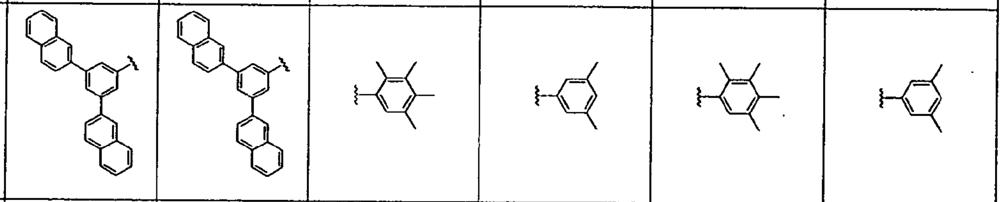
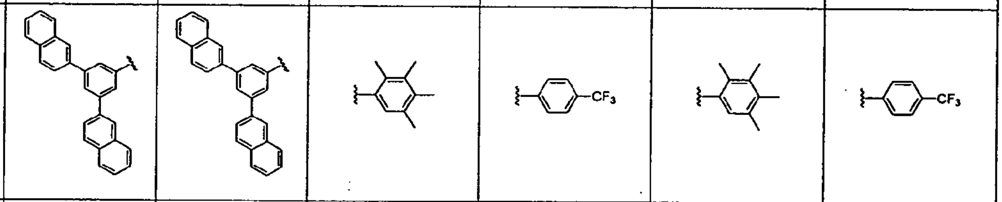
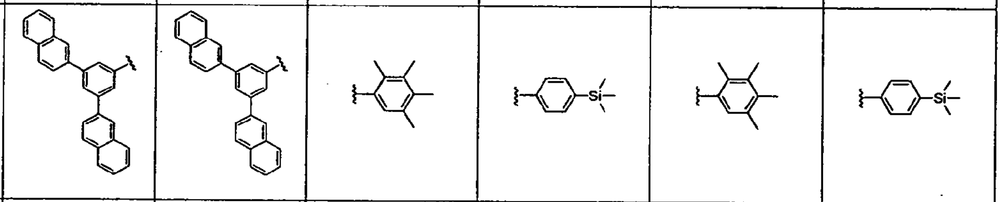
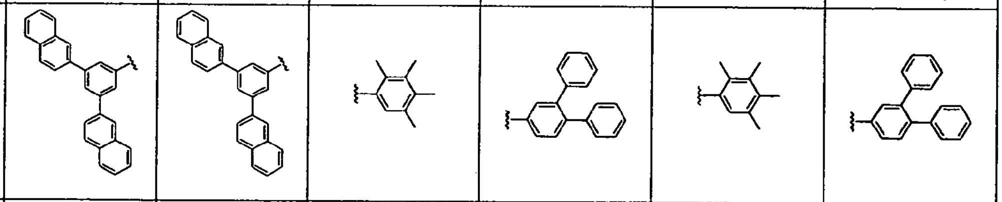
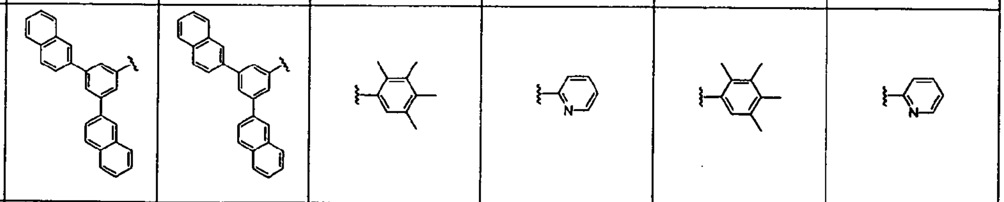
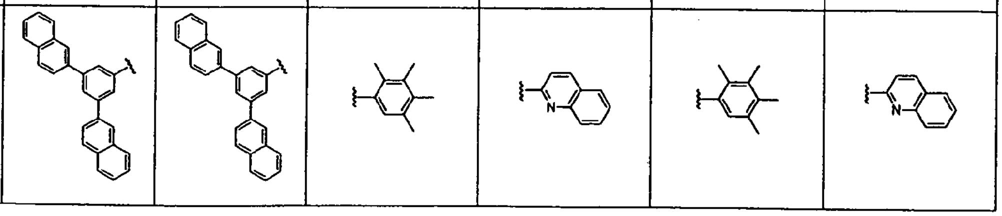
2024	
2025	
2026	
2027	
2028	
2029	
2030	
2031	

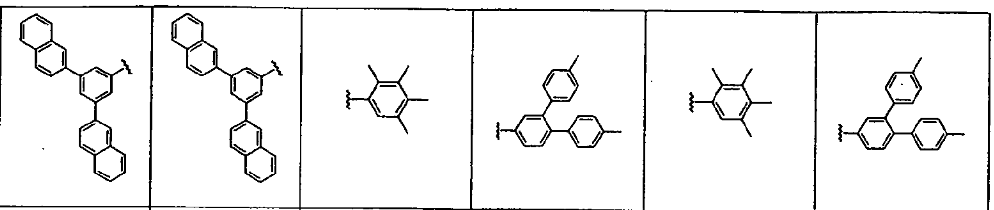
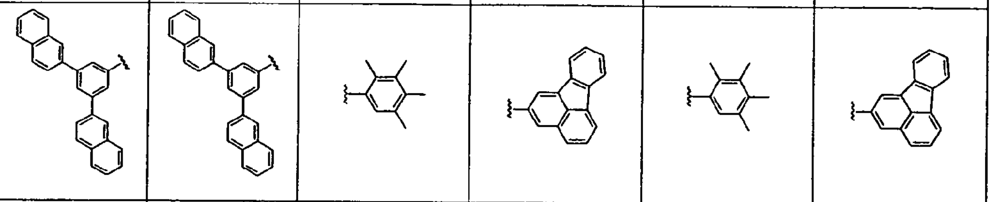
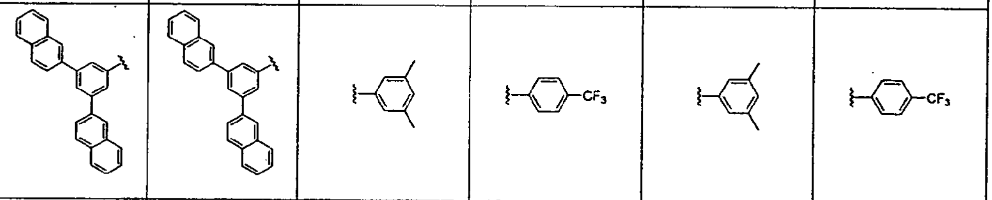
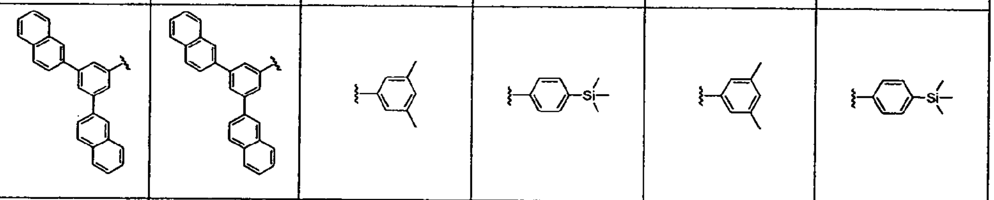
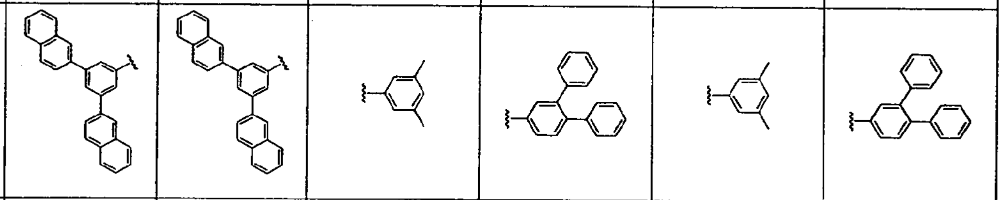
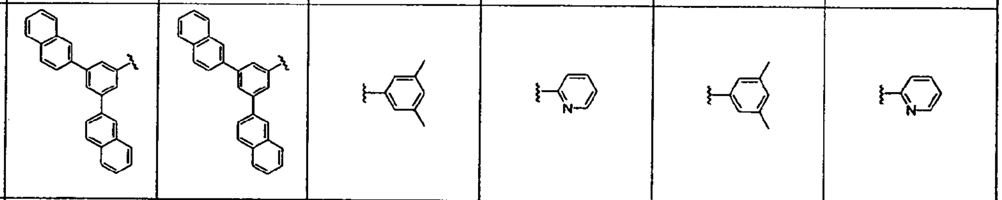
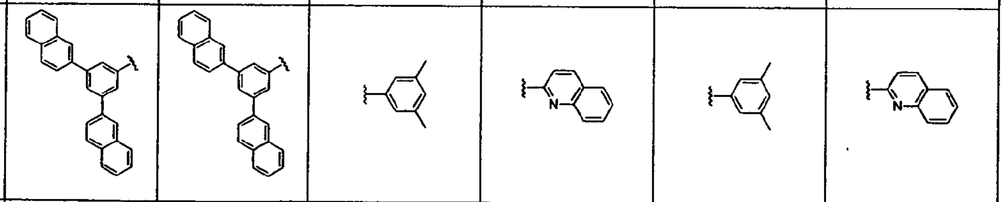
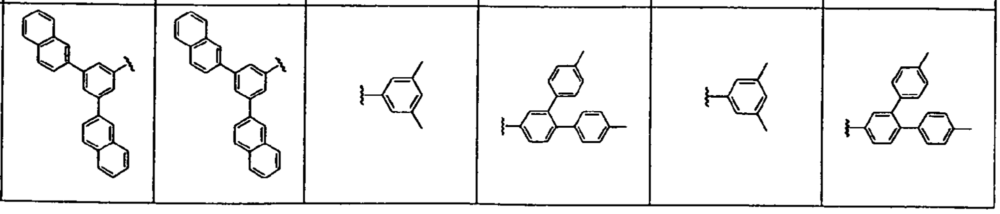
2032	
2033	
2034	
2035	
2036	
2037	
2038	
2039	

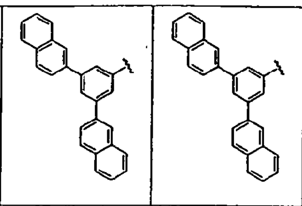
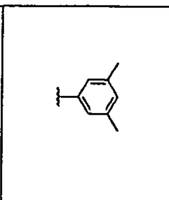
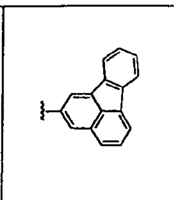
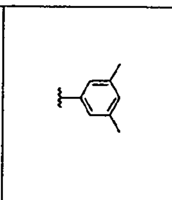
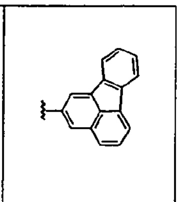
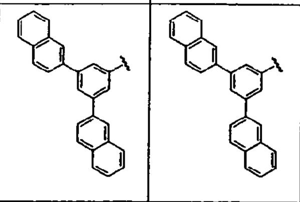
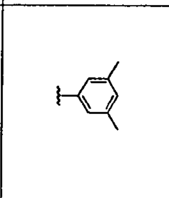
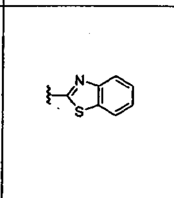
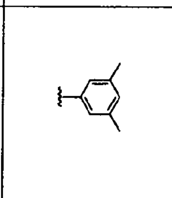
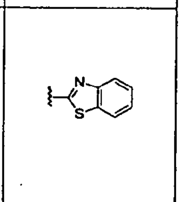
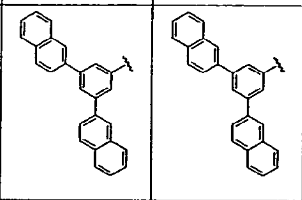
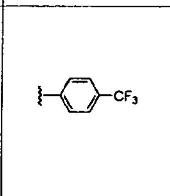
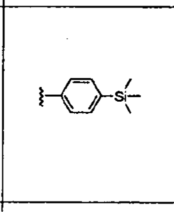
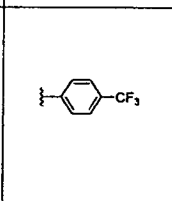
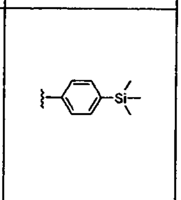
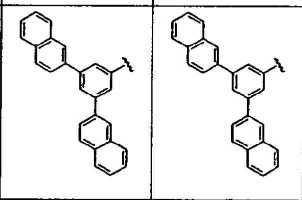
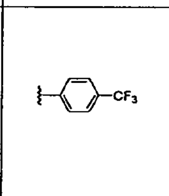
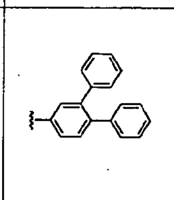
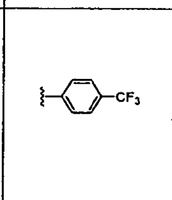
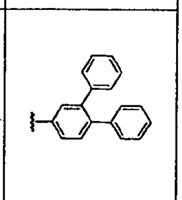
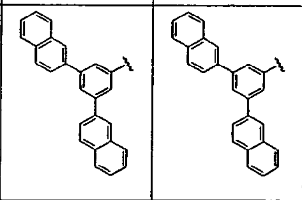
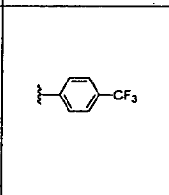
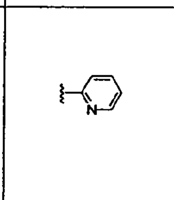
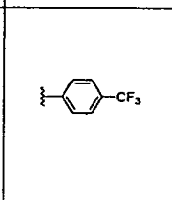
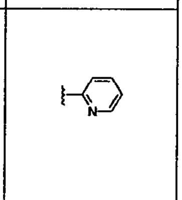
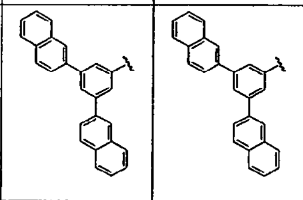
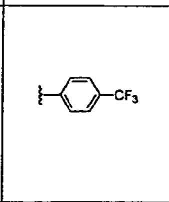
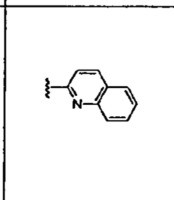
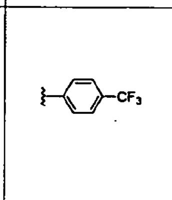
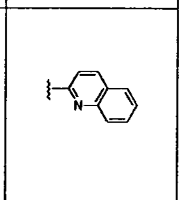
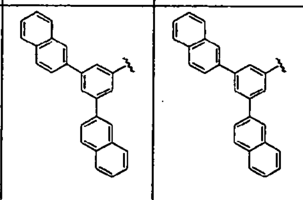
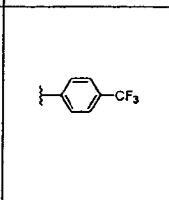
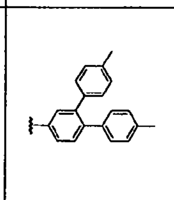
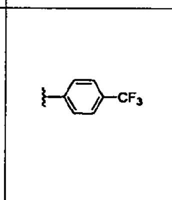
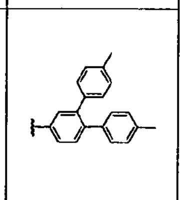
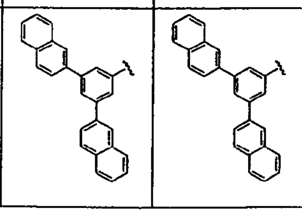
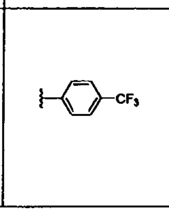
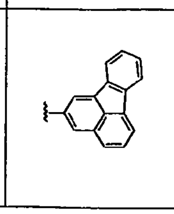
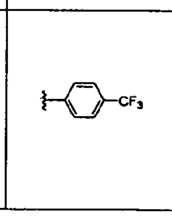
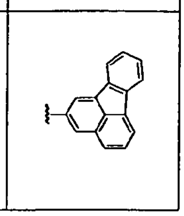
2040	
2041	
2042	
2043	
2044	
2045	
2046	
2047	

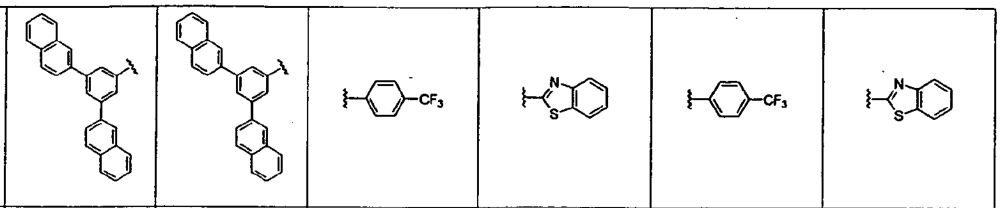
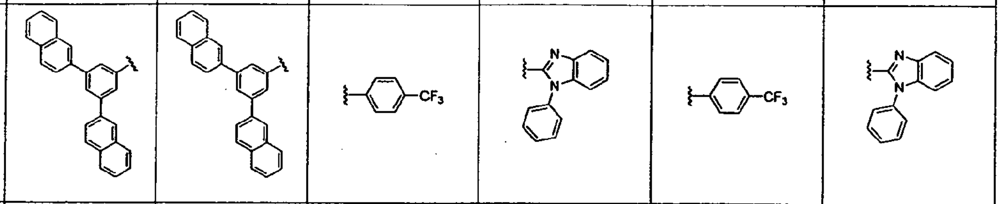
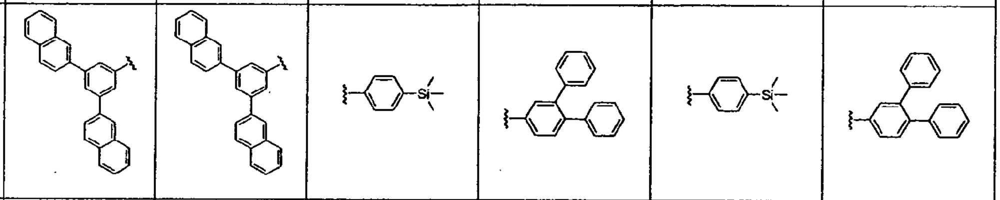
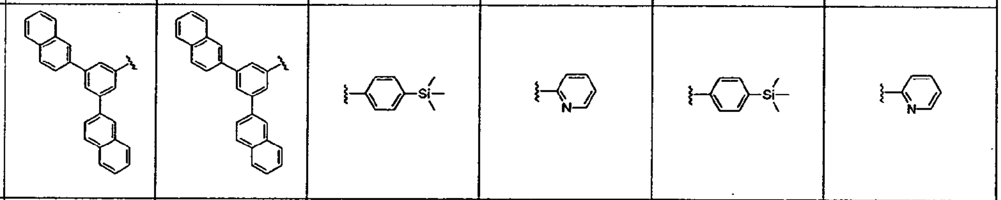
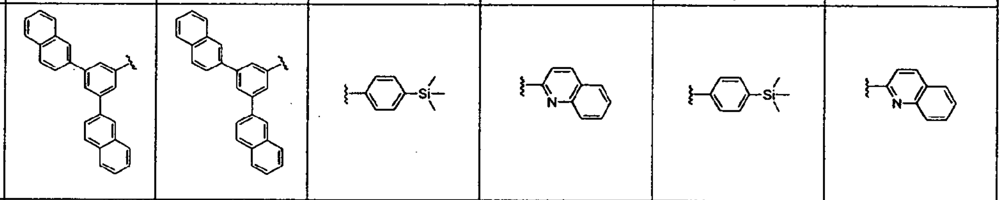
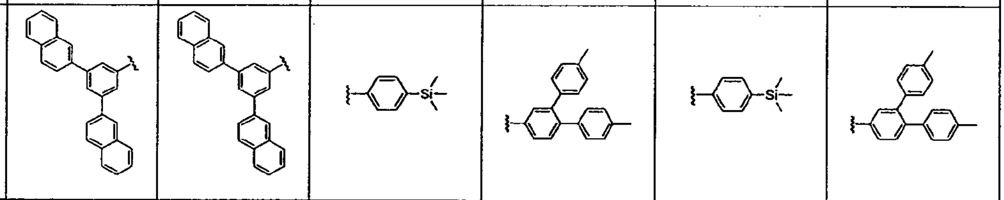
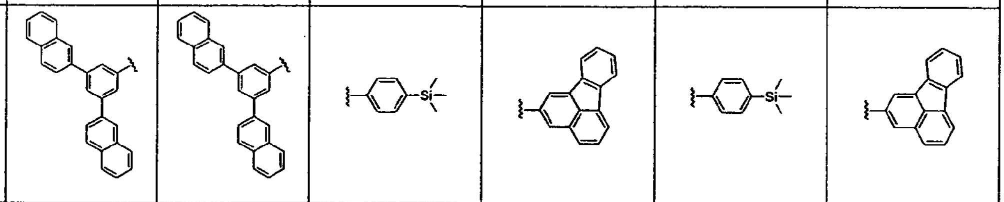
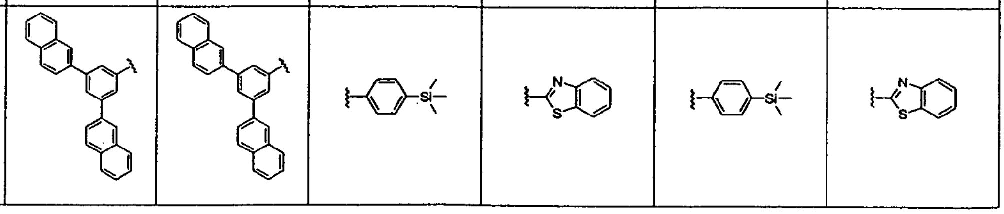
2048	
2049	
2050	
2051	
2052	
2053	
2054	
2055	

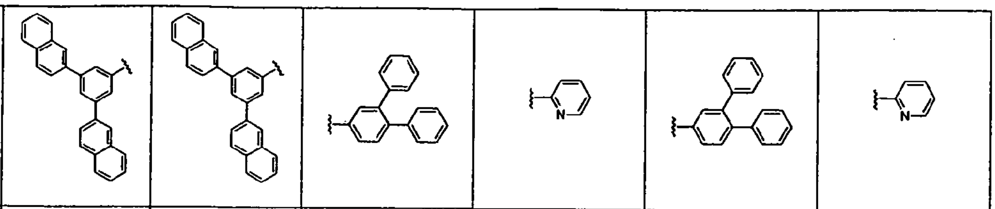
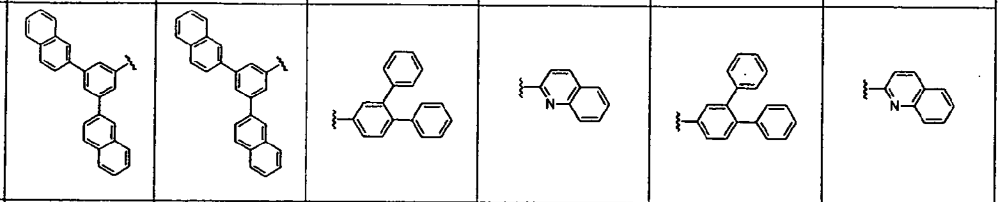
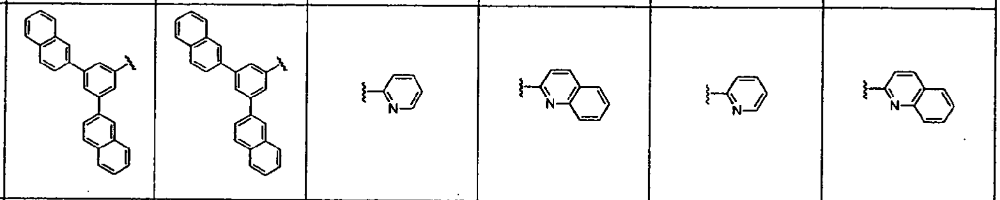
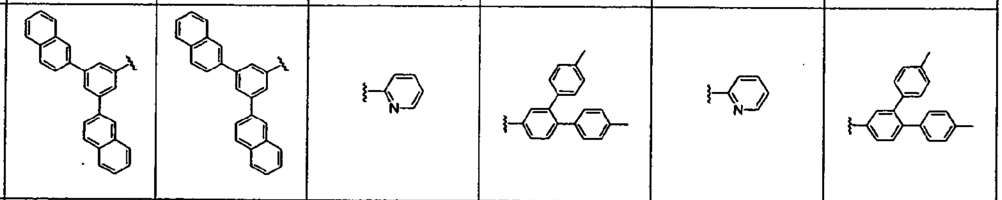
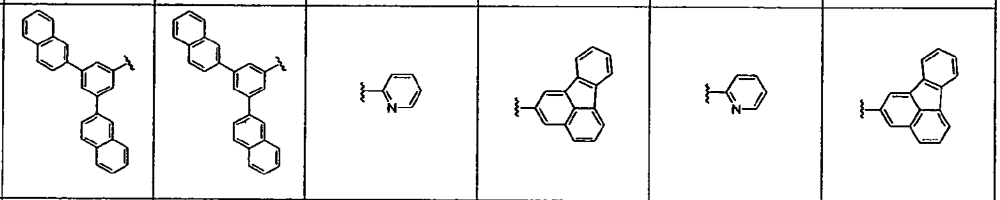
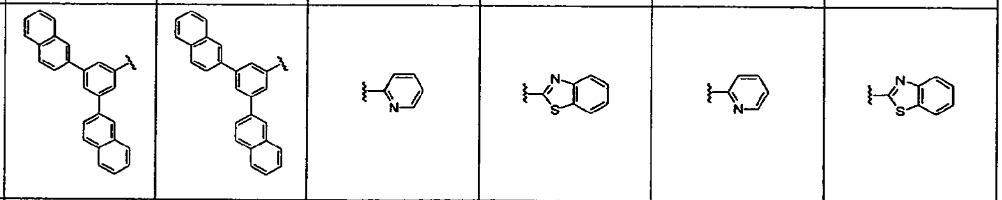
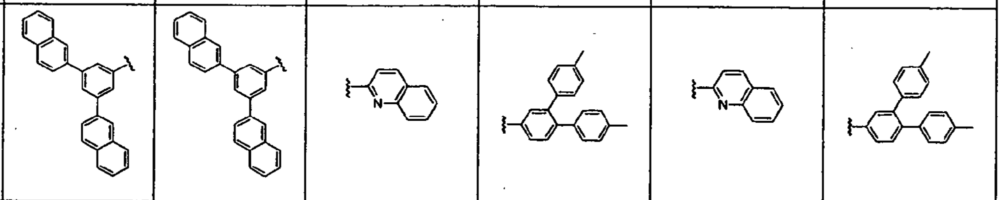
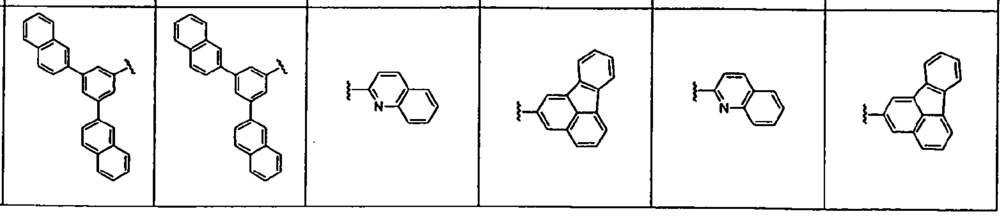
2056	
2057	
2058	
2059	
2060	
2061	
2062	
2063	

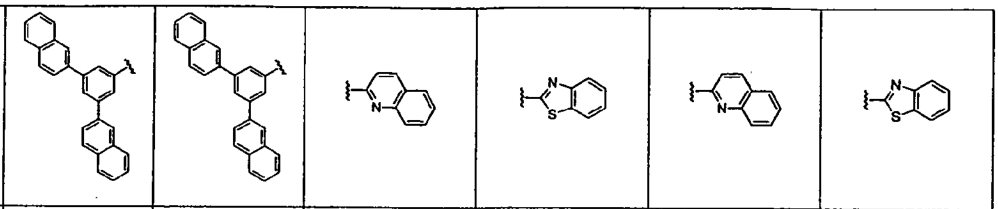
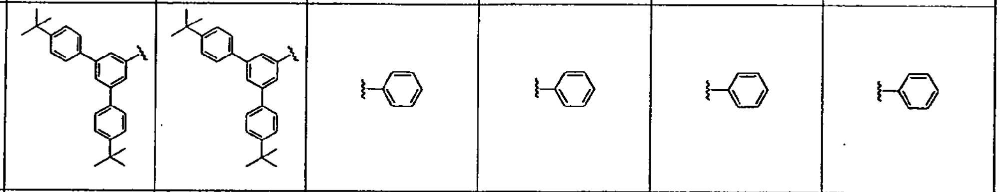
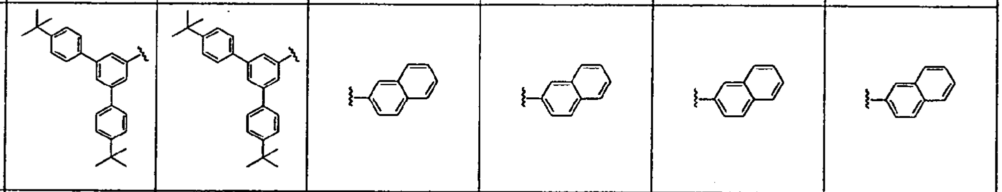
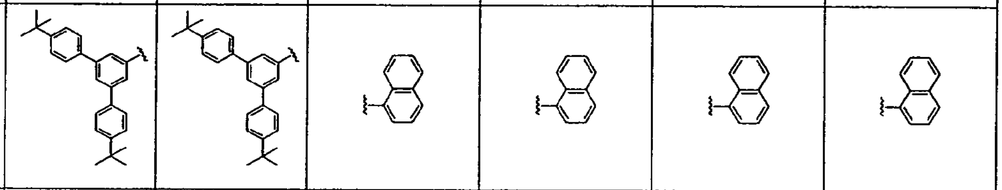
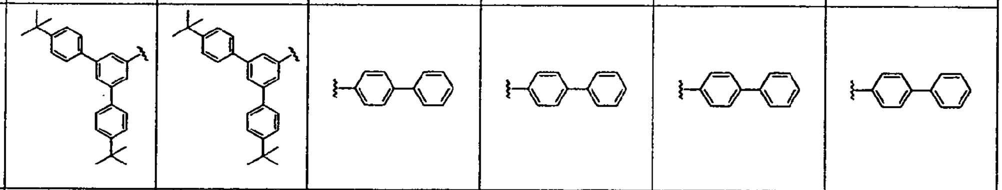
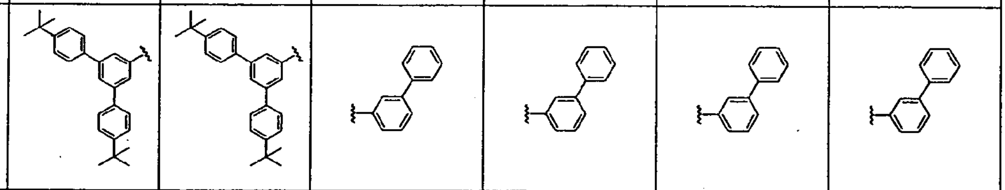
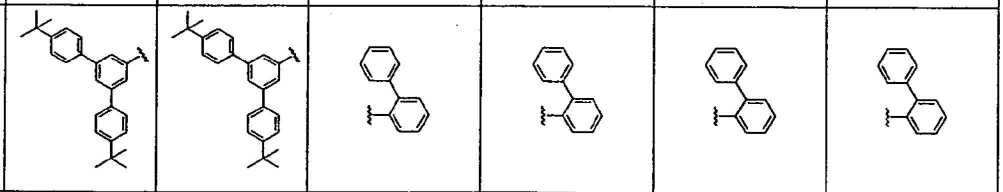
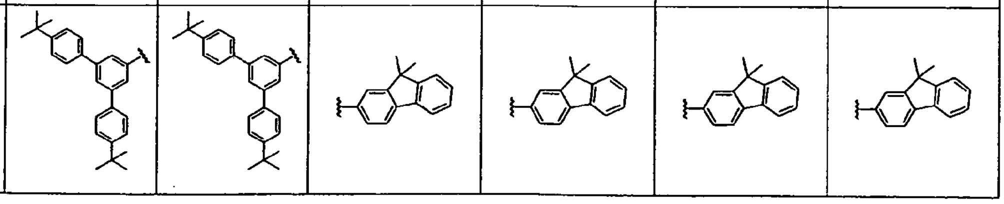
2064	
2065	
2066	
2067	
2068	
2069	
2070	
2071	

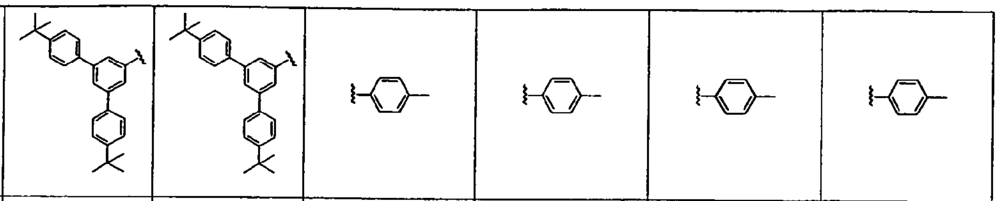
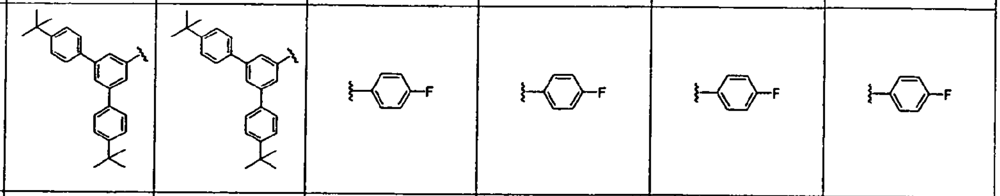
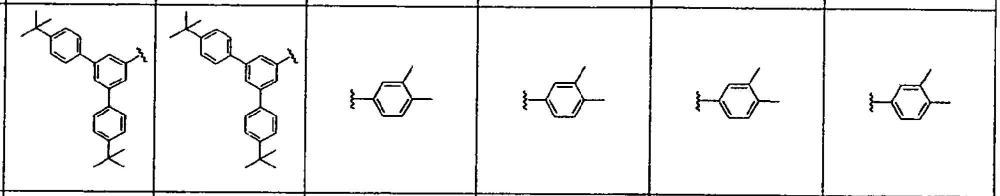
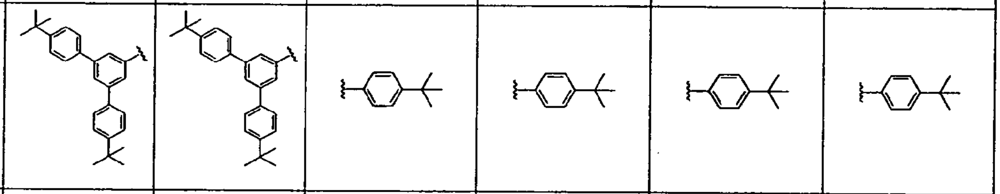
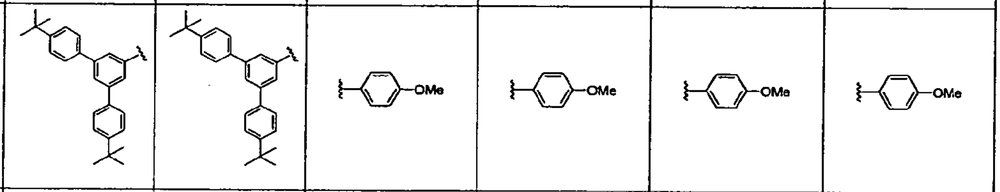
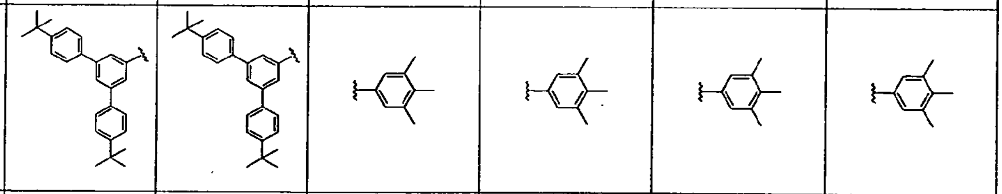
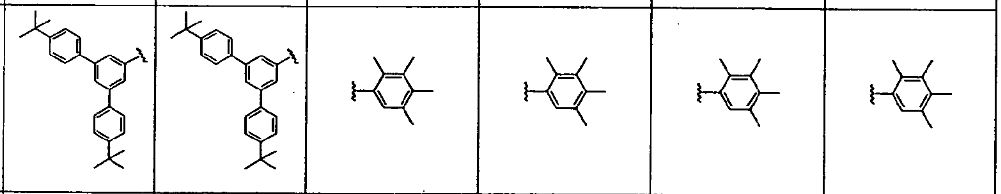
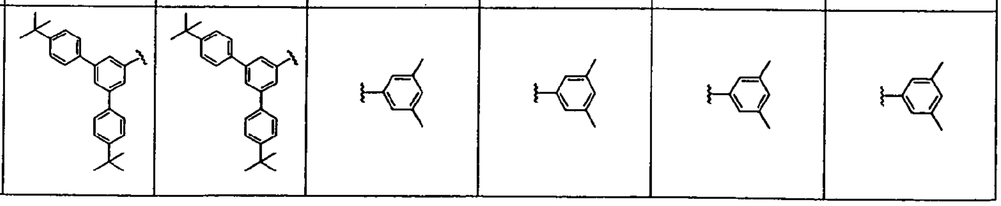
2072	
2073	
2074	
2075	
2076	
2077	
2078	
2079	

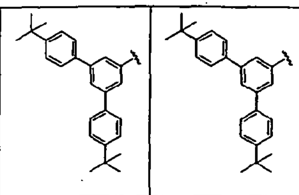
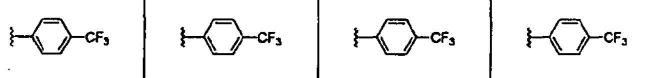
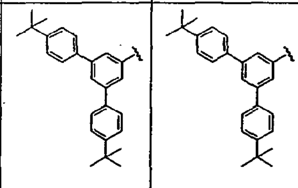
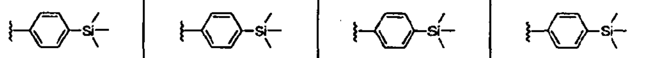
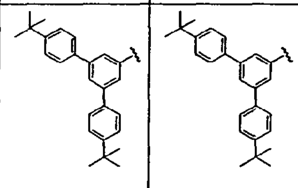
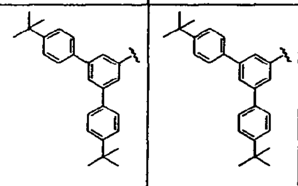
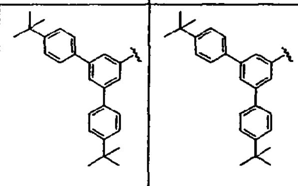
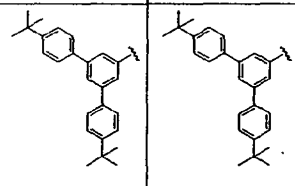
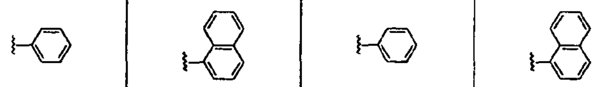
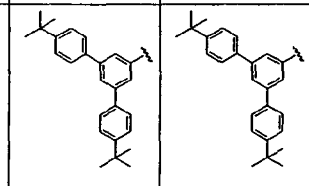
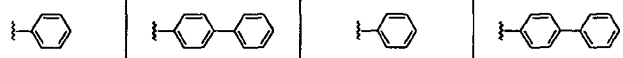
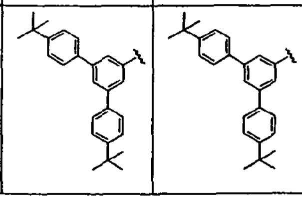
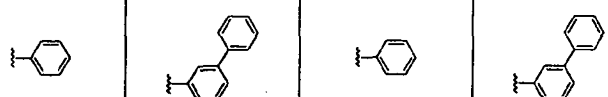
2080						
2081						
2082						
2083						
2084						
2085						
2086						
2087						

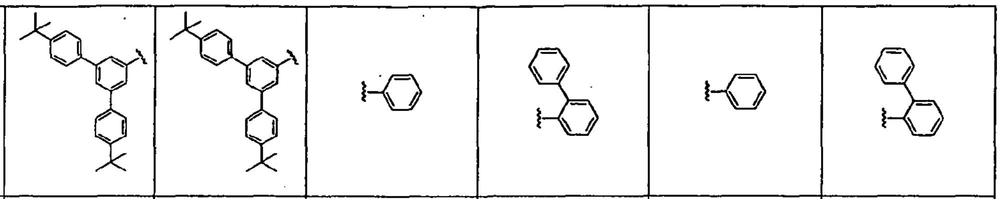
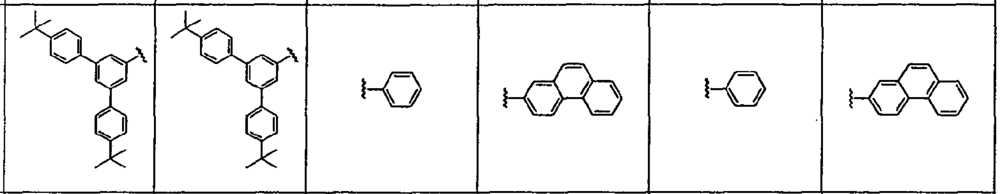
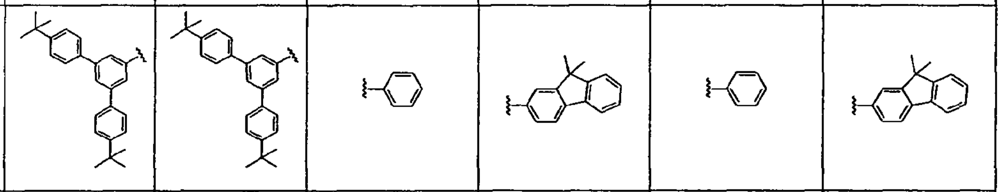
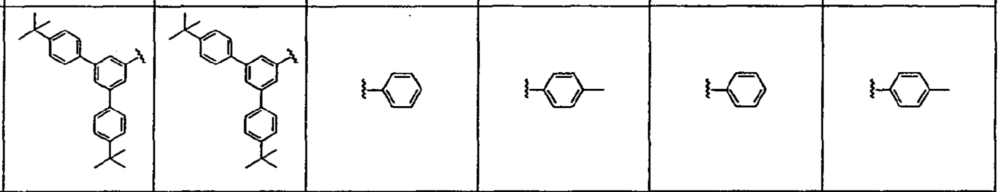
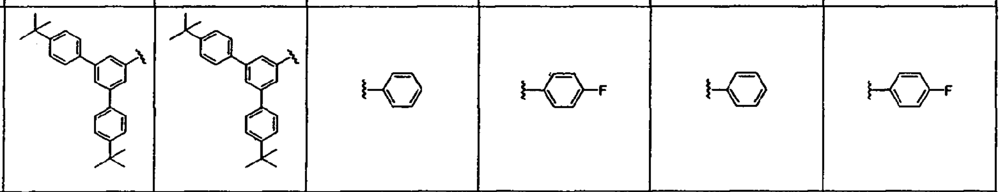
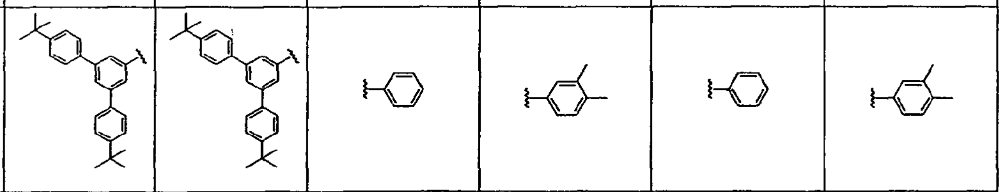
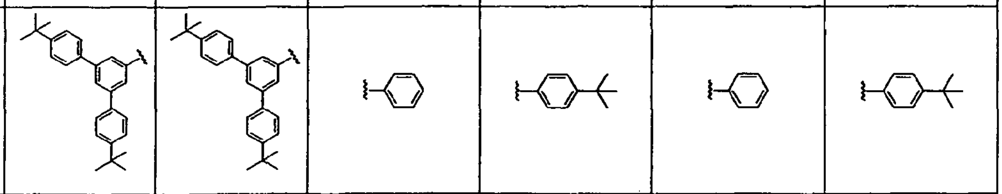
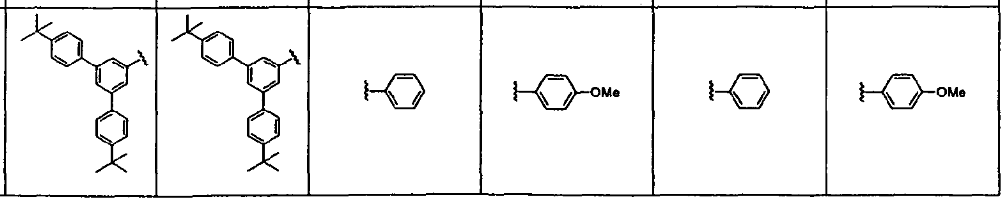
2088	
2089	
2090	
2091	
2092	
2093	
2094	
2095	

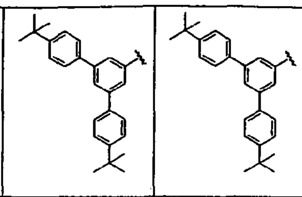
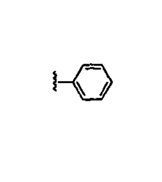
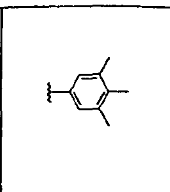
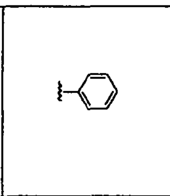
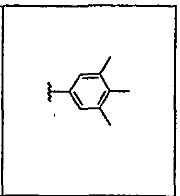
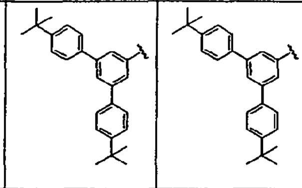
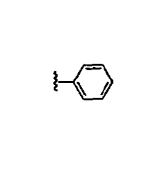
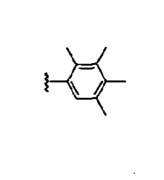
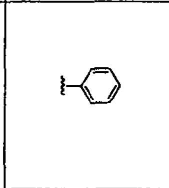
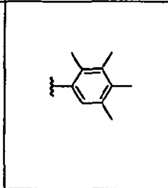
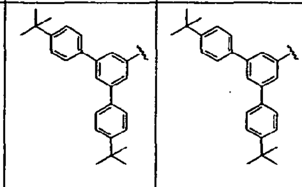
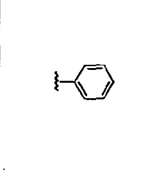
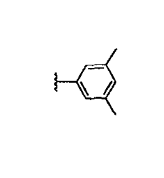
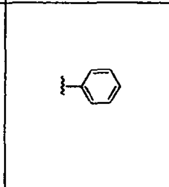
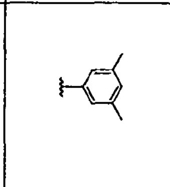
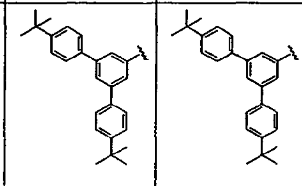
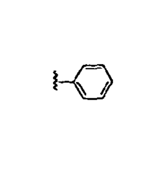
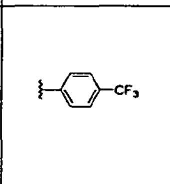
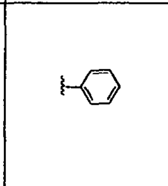
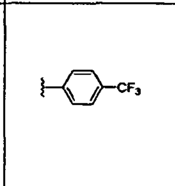
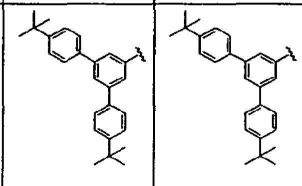
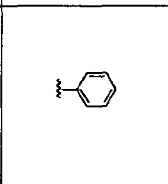
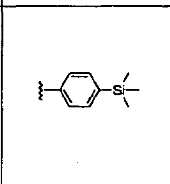
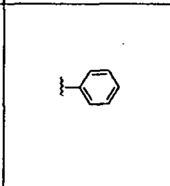
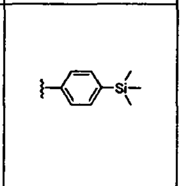
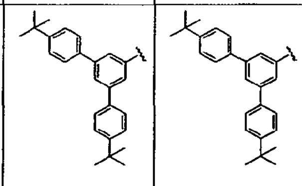
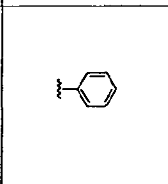
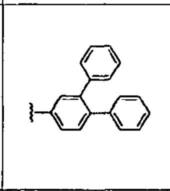
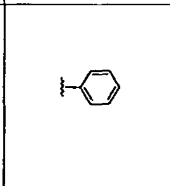
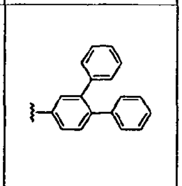
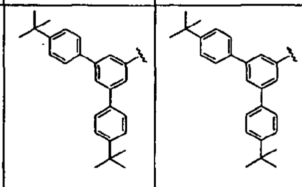
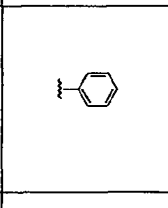
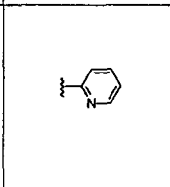
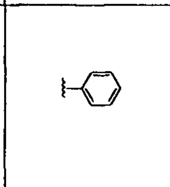
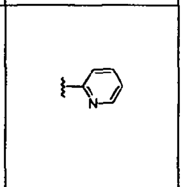
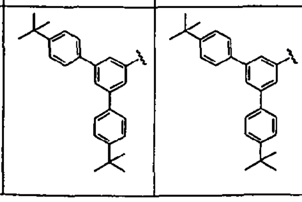
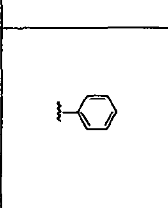
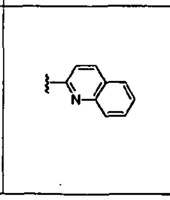
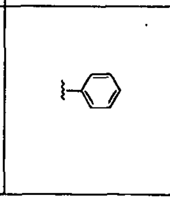
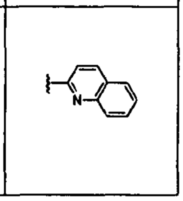
2096						
2097						
2098						
2099						
2100						
2101						
2102						
2103						

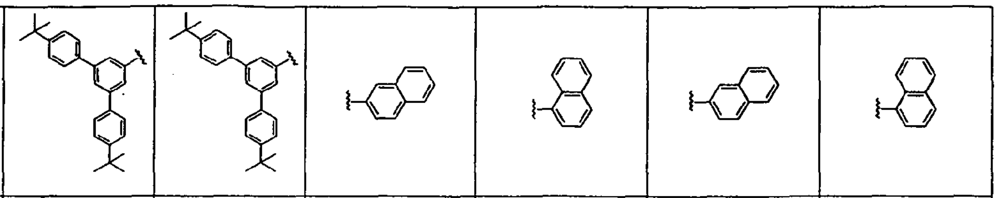
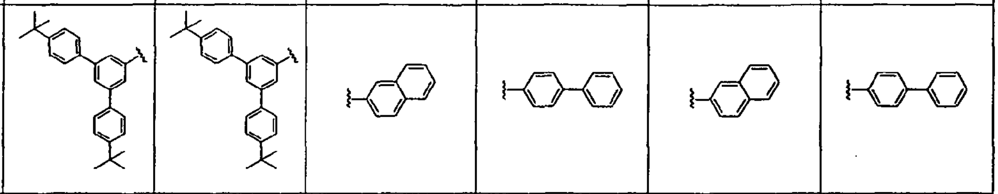
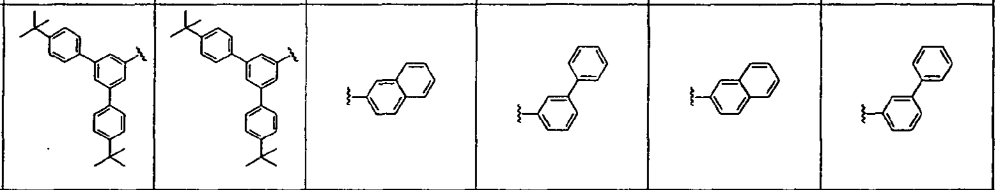
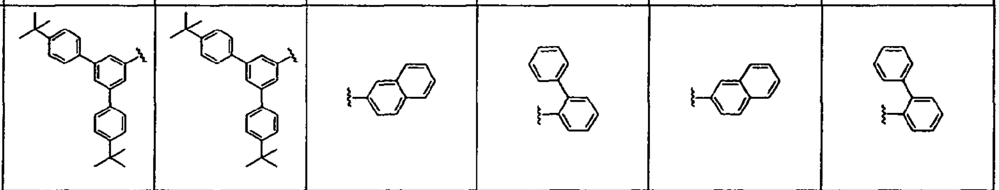
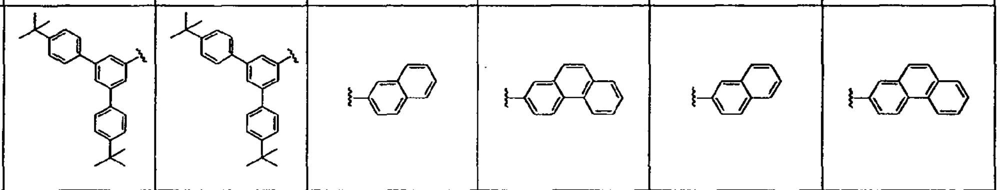
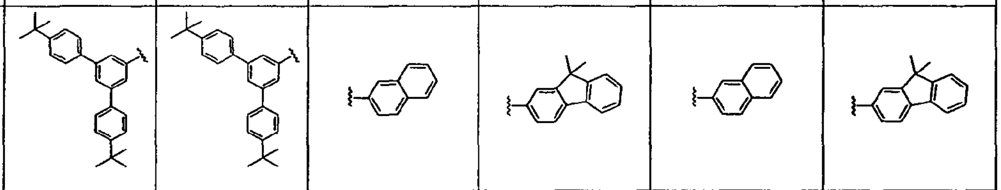
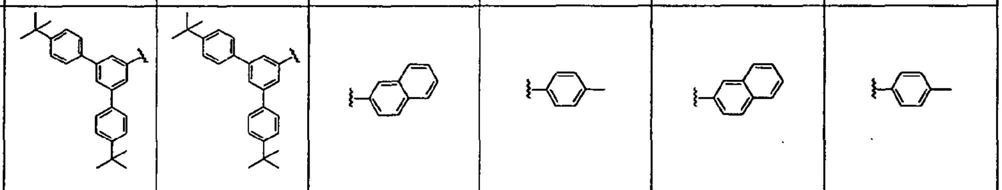
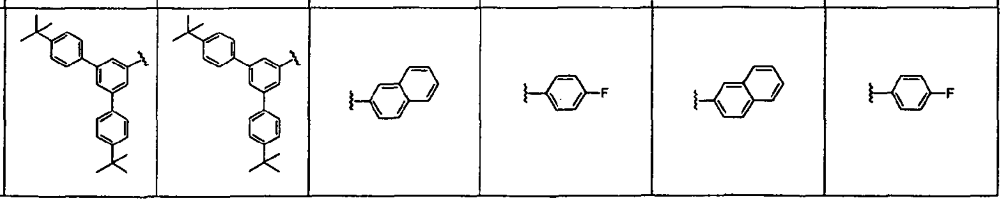
2104	
2105	
2106	
2107	
2108	
2109	
2110	
2111	

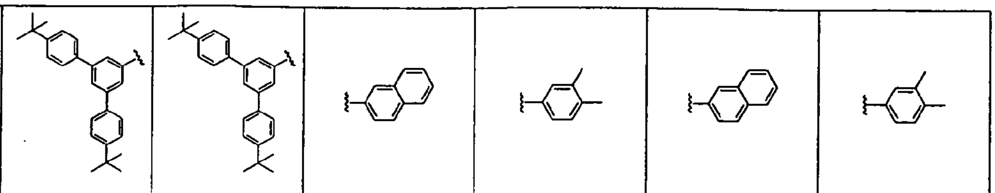
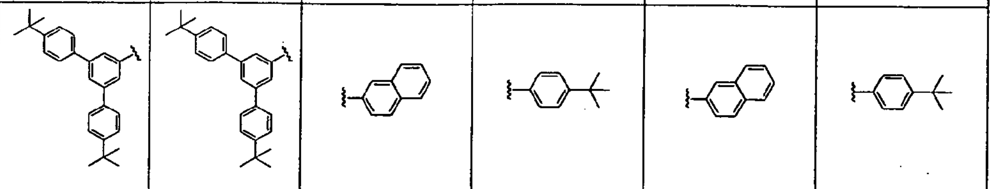
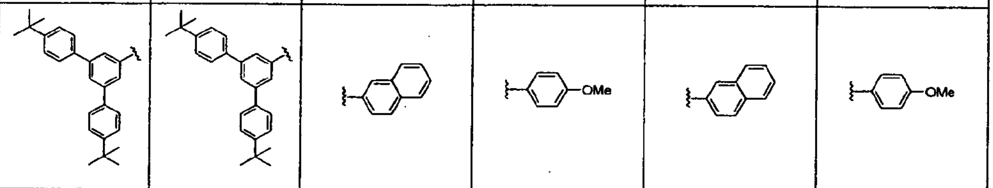
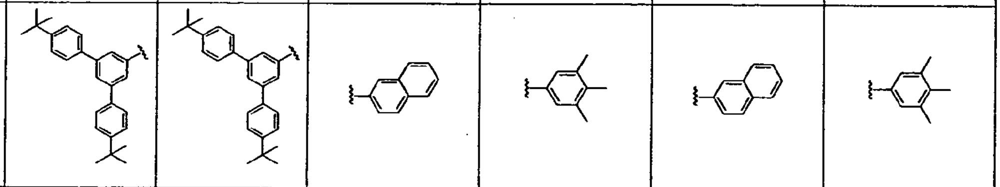
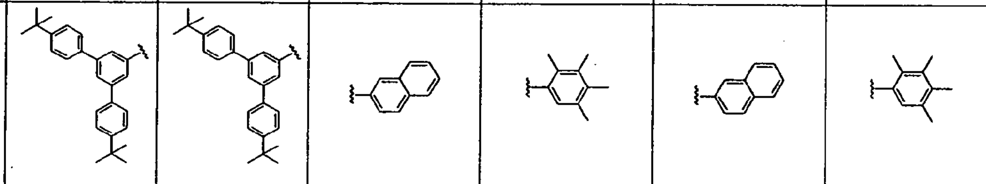
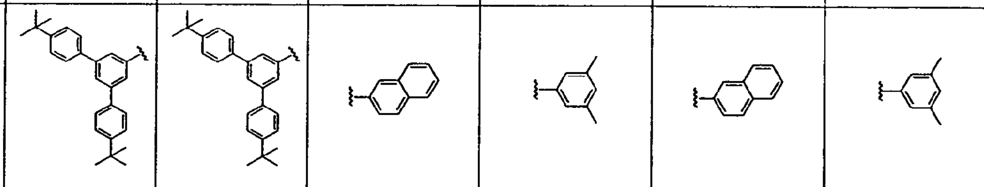
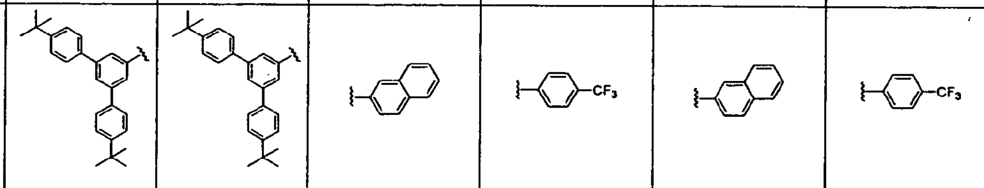
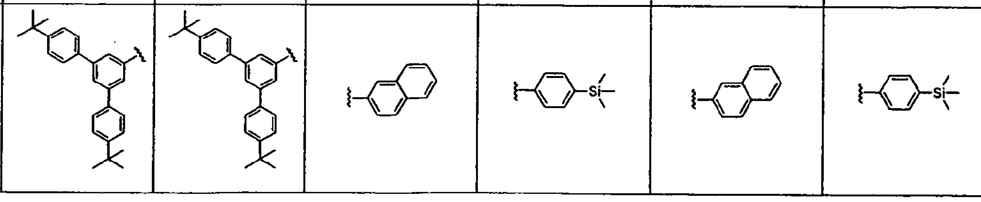
2112	
2113	
2114	
2115	
2116	
2117	
2118	
2119	

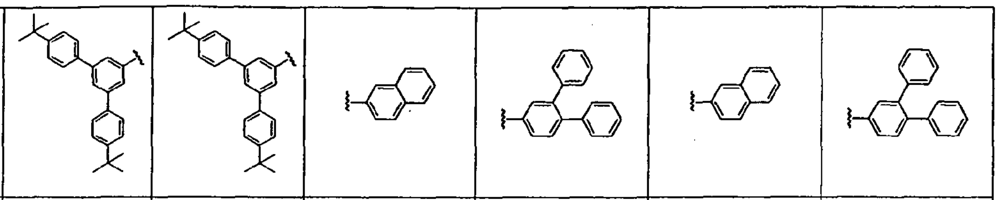
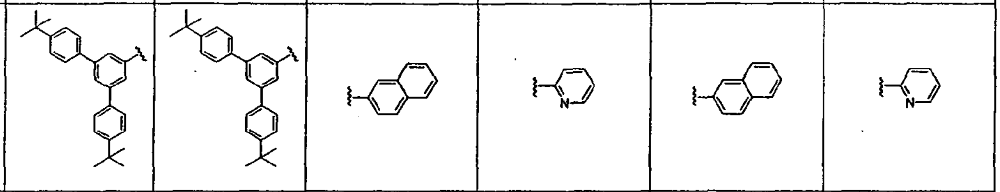
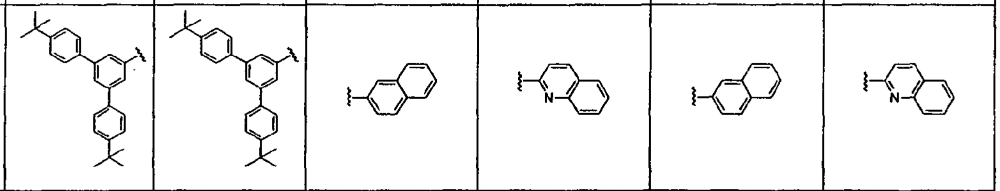
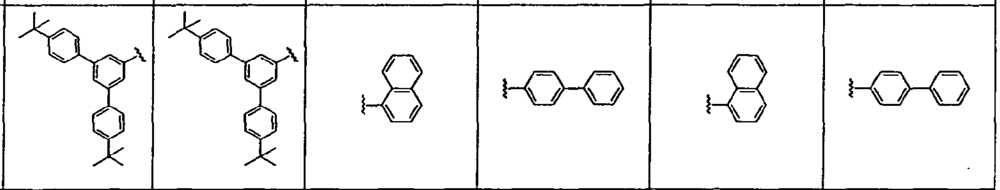
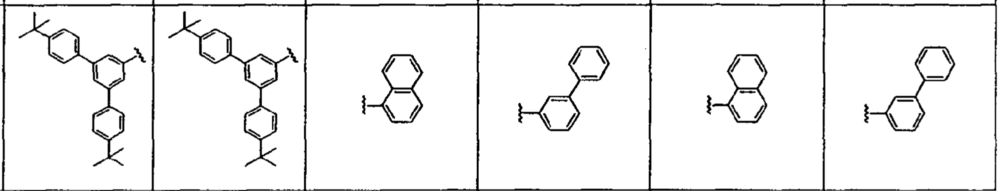
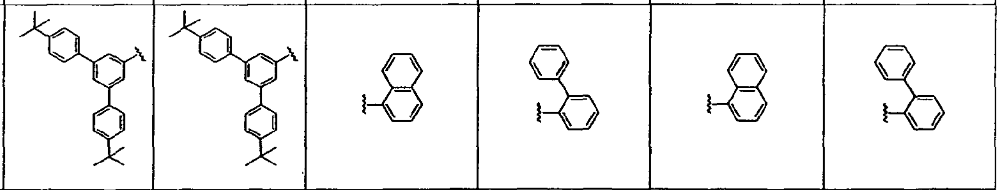
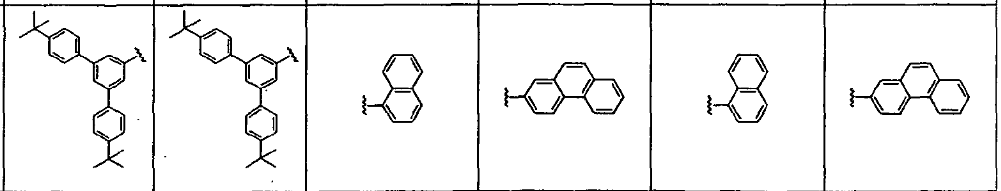
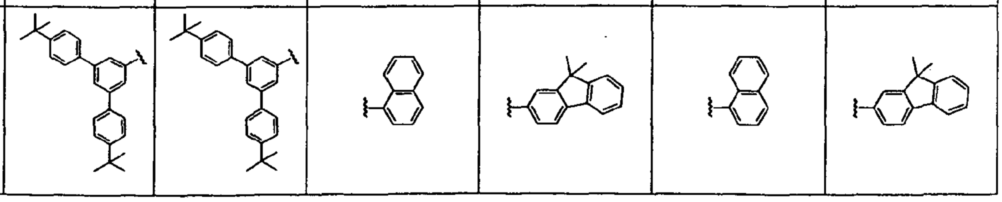
2120		
2121		
2122		
2123		
2124		
2125		
2126		
2127		

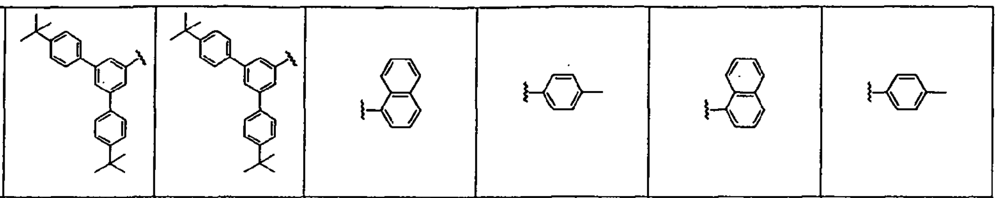
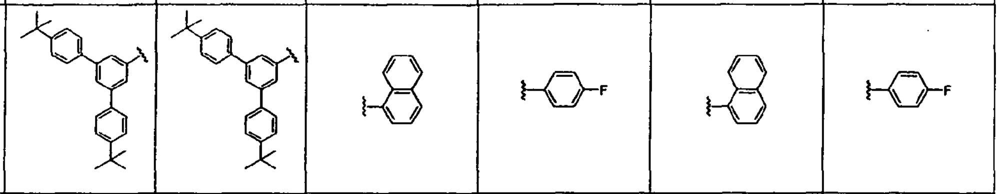
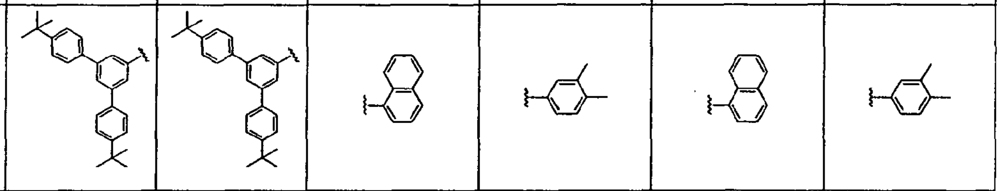
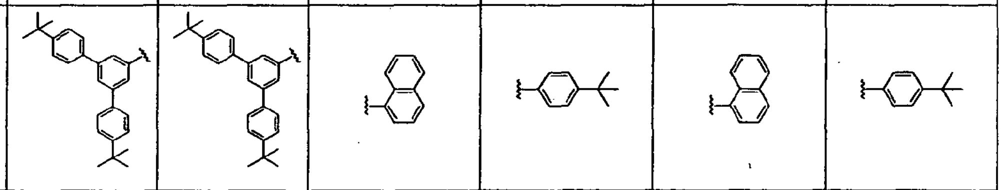
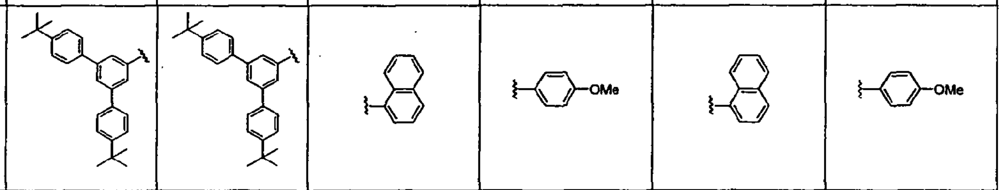
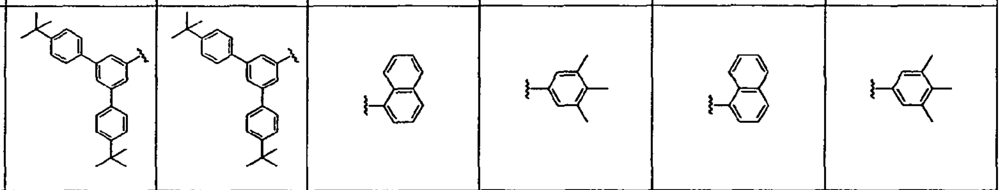
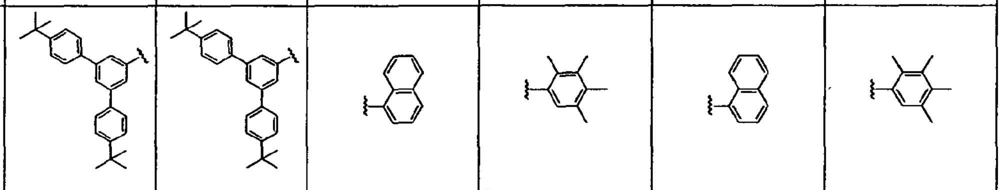
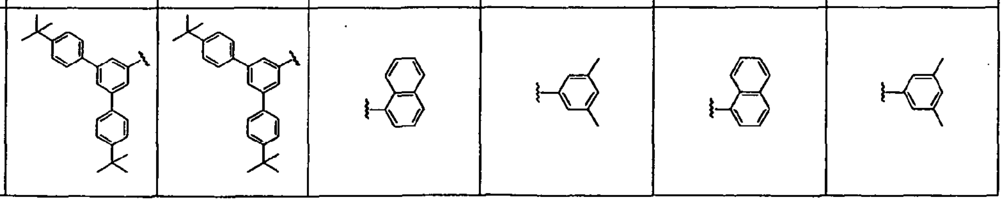
2128	
2129	
2130	
2131	
2132	
2133	
2134	
2135	

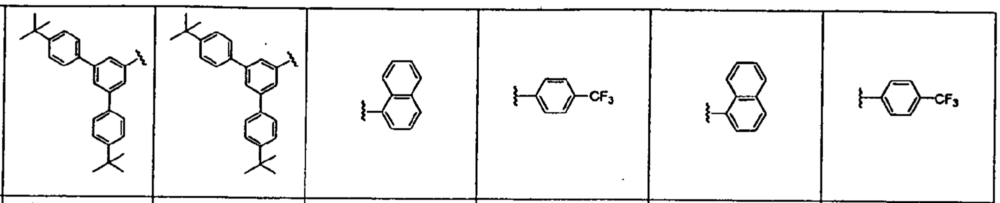
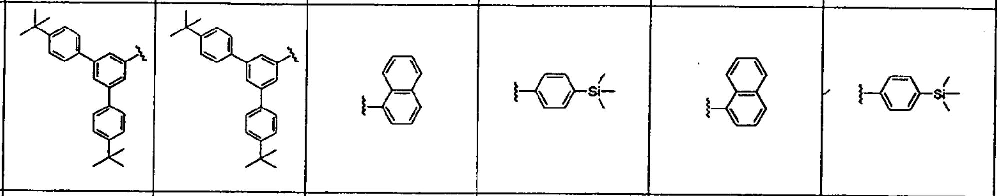
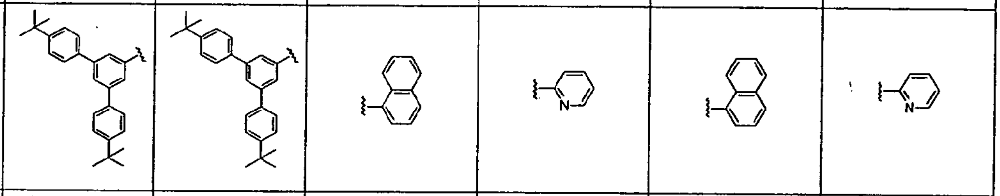
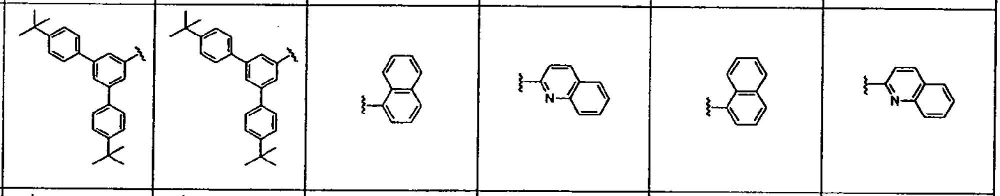
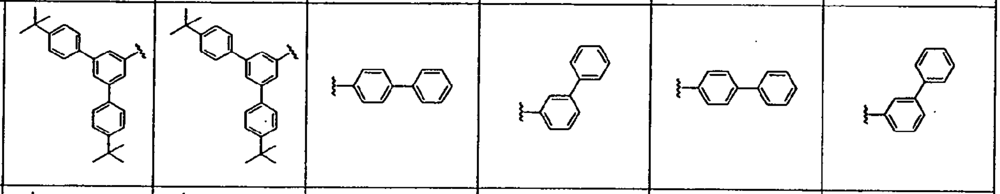
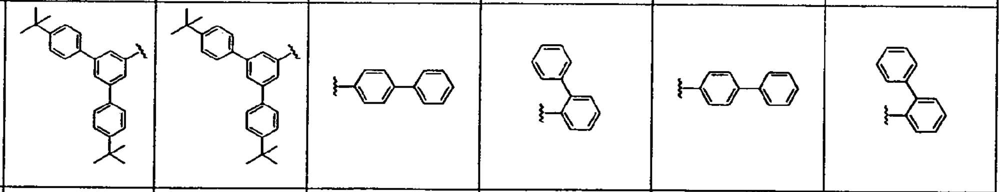
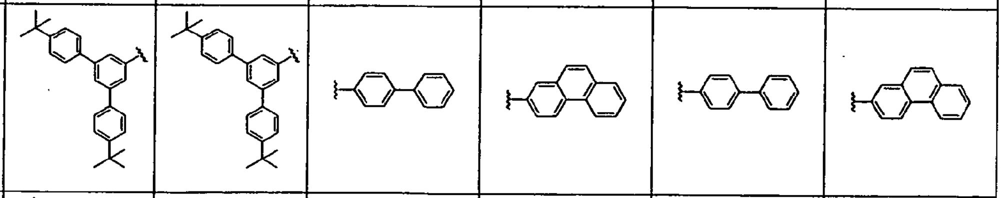
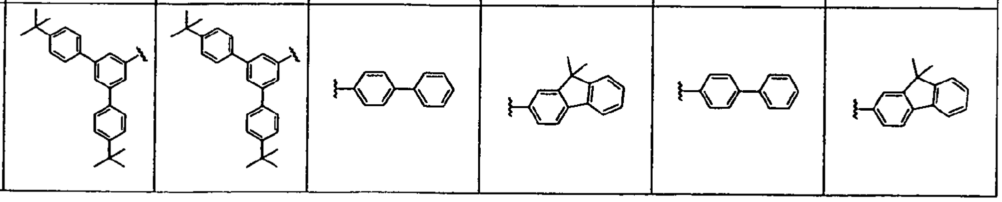
2136						
2137						
2138						
2139						
2140						
2141						
2142						
2143						

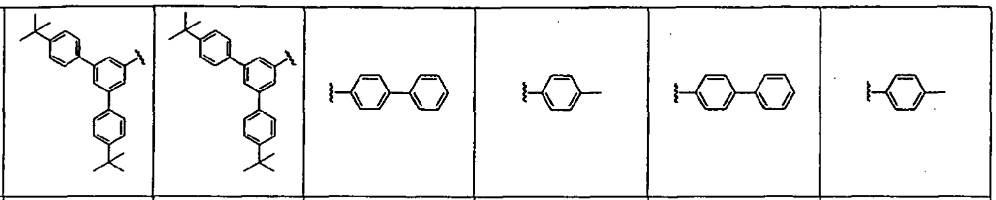
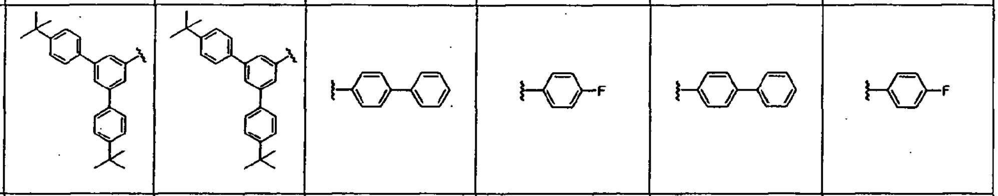
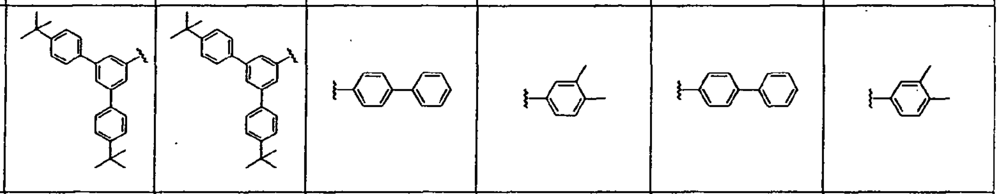
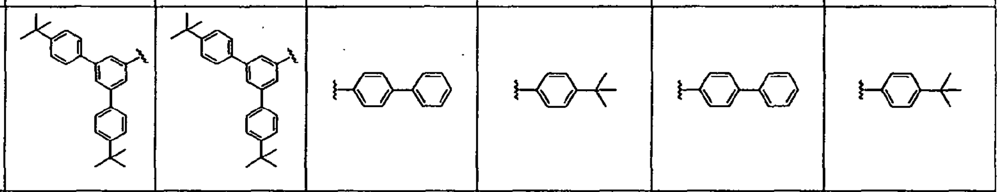
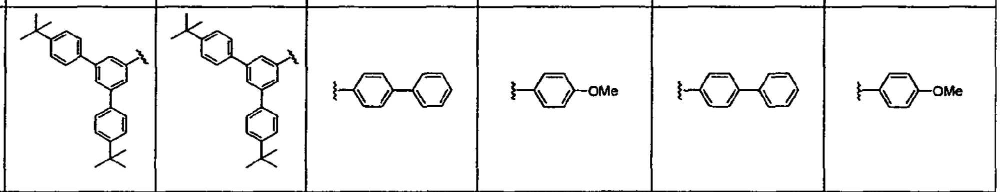
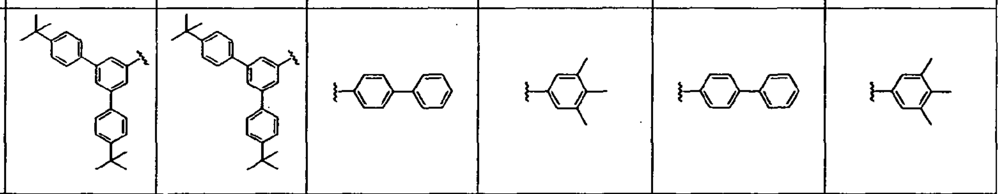
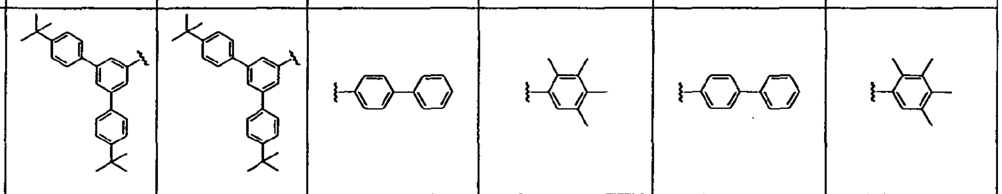
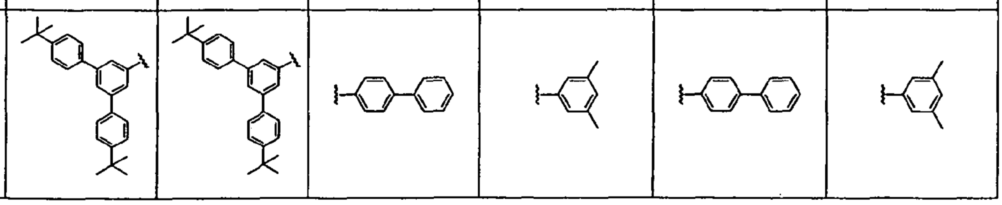
2144	
2145	
2146	
2147	
2148	
2149	
2150	
2151	

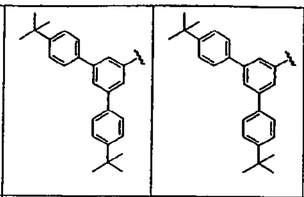
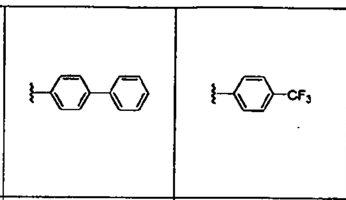
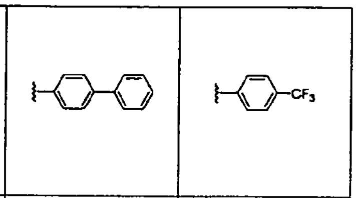
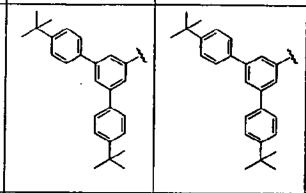
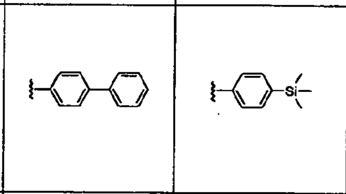
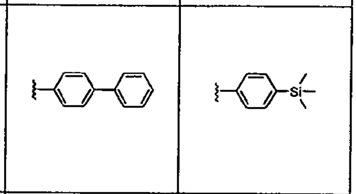
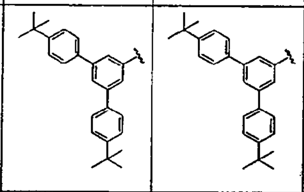
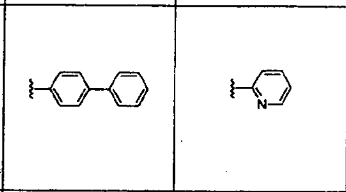
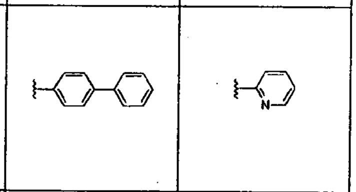
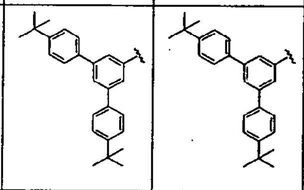
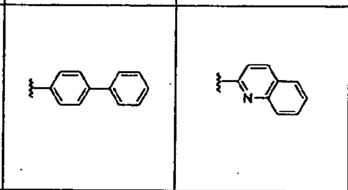
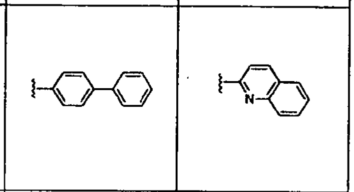
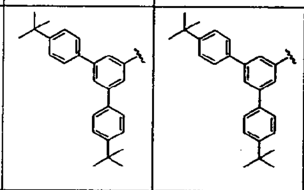
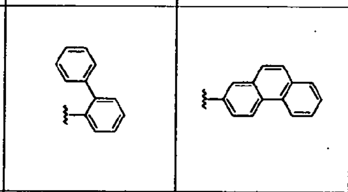
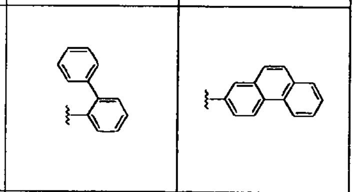
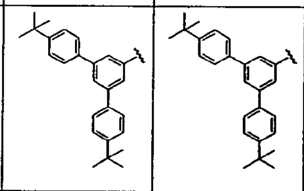
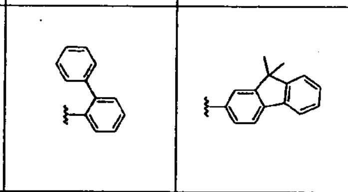
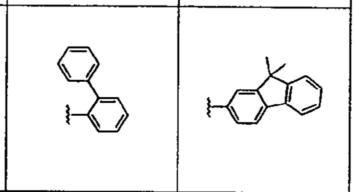
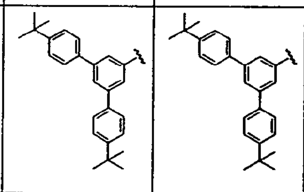
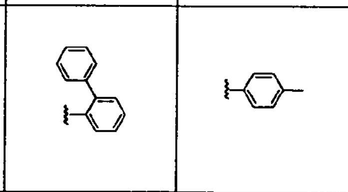
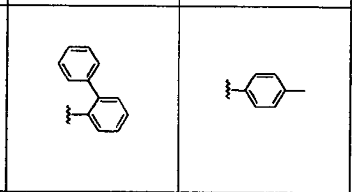
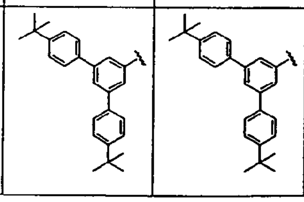
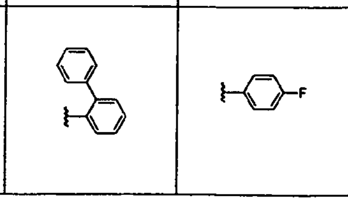
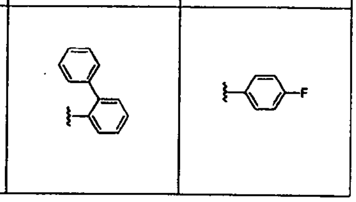
2152	
2153	
2154	
2155	
2156	
2157	
2158	
2159	

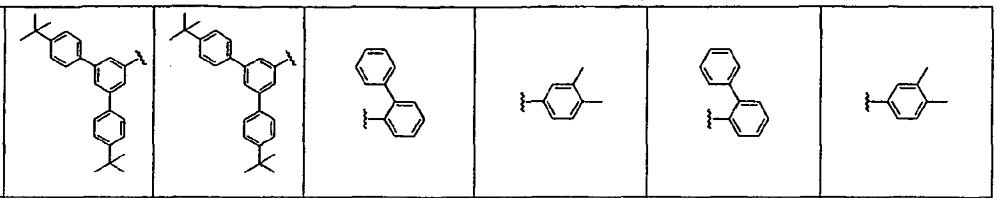
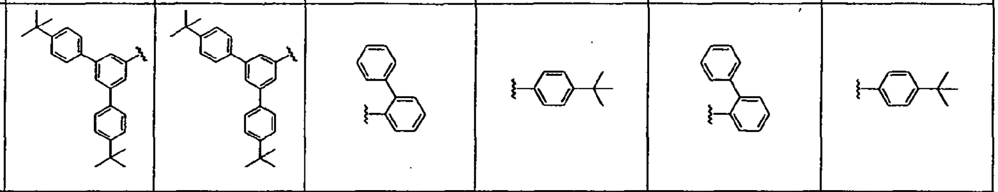
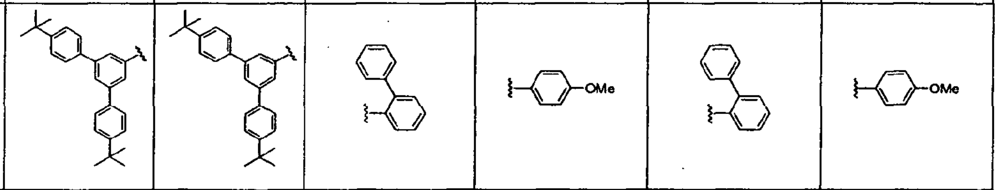
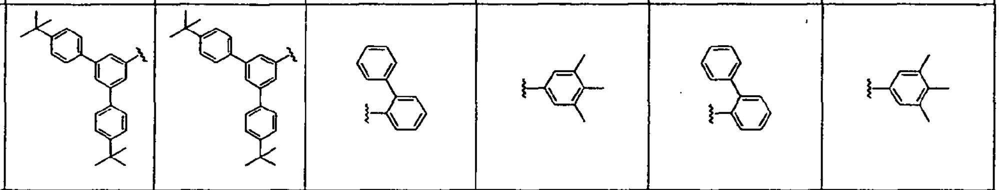
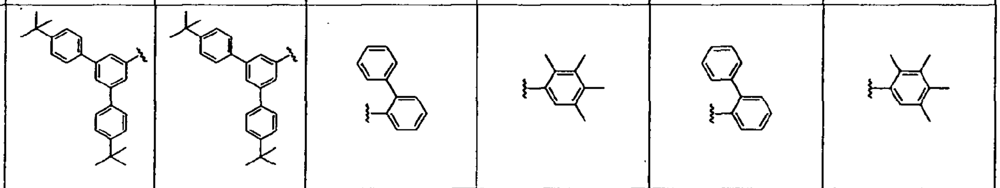
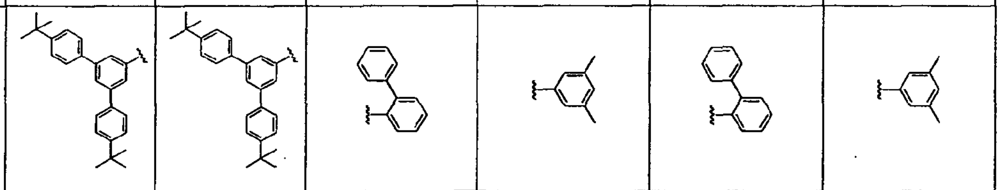
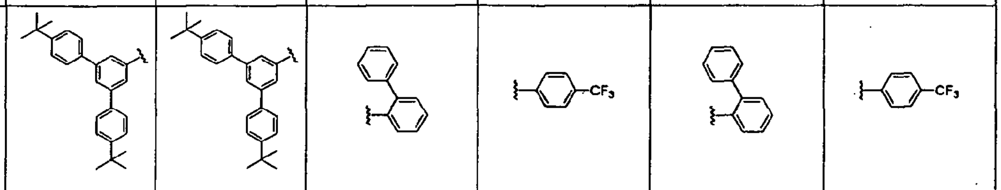
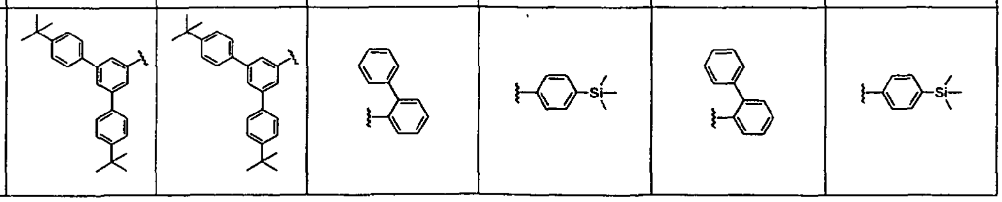
2160	
2161	
2162	
2163	
2164	
2165	
2166	
2167	

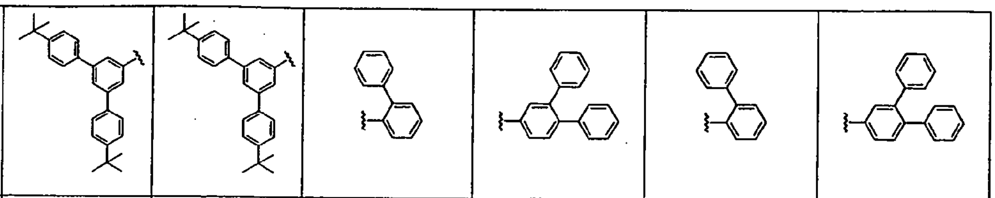
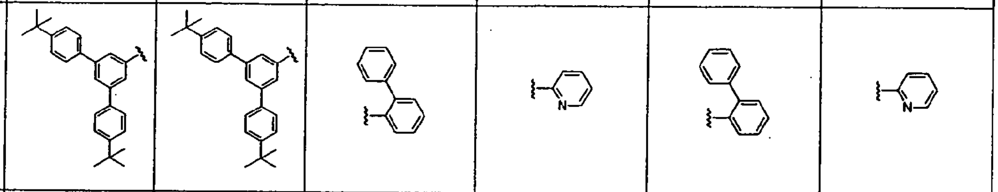
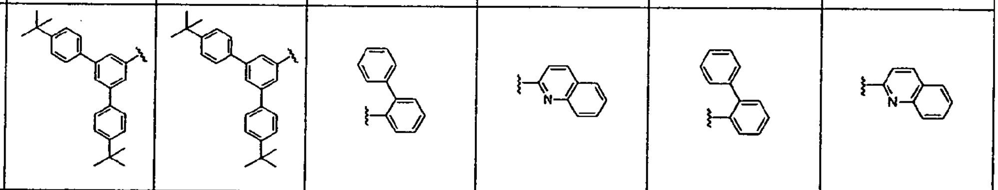
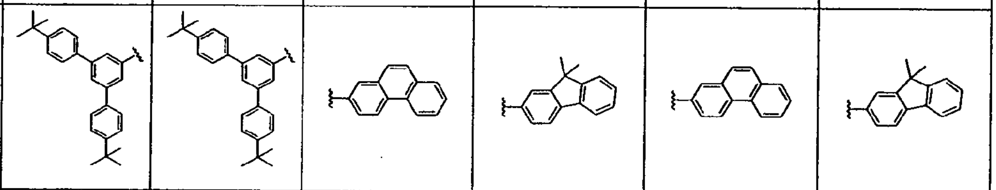
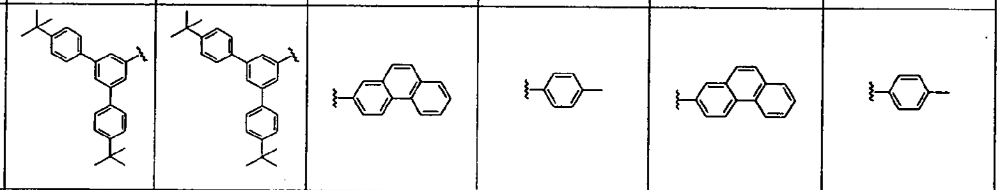
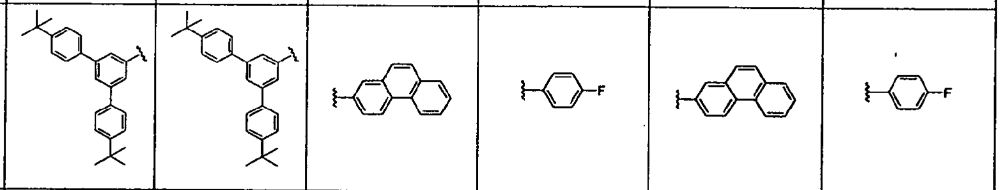
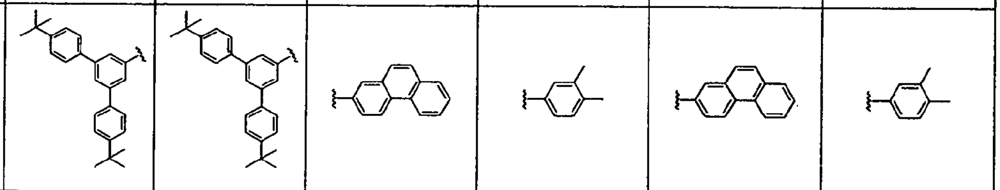
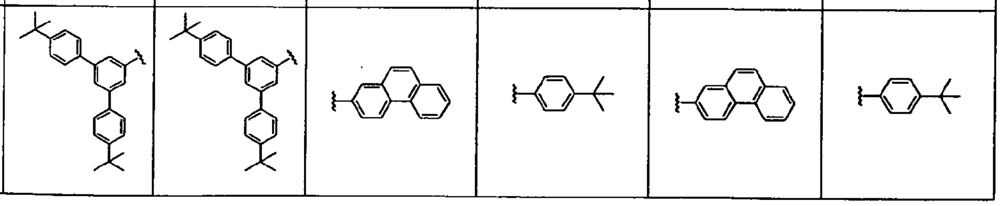
2168	
2169	
2170	
2171	
2172	
2173	
2174	
2175	

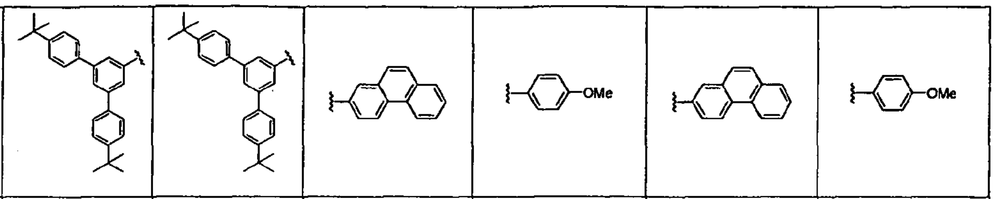
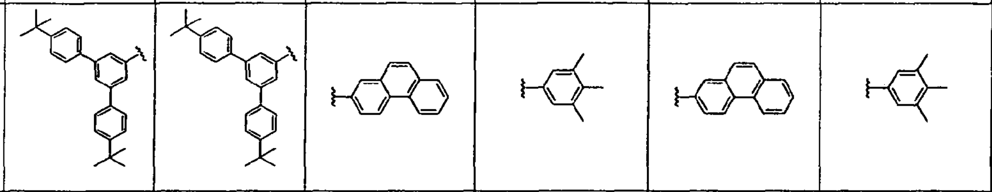
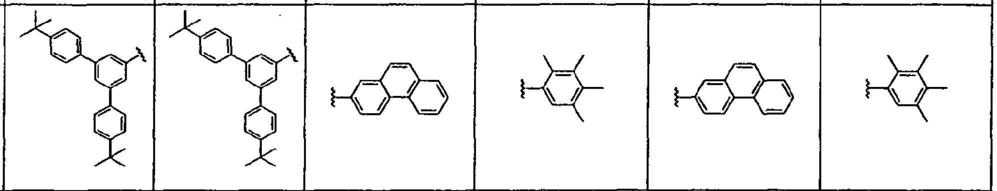
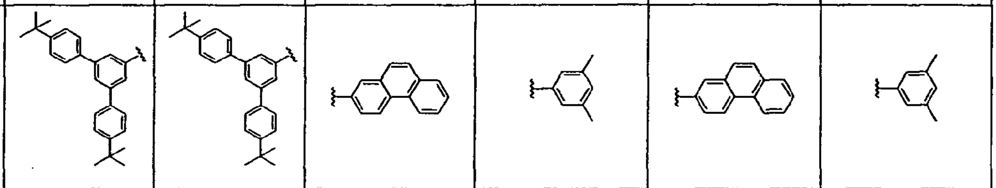
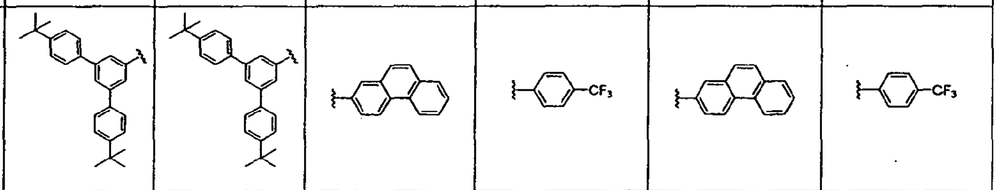
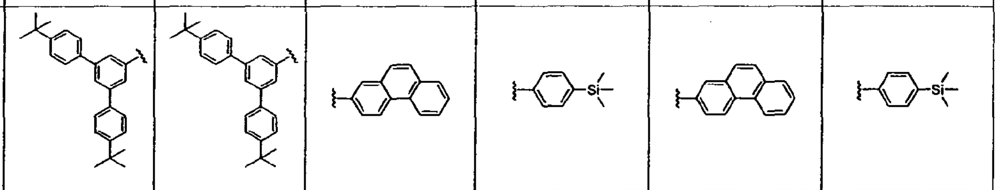
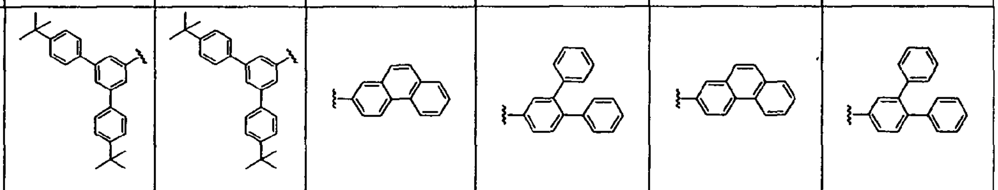
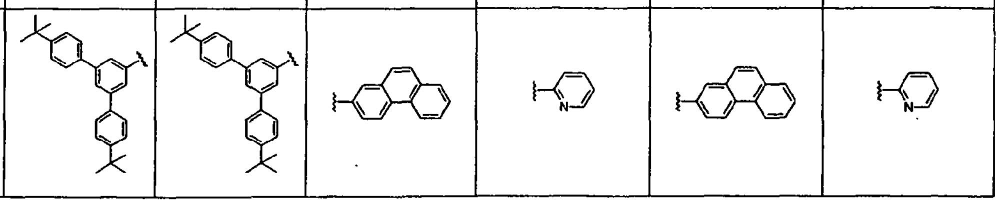
2176	
2177	
2178	
2179	
2180	
2181	
2182	
2183	

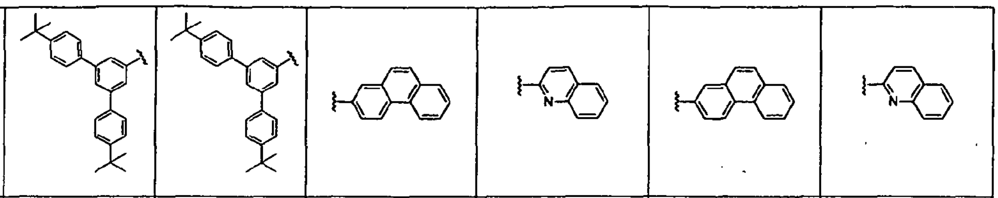
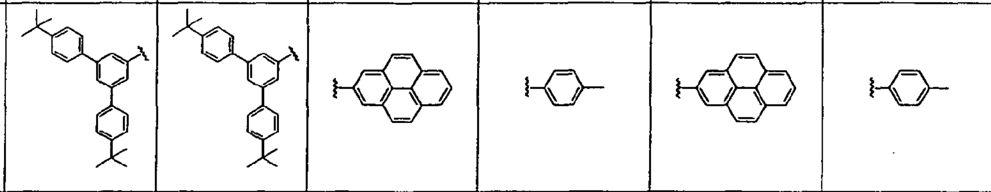
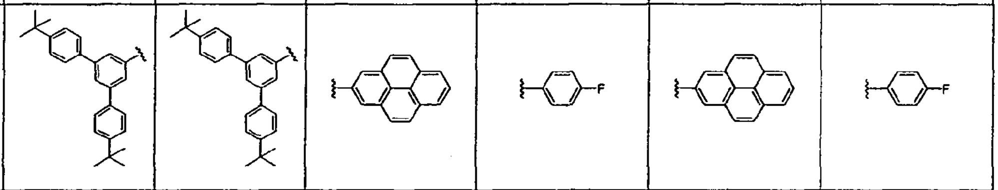
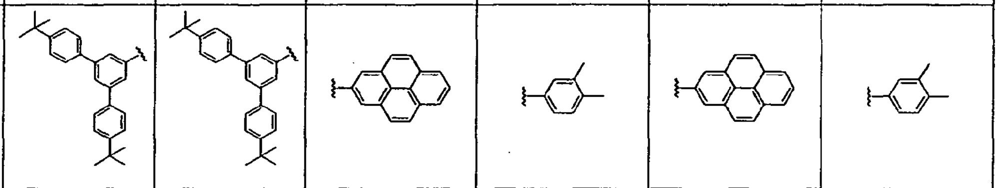
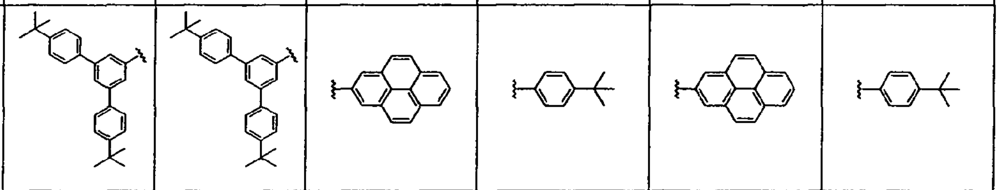
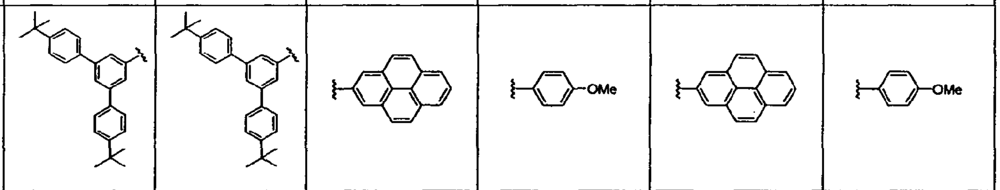
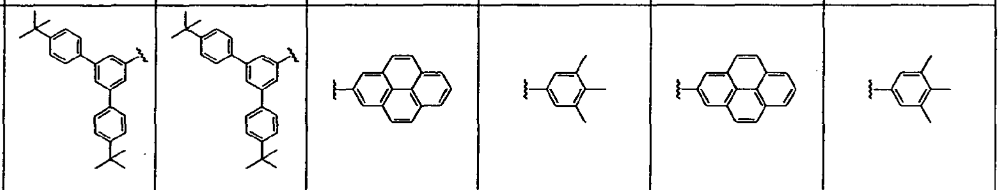
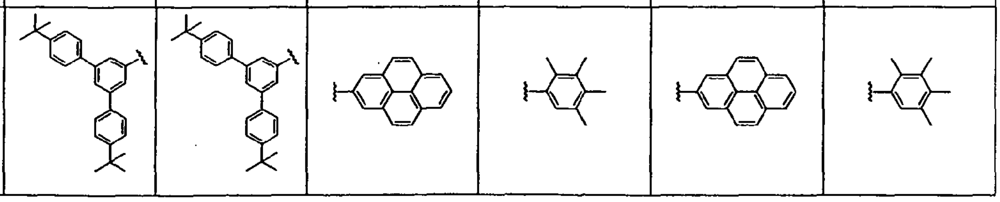
2184	
2185	
2186	
2187	
2188	
2189	
2190	
2191	

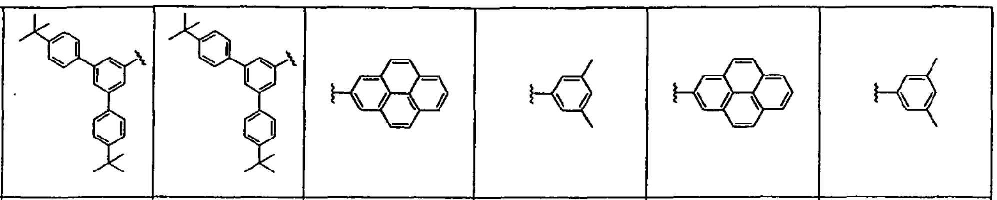
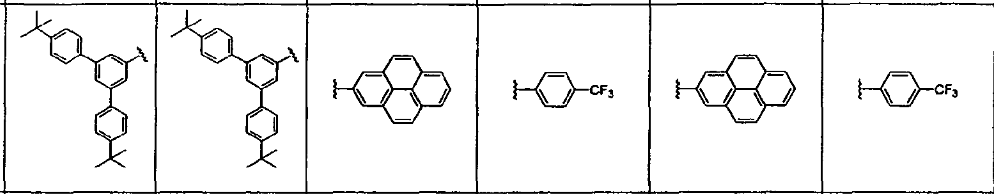
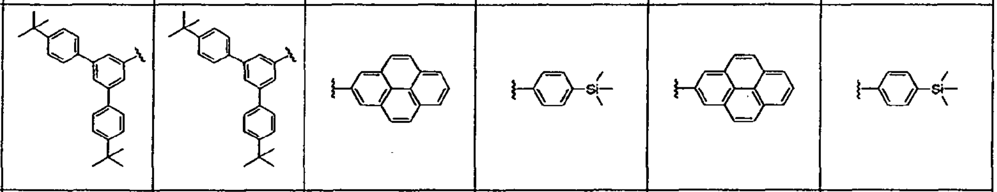
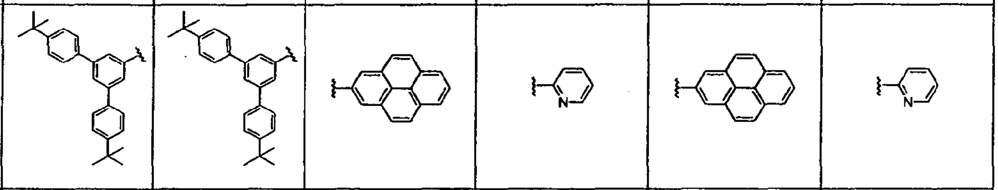
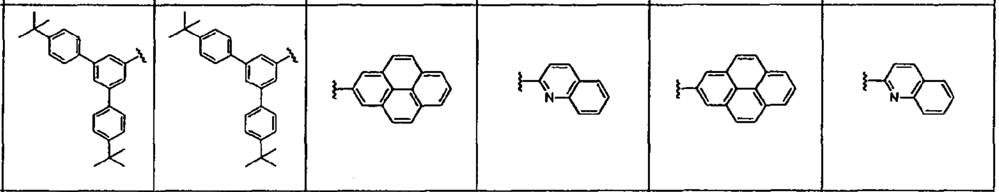
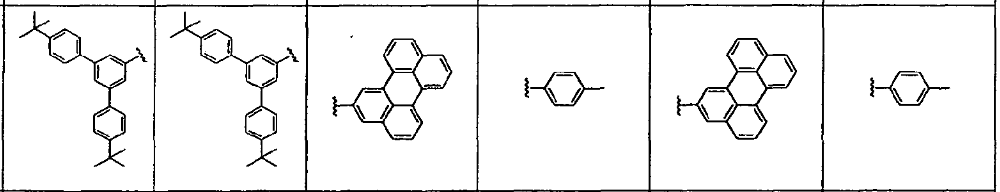
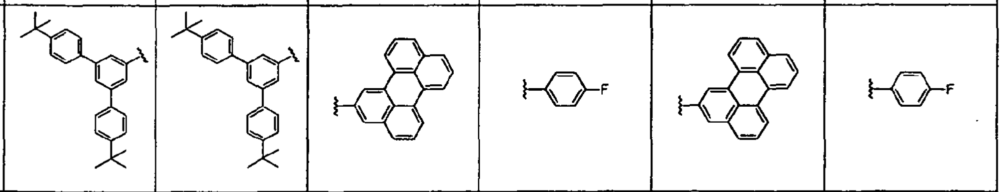
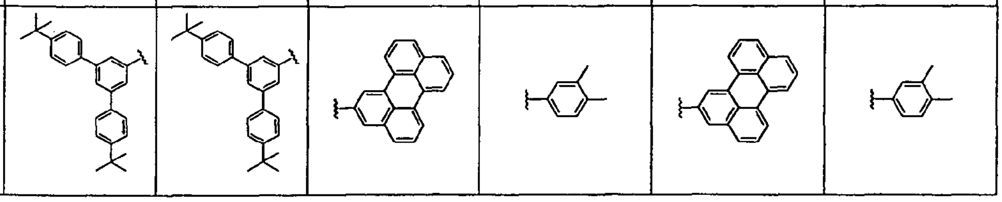
2192						
2193						
2194						
2195						
2196						
2197						
2198						
2199						

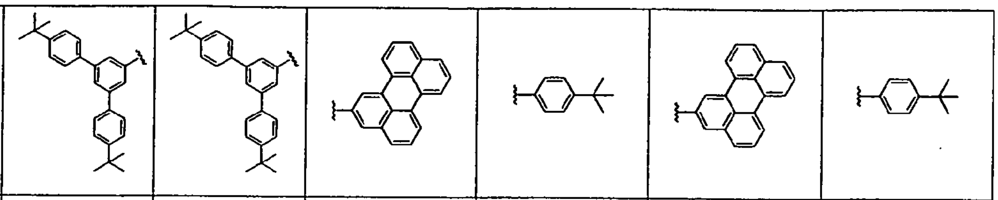
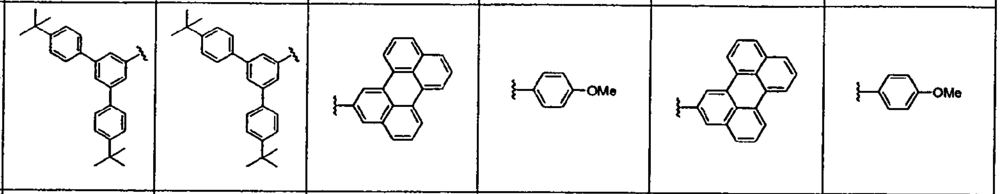
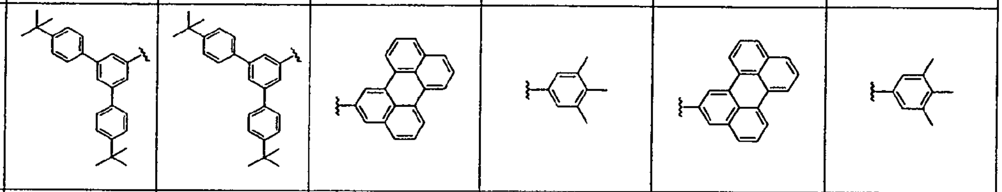
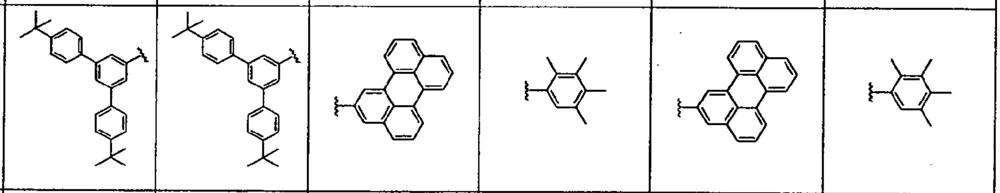
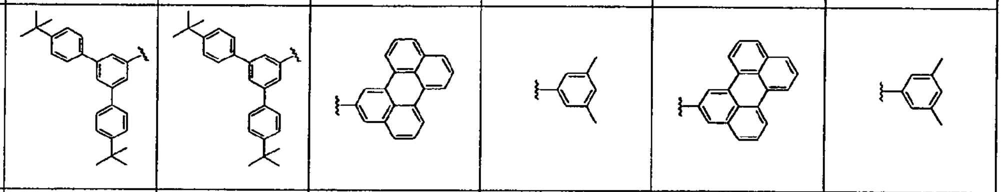
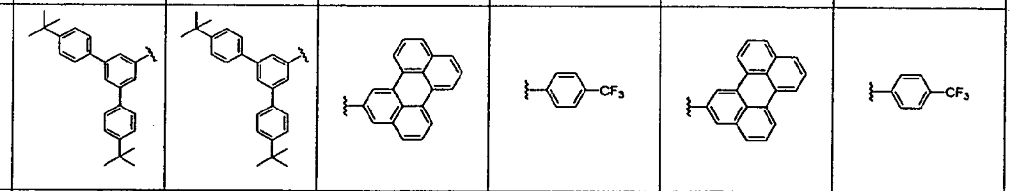
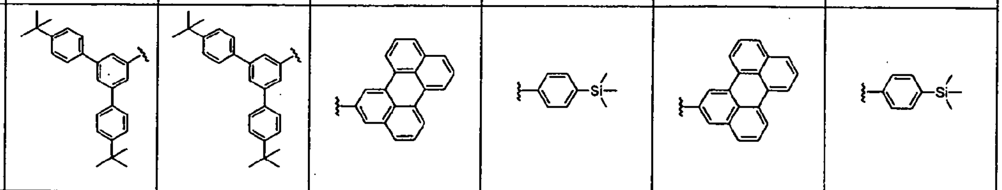
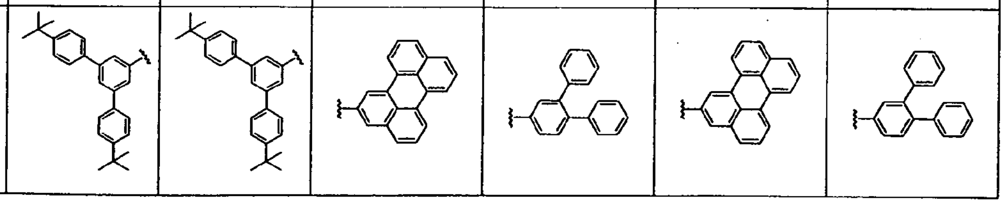
2200	
2201	
2202	
2203	
2204	
2205	
2206	
2207	

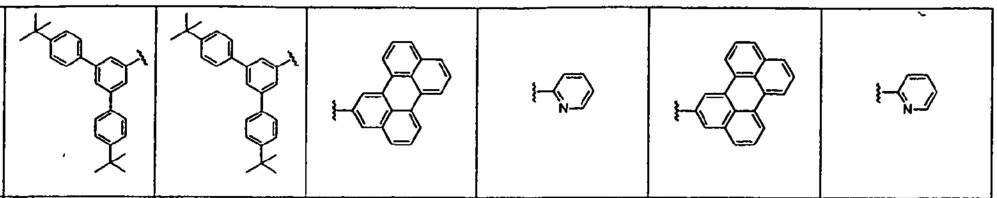
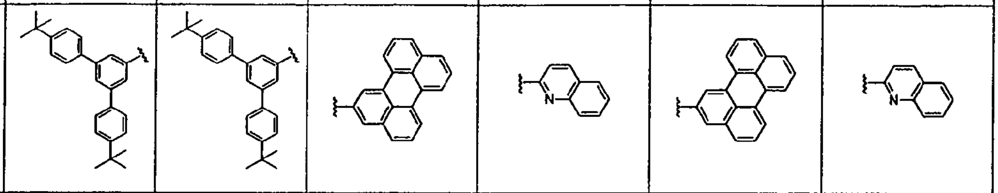
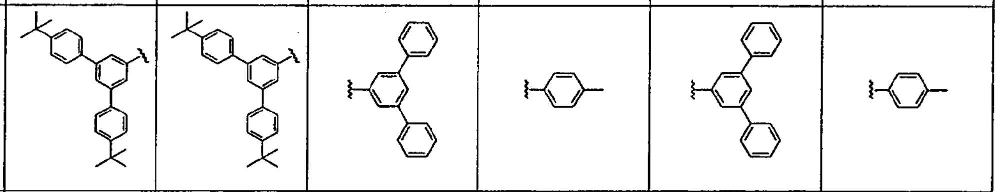
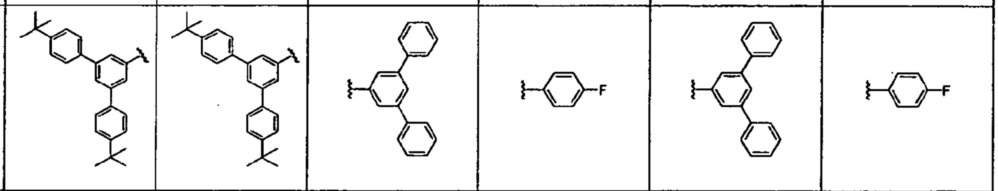
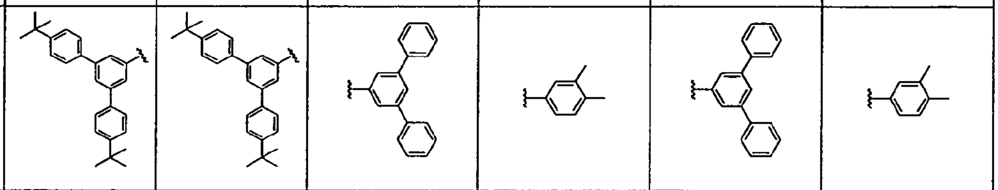
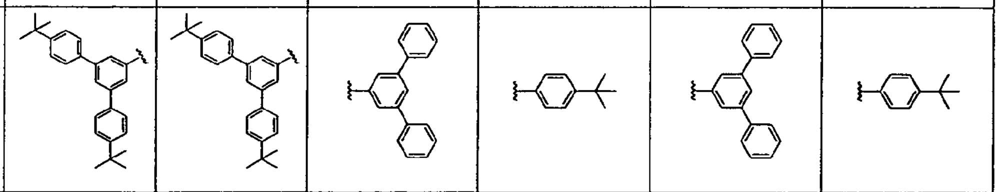
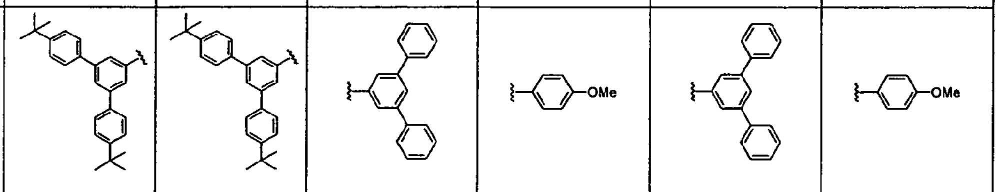
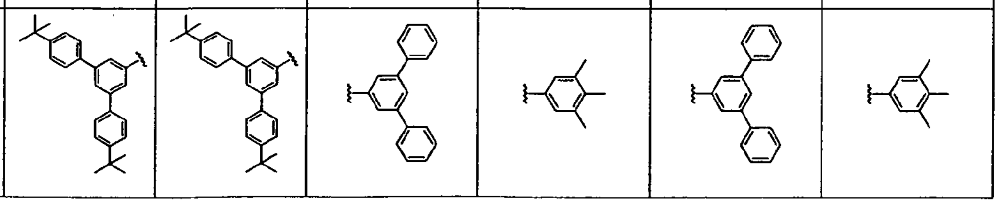
2208	
2209	
2210	
2211	
2212	
2213	
2214	
2215	

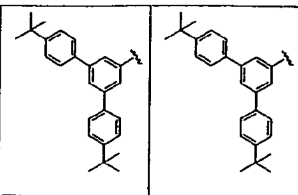
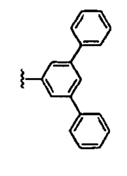
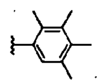
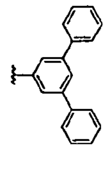
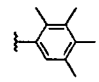
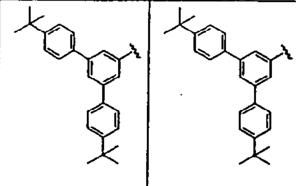
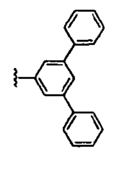
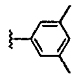
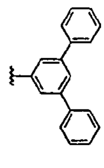
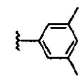
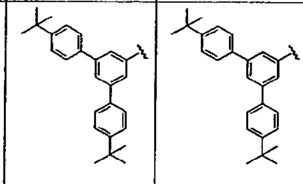
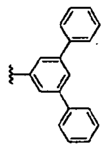
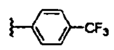
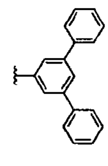
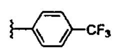
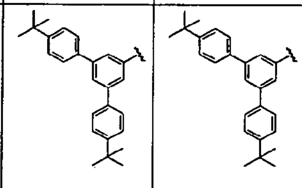
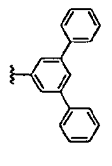
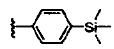
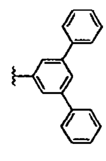
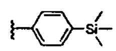
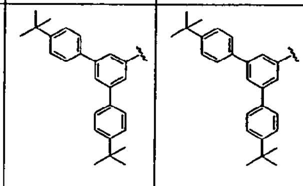
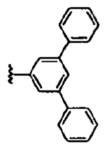
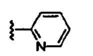
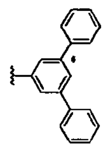
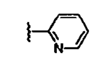
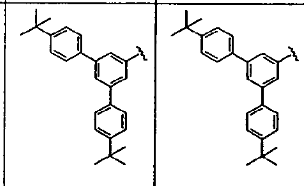
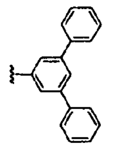
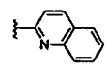
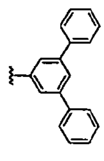
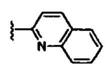
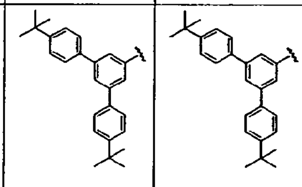
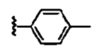
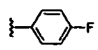
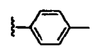
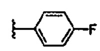
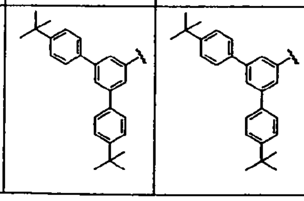
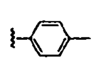
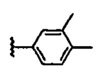
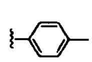
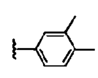
2216	
2217	
2218	
2219	
2220	
2221	
2222	
2223	

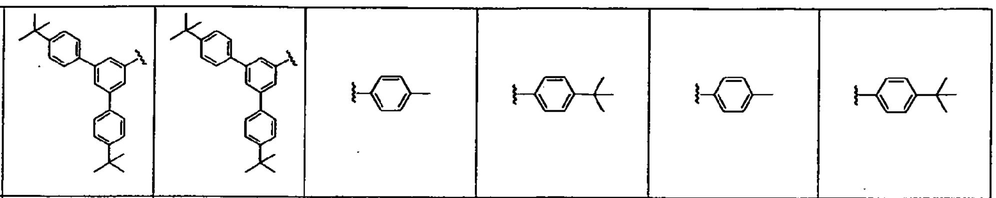
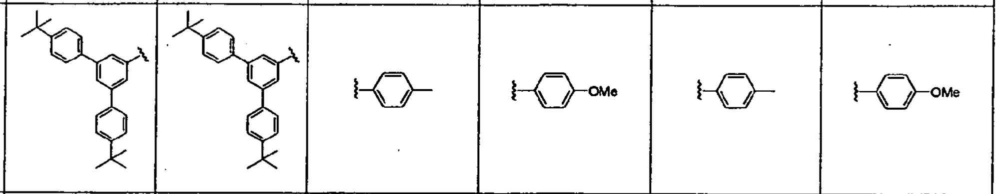
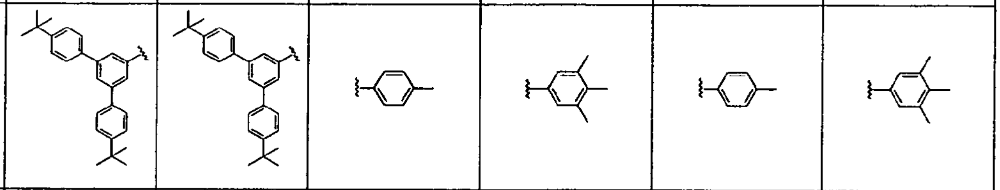
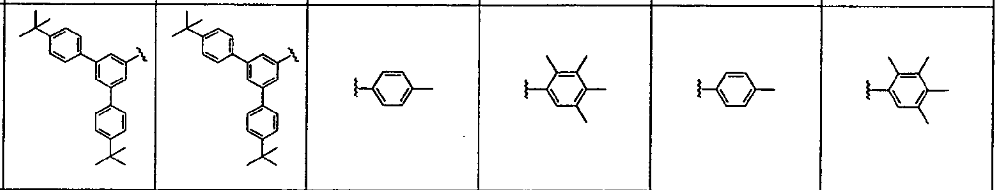
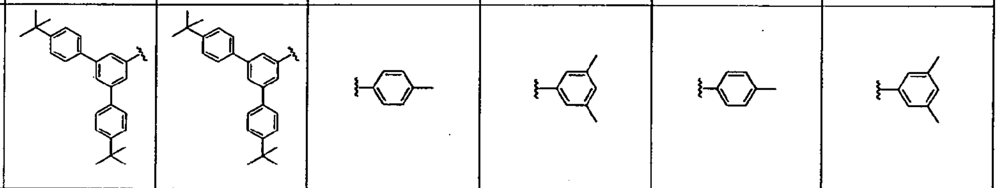
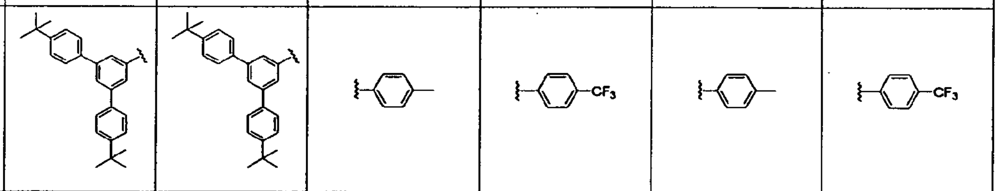
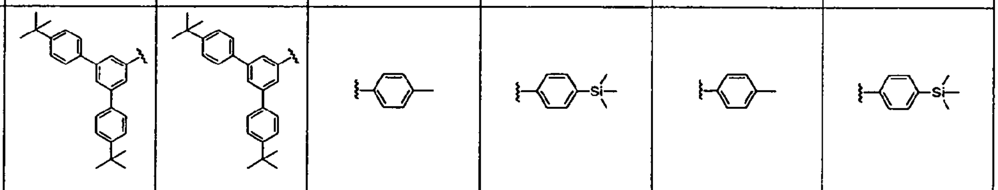
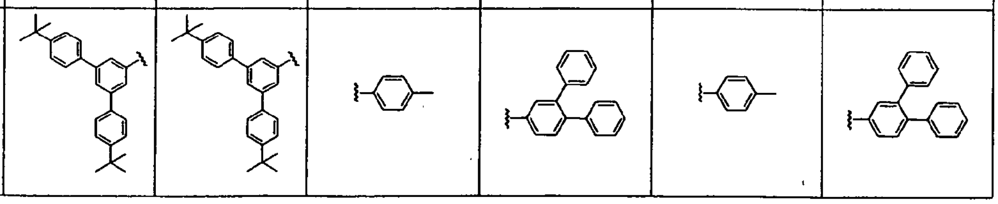
2224	
2225	
2226	
2227	
2228	
2229	
2230	
2231	

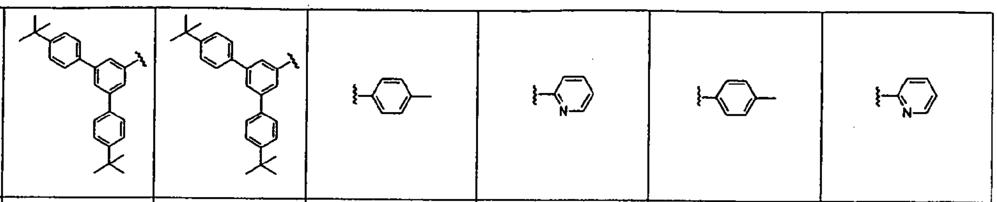
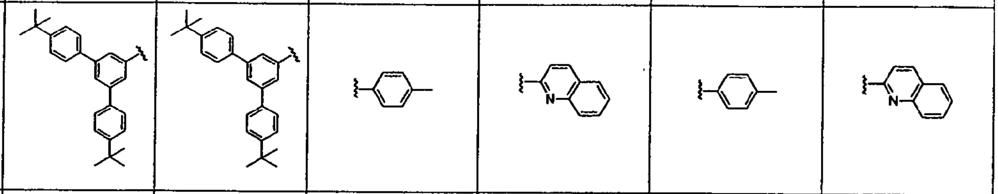
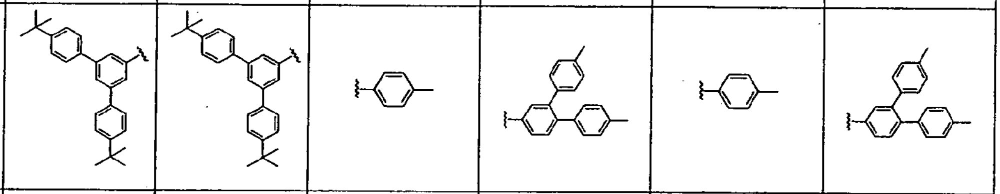
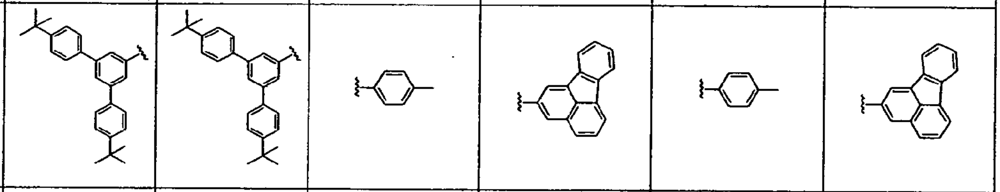
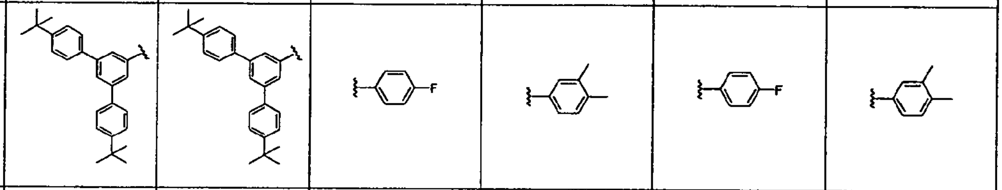
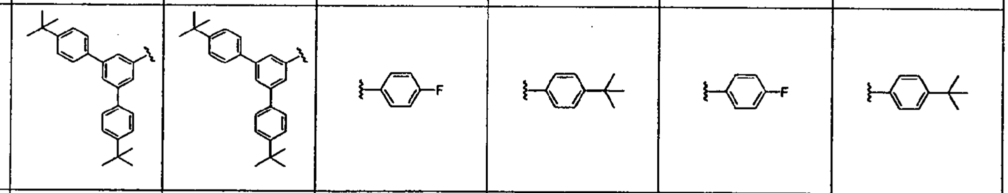
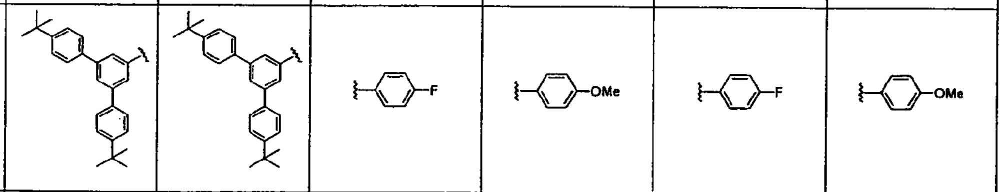
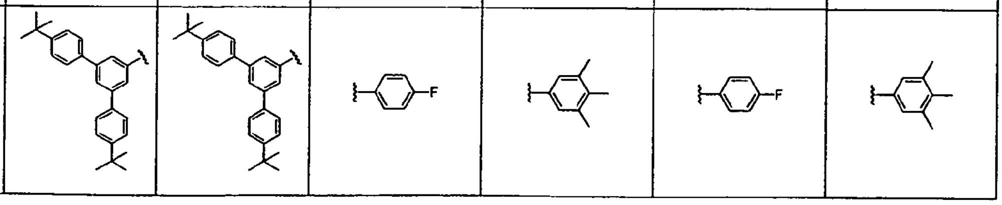
2232	
2233	
2234	
2235	
2236	
2237	
2238	
2239	

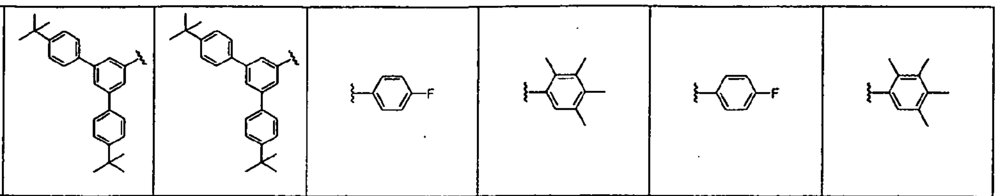
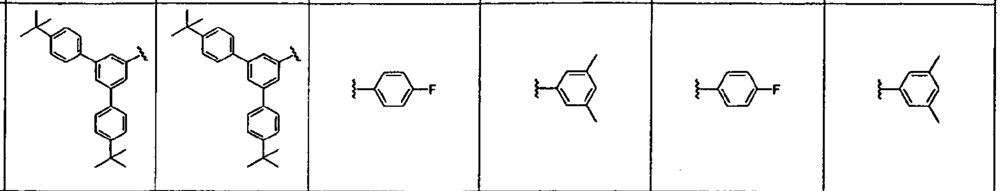
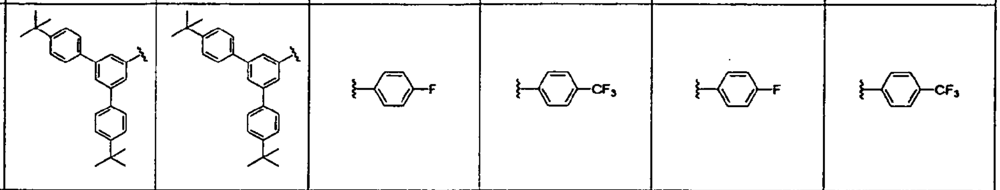
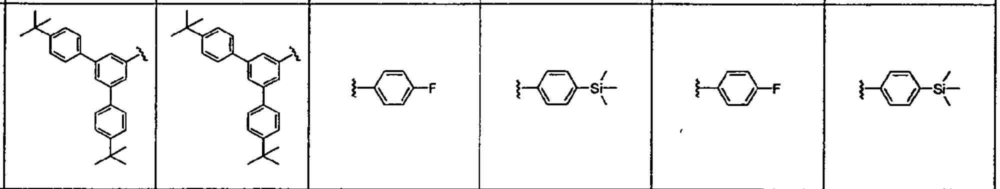
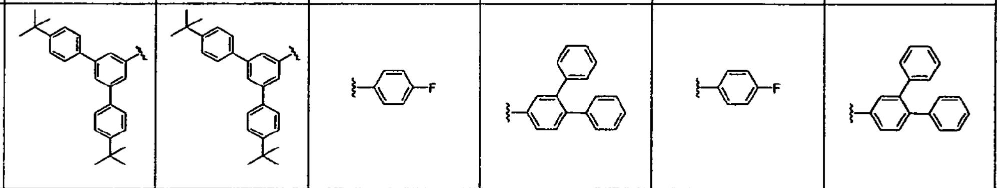
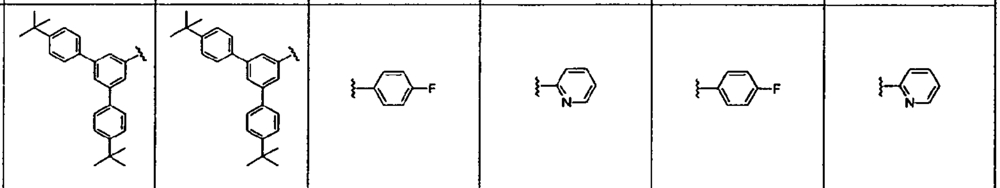
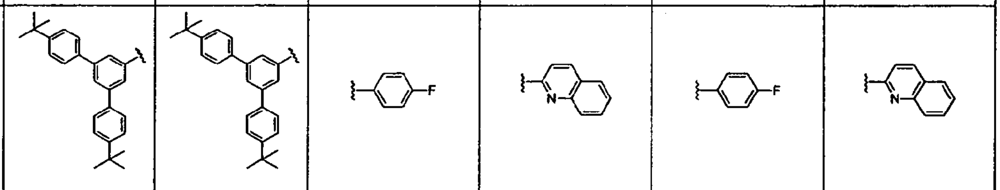
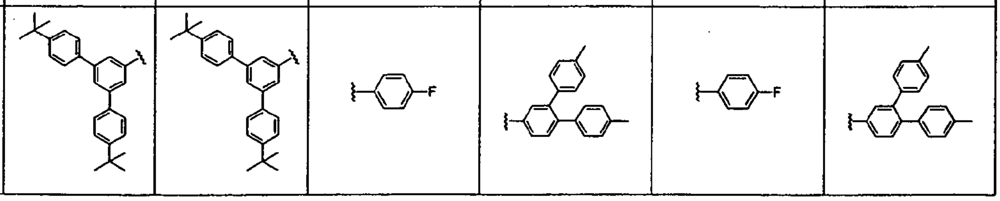
2240	
2241	
2242	
2243	
2244	
2245	
2246	
2247	

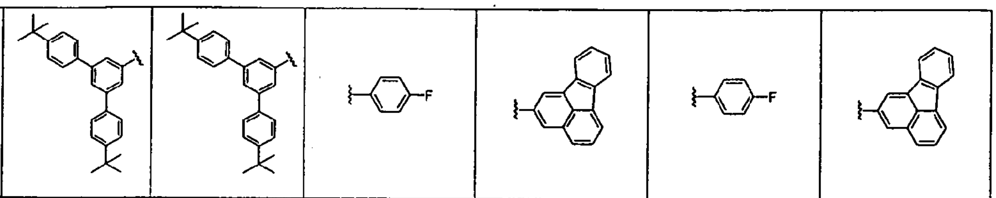
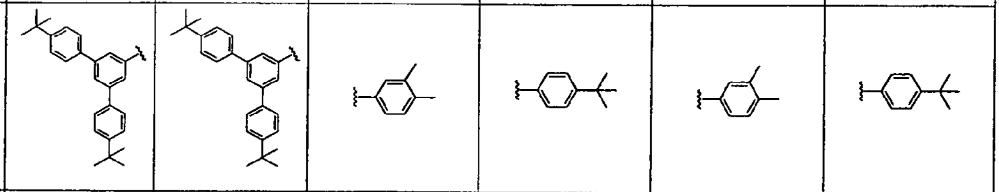
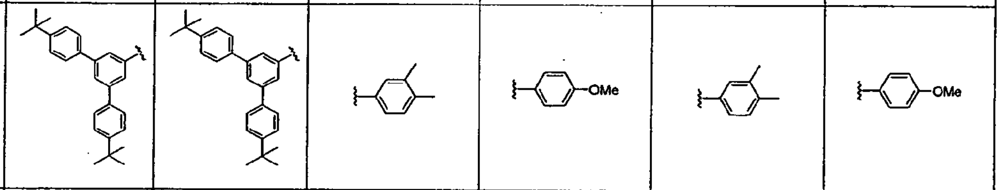
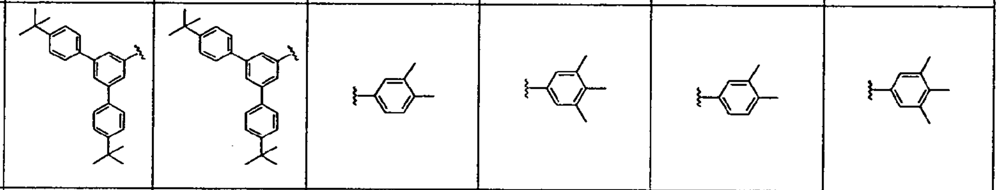
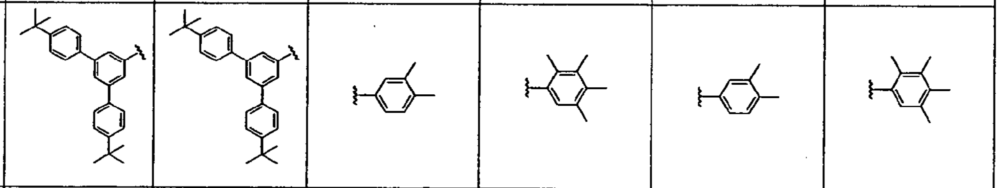
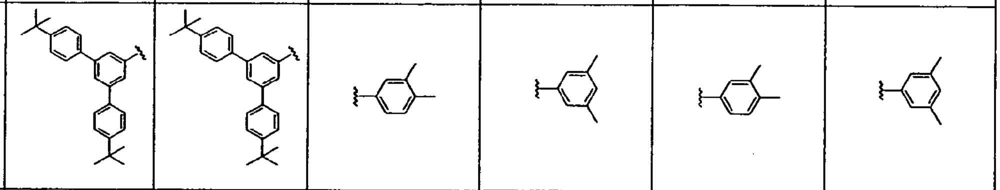
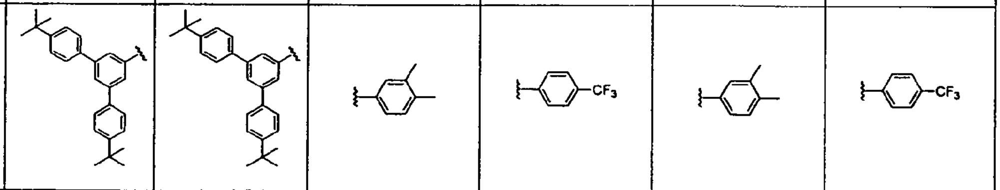
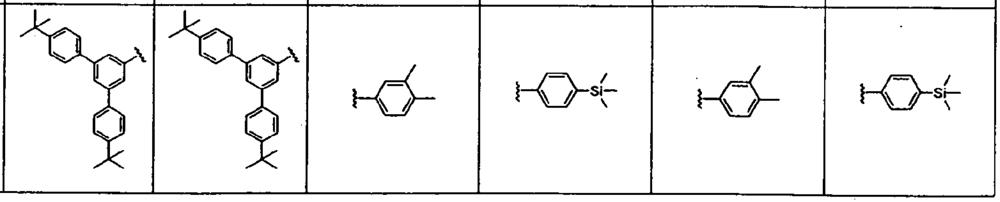
2248	
2249	
2250	
2251	
2252	
2253	
2254	
2255	

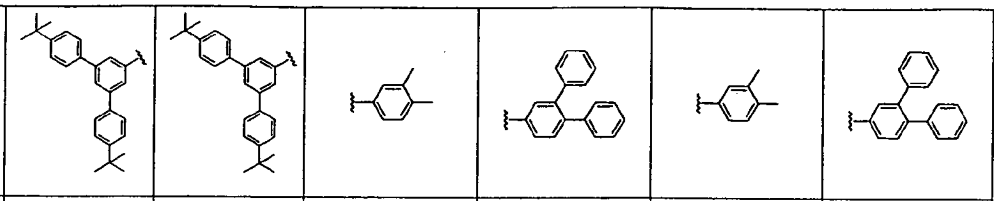
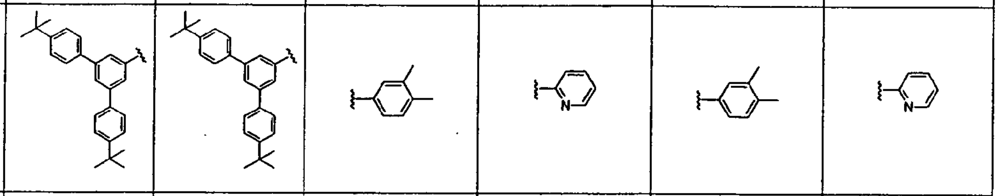
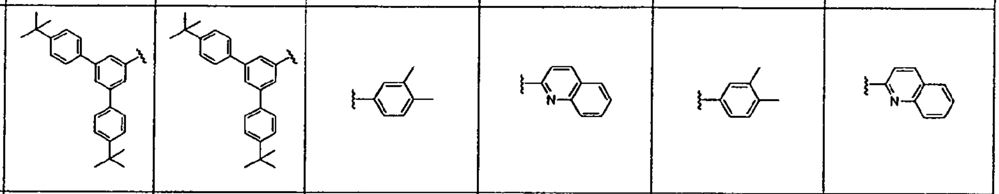
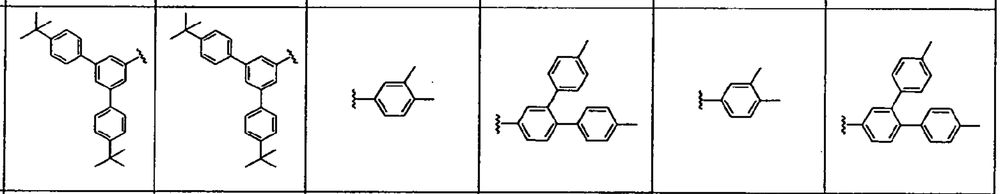
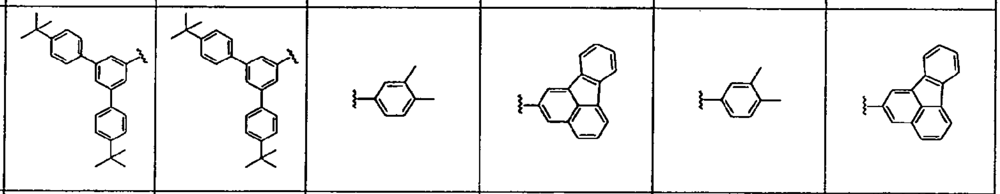
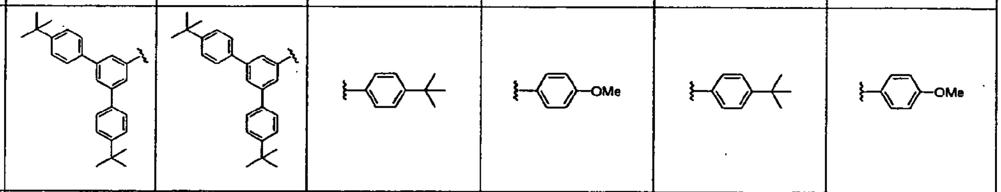
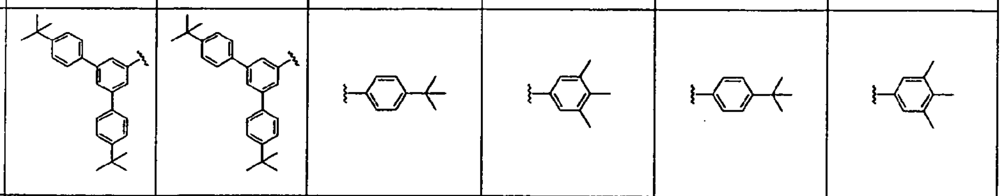
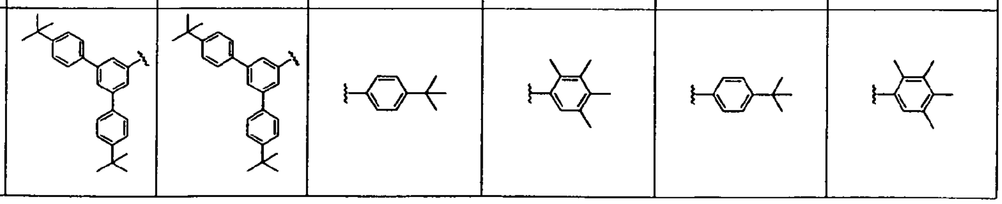
2256					
2257					
2258					
2259					
2260					
2261					
2262					
2263					

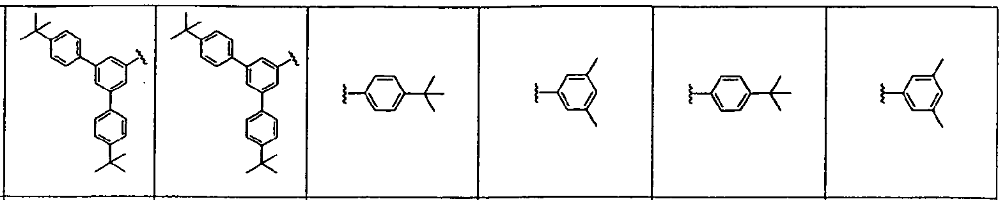
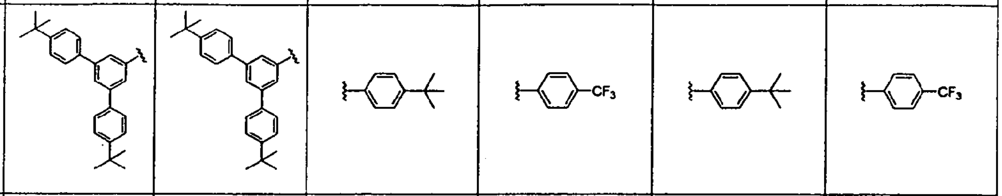
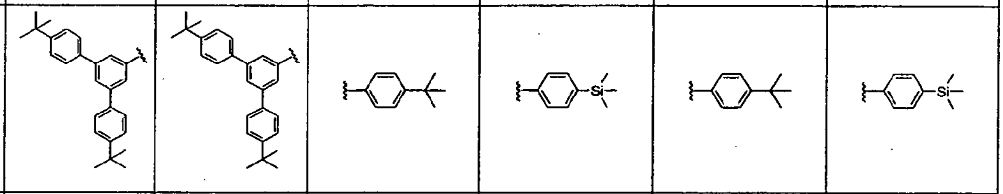
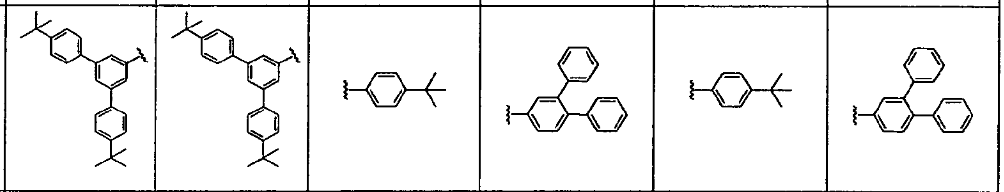
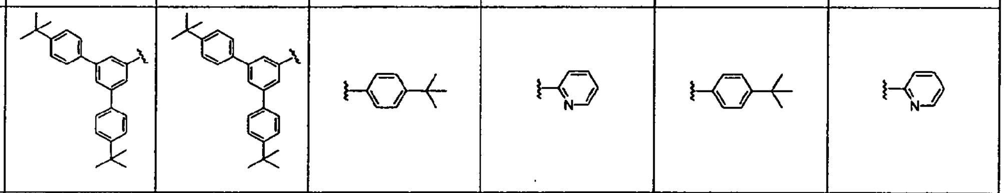
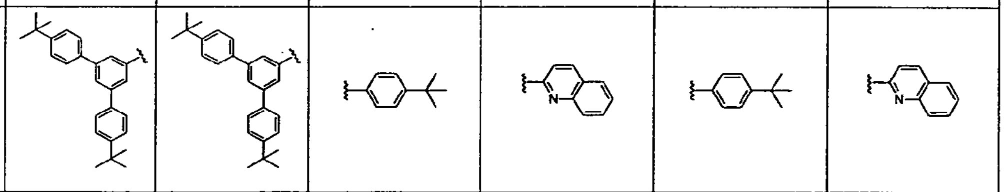
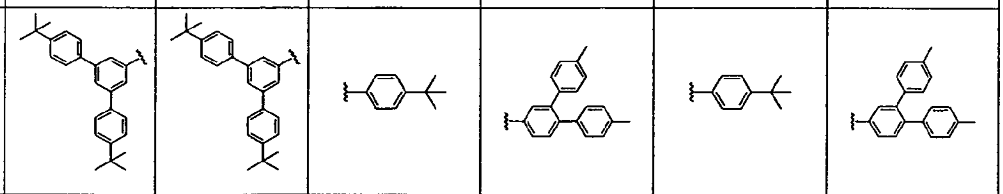
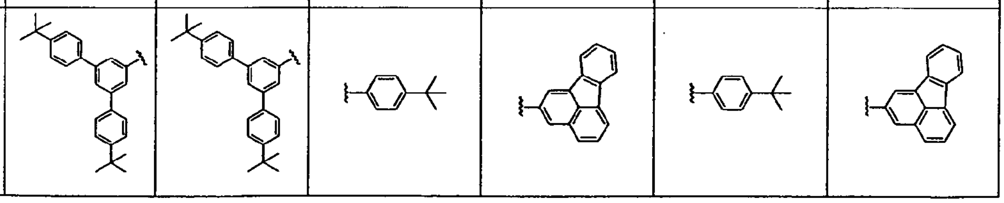
2264	
2265	
2266	
2267	
2268	
2269	
2270	
2271	

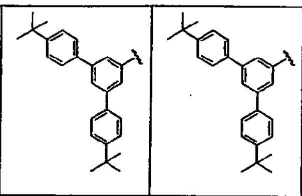
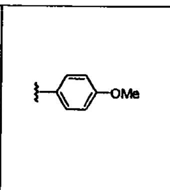
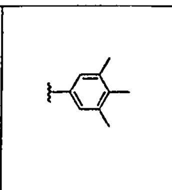
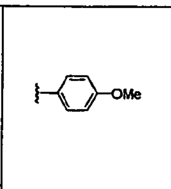
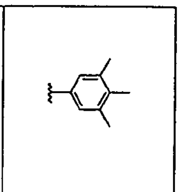
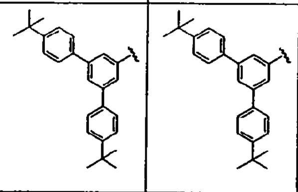
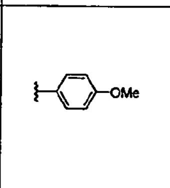
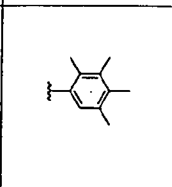
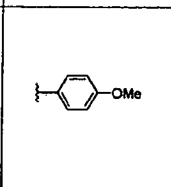
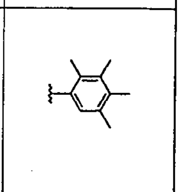
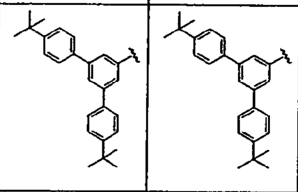
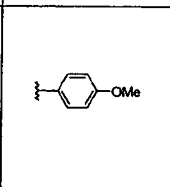
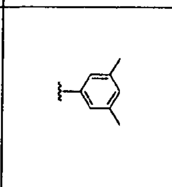
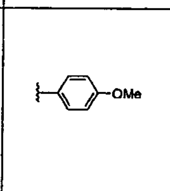
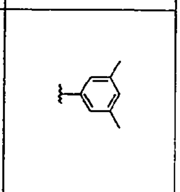
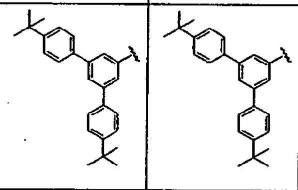
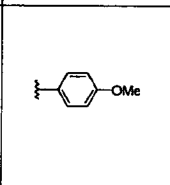
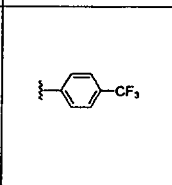
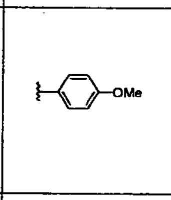
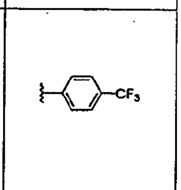
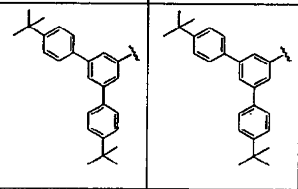
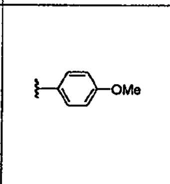
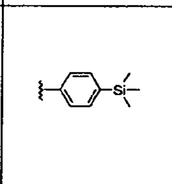
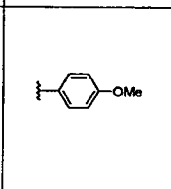
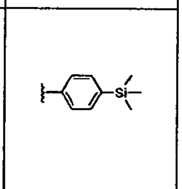
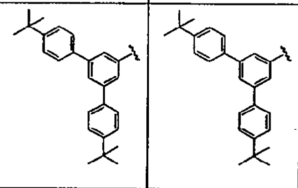
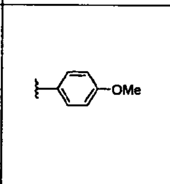
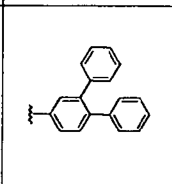
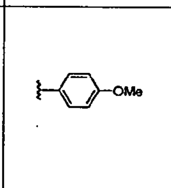
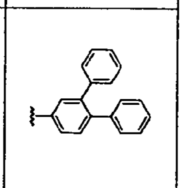
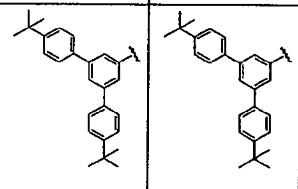
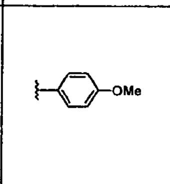
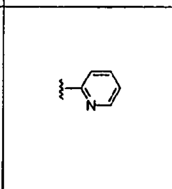
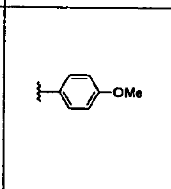
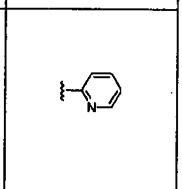
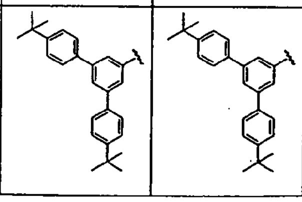
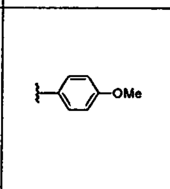
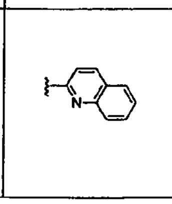
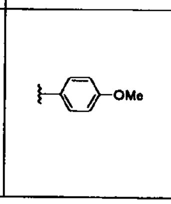
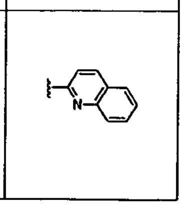
2272	
2273	
2274	
2275	
2276	
2277	
2278	
2279	

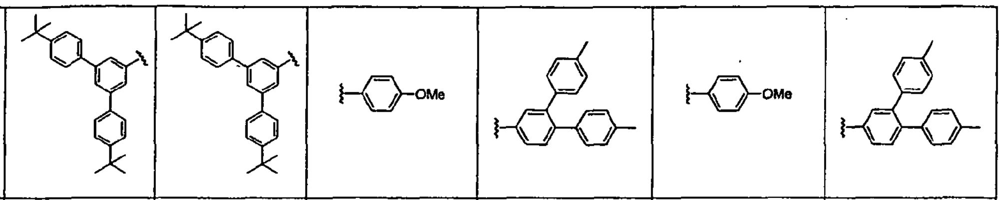
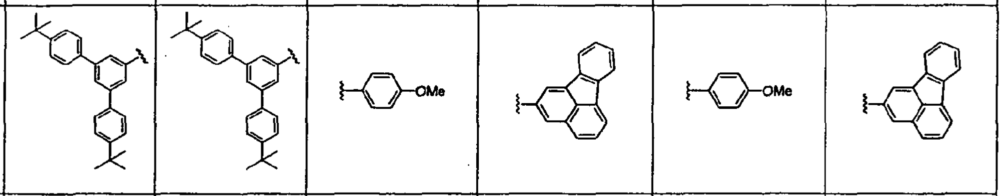
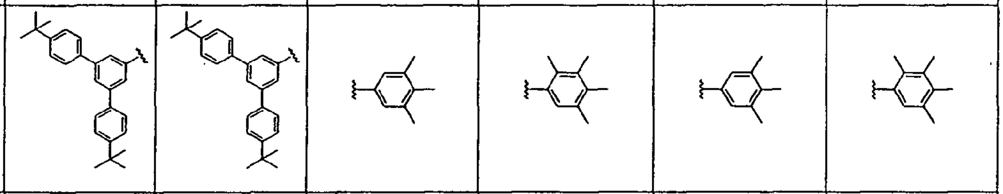
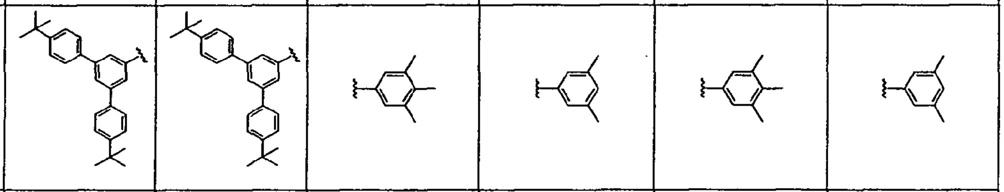
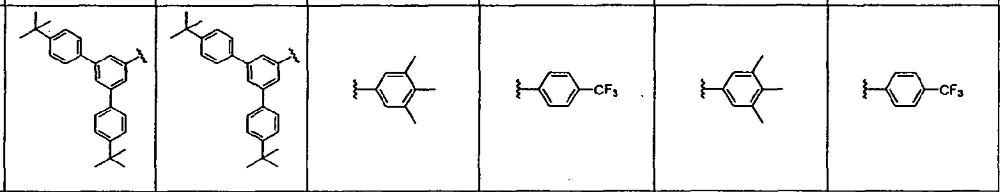
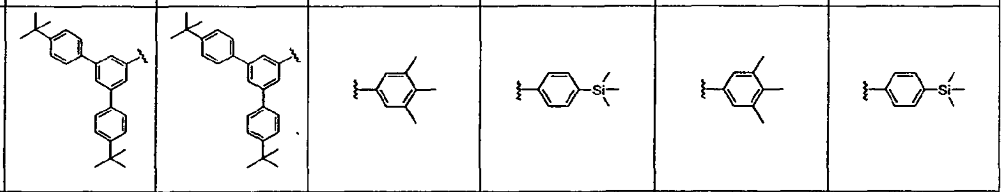
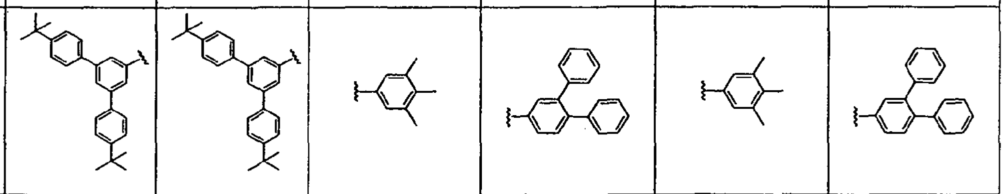
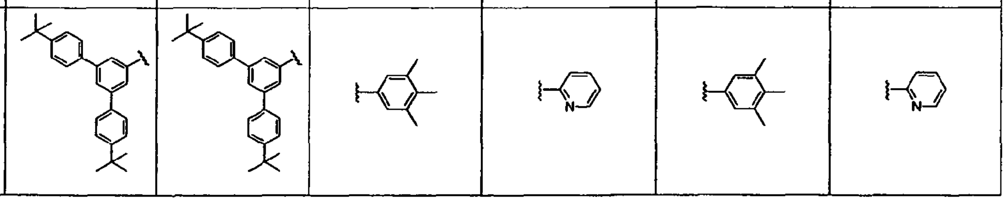
2280	
2281	
2282	
2283	
2284	
2285	
2286	
2287	

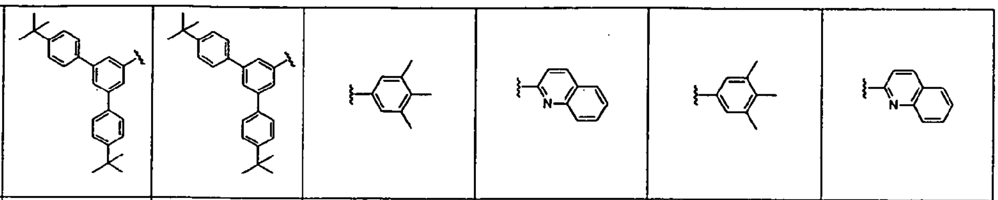
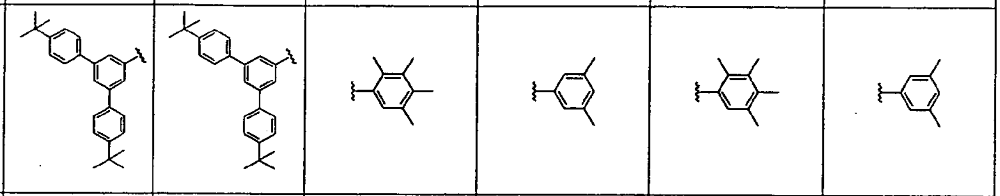
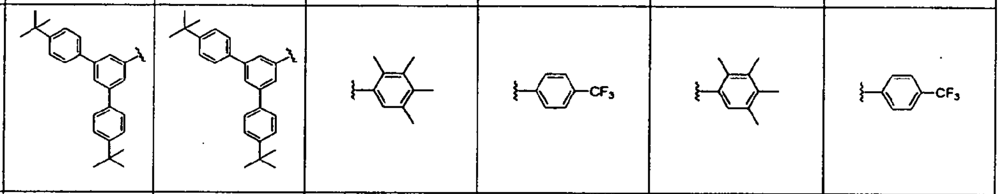
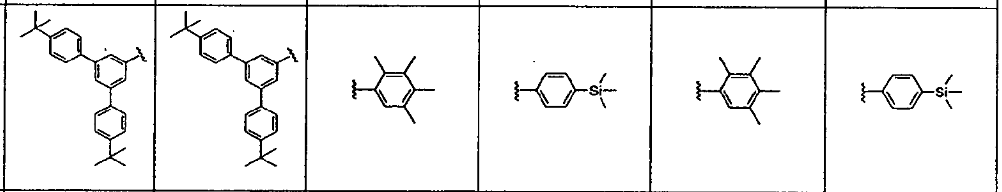
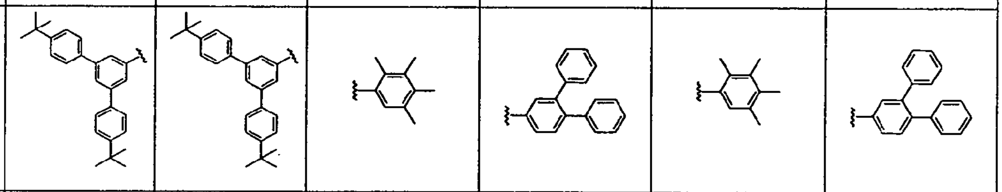
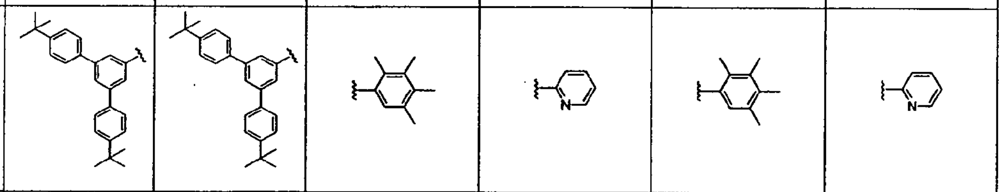
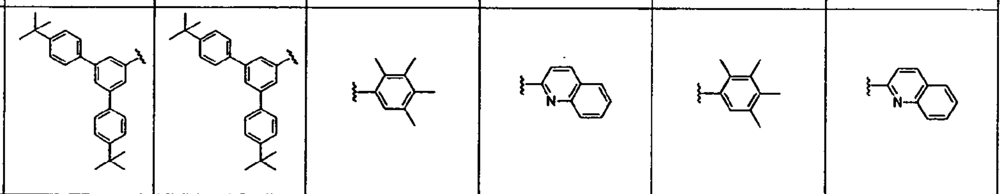
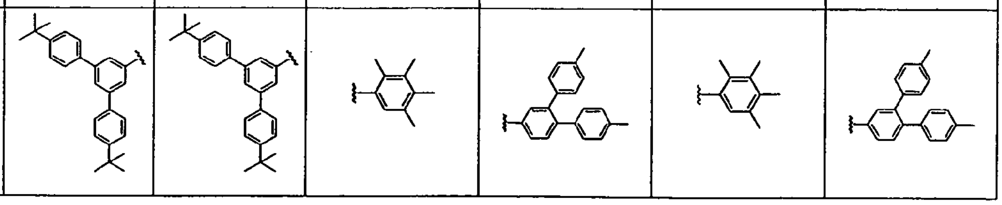
2288	
2289	
2290	
2291	
2292	
2293	
2294	
2295	

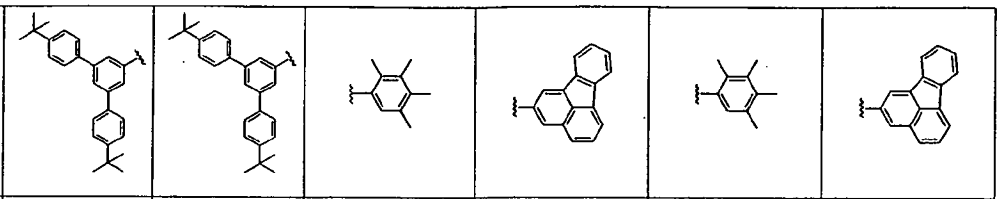
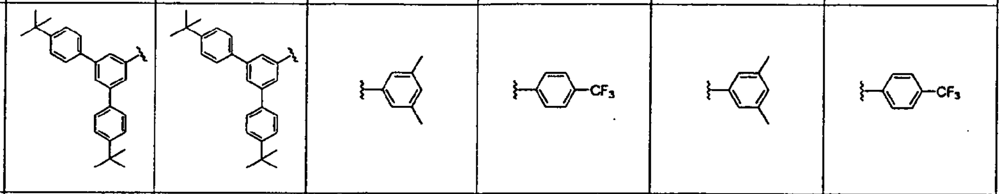
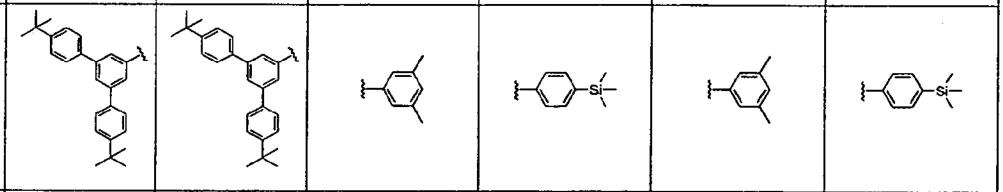
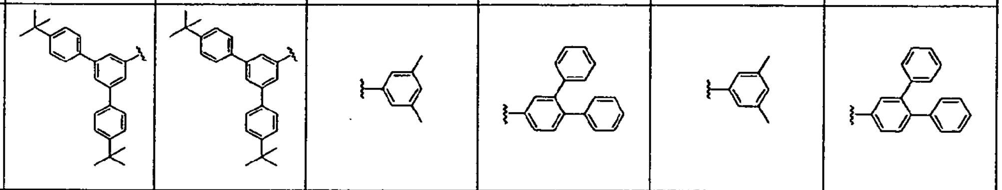
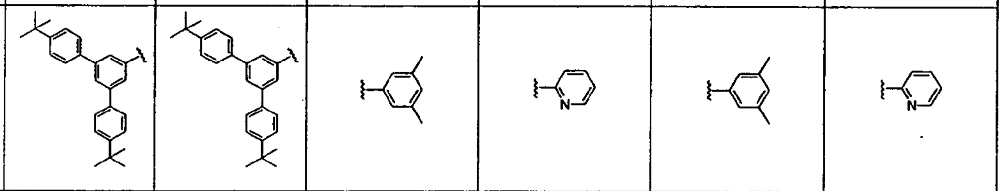
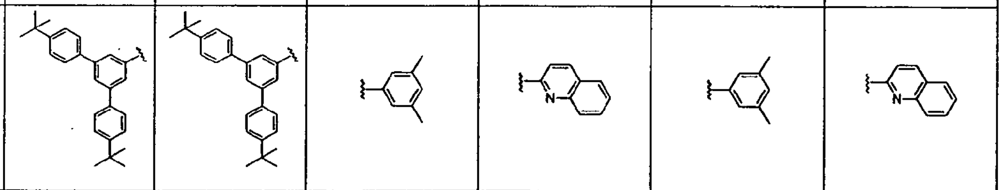
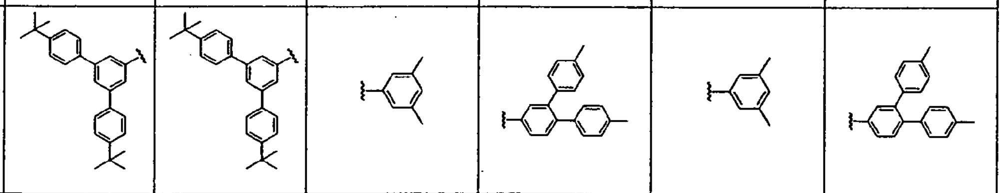
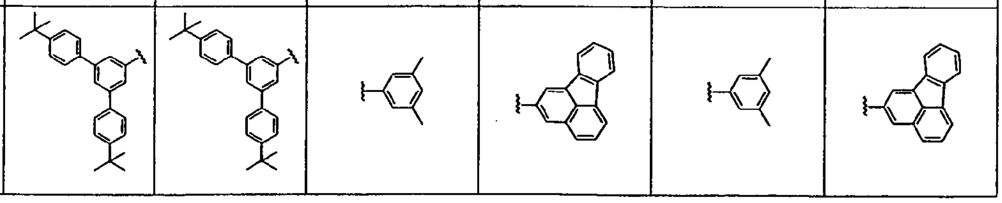
2296	
2297	
2298	
2299	
2300	
2301	
2302	
2303	

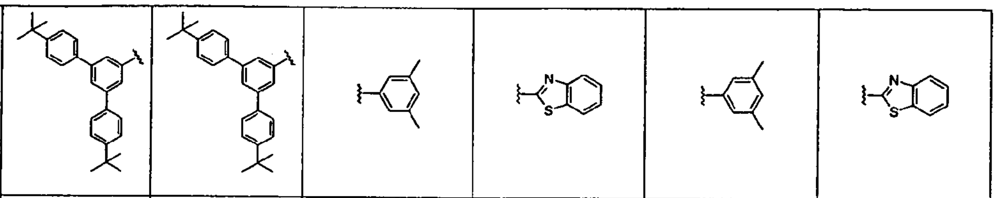
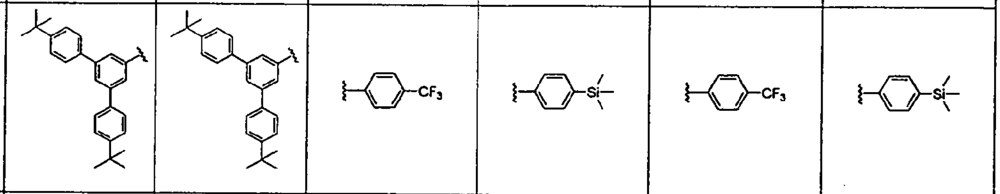
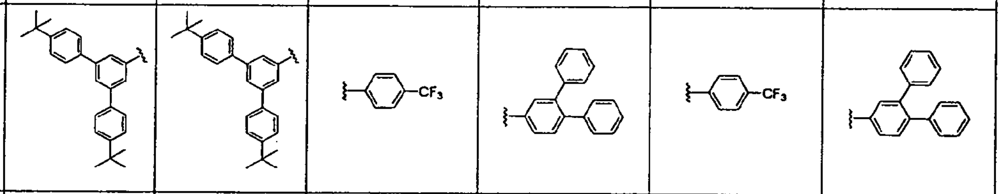
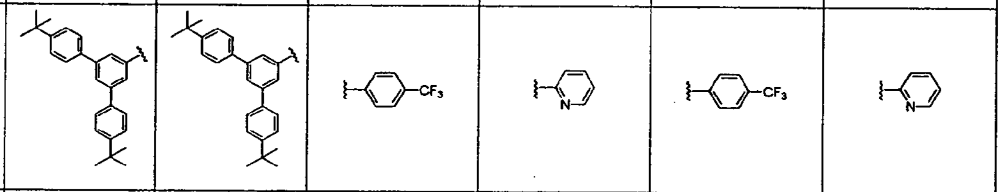
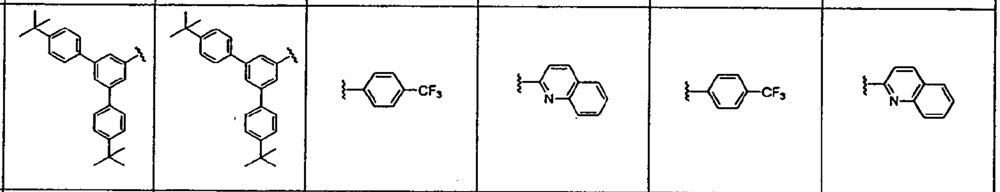
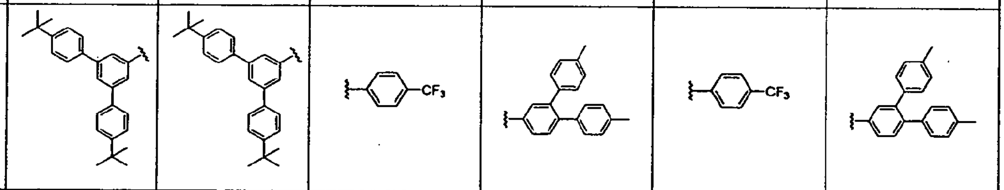
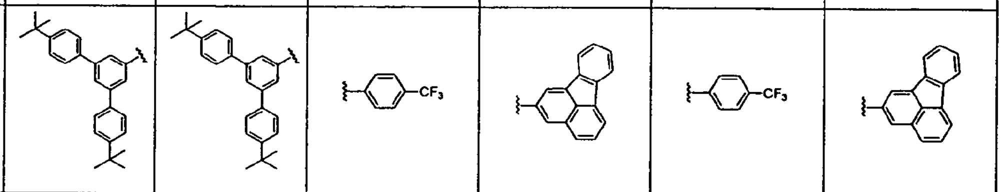
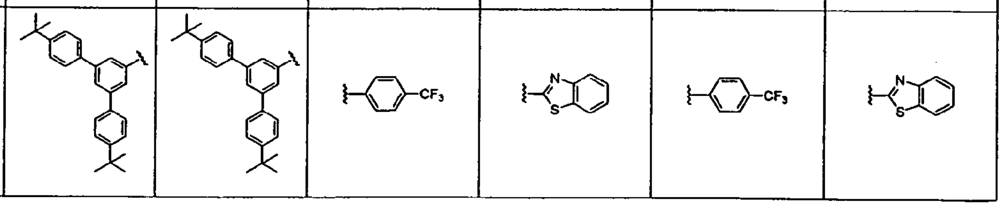
2304	
2305	
2306	
2307	
2308	
2309	
2310	
2311	

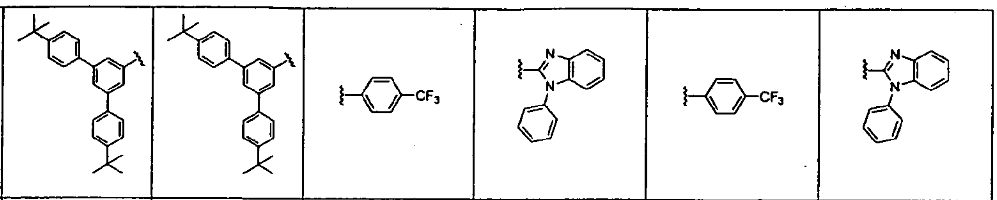
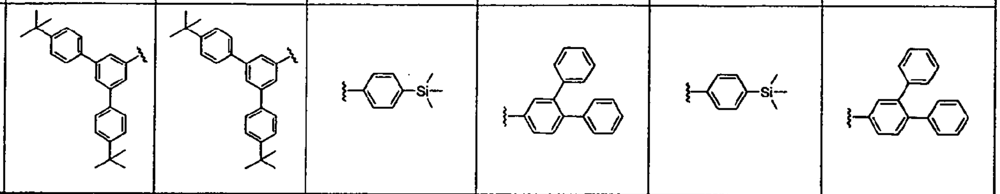
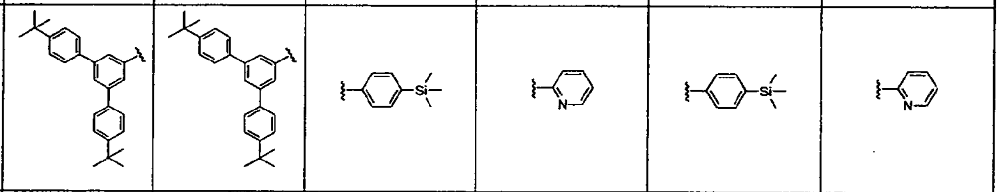
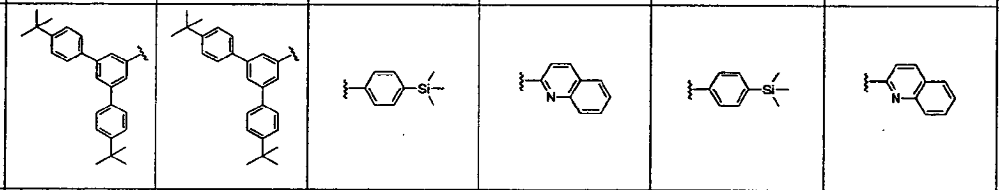
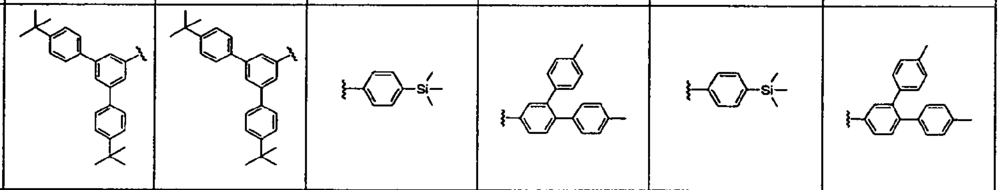
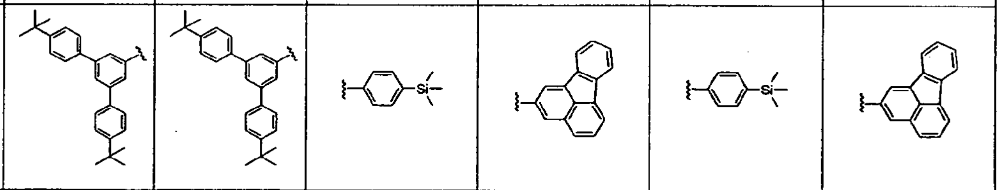
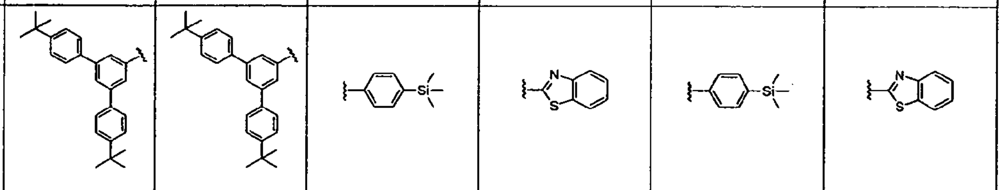
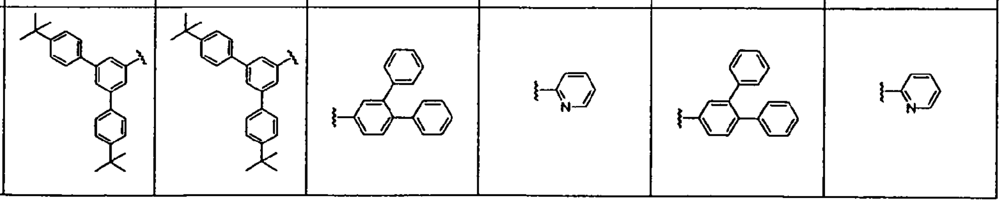
2312					
2313					
2314					
2315					
2316					
2317					
2318					
2319					

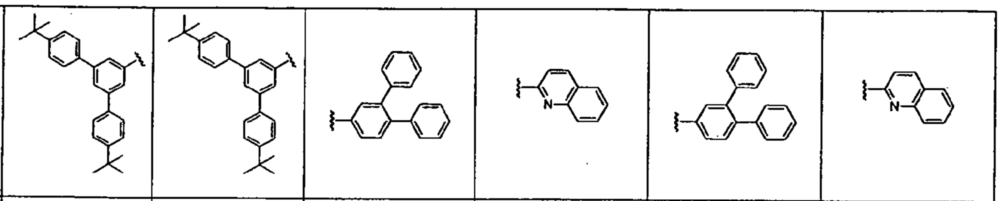
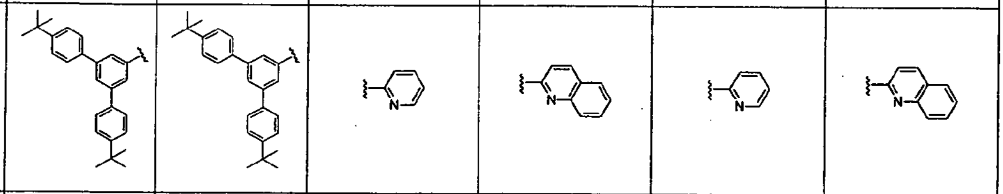
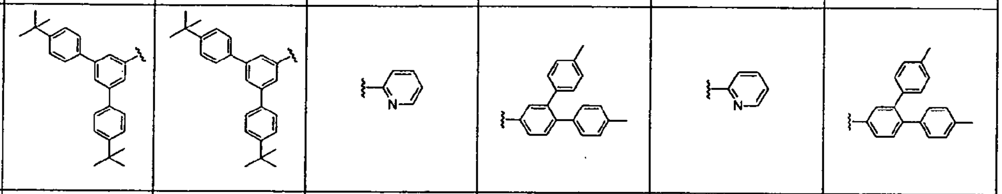
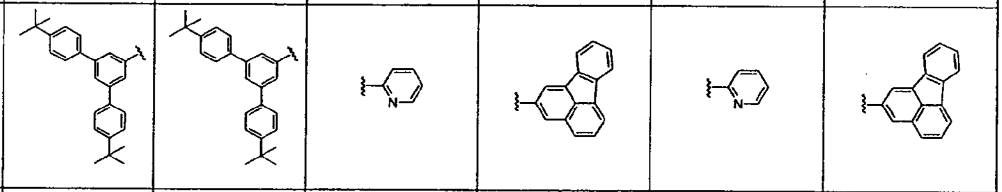
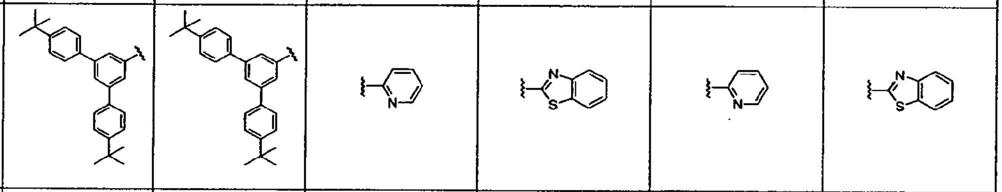
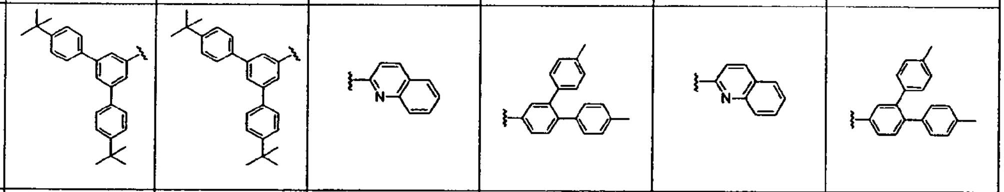
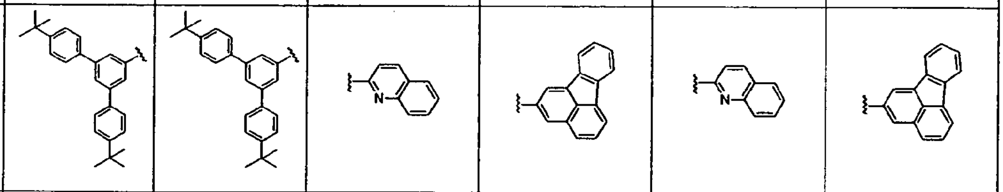
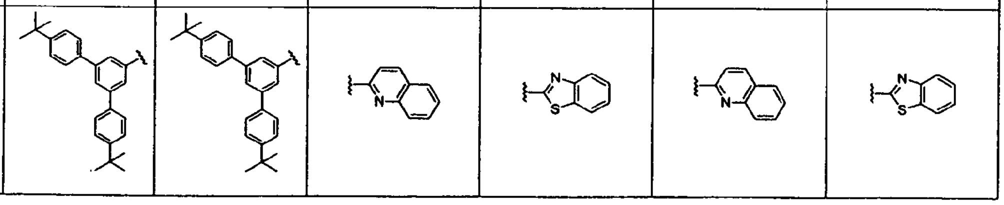
2320	
2321	
2322	
2323	
2324	
2325	
2326	
2327	

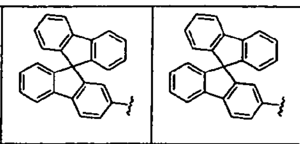
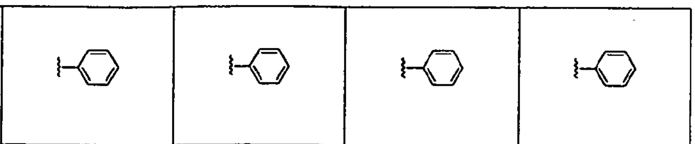
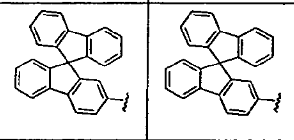
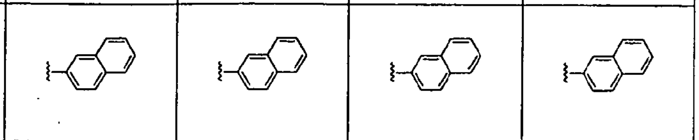
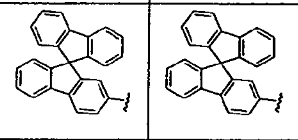
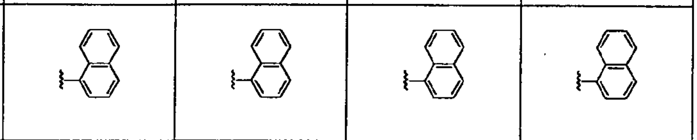
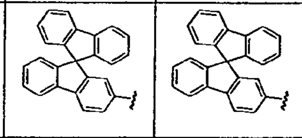
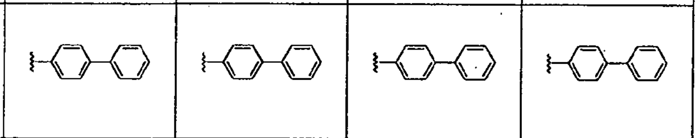
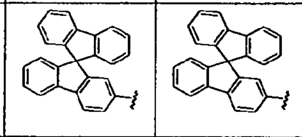
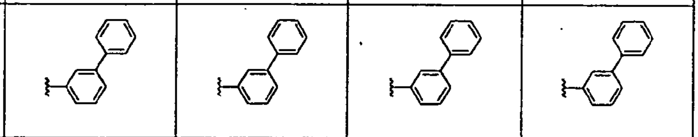
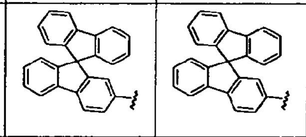
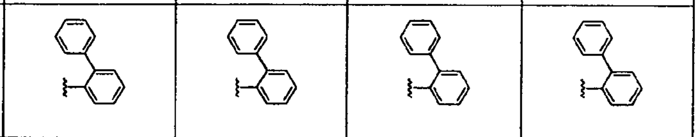
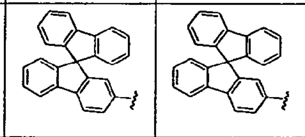
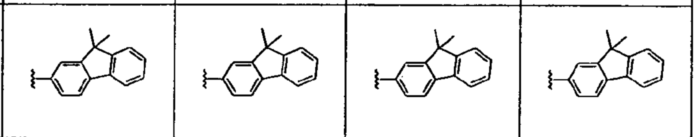
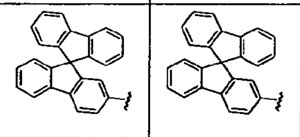
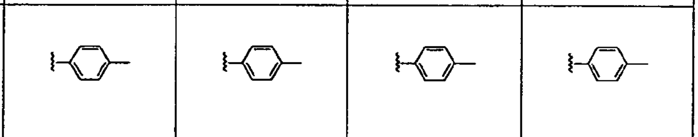
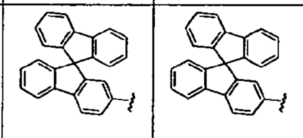
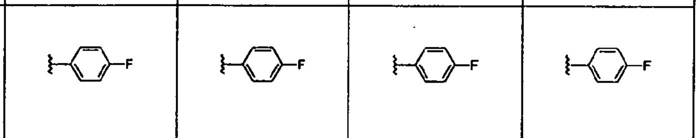
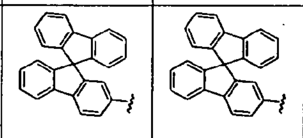
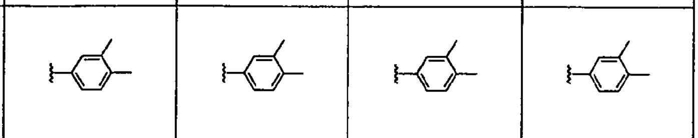
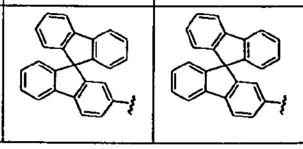
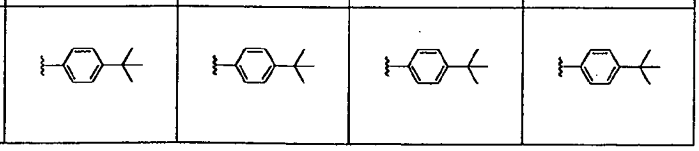
2328	
2329	
2330	
2331	
2332	
2333	
2334	
2335	

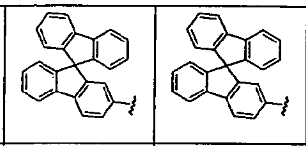
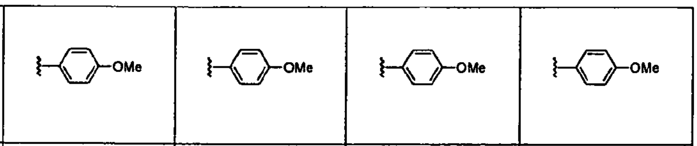
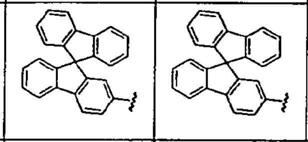
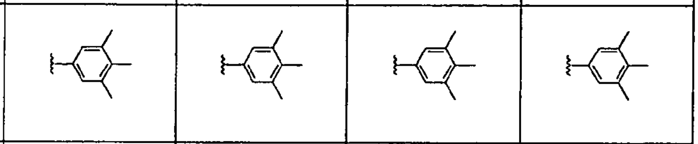
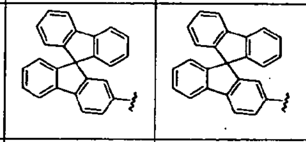
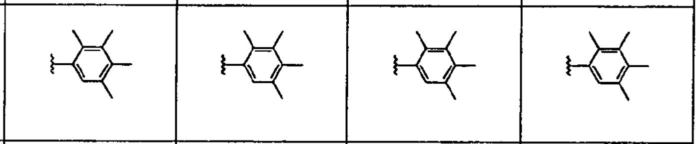
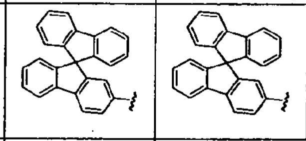
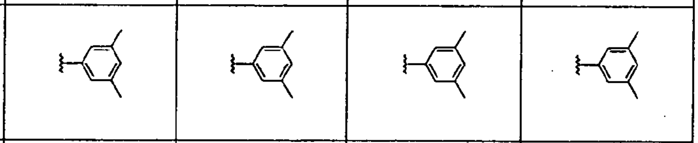
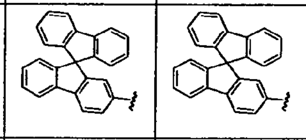
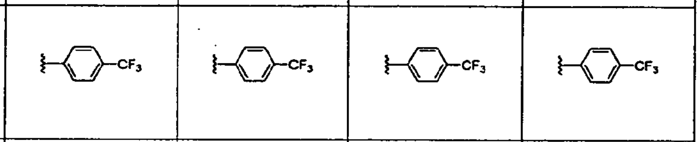
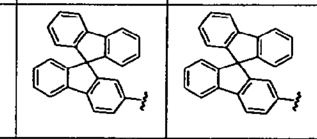
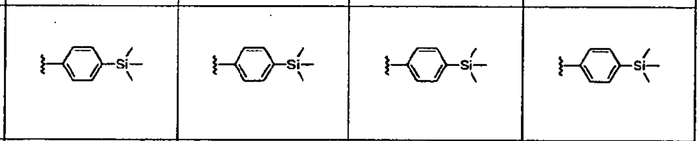
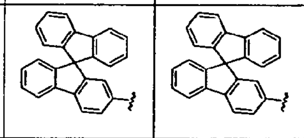
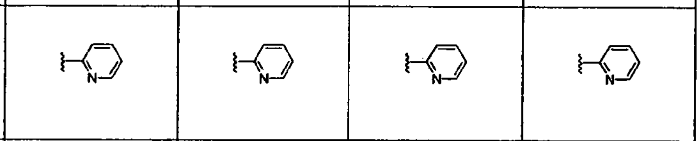
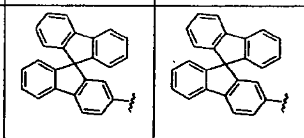
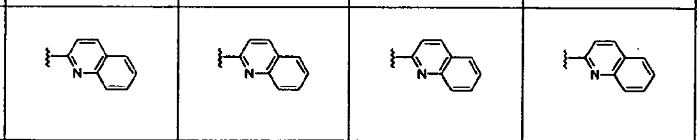
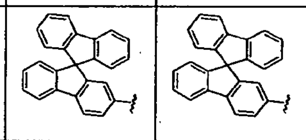
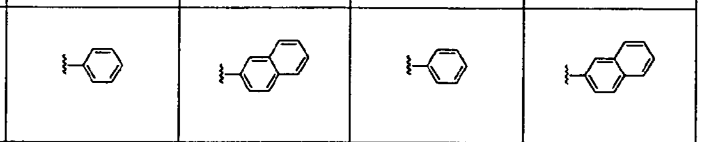
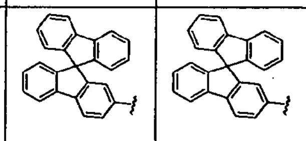
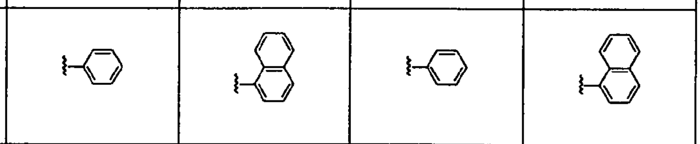
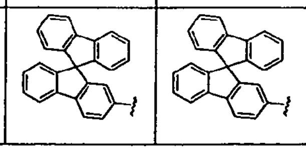
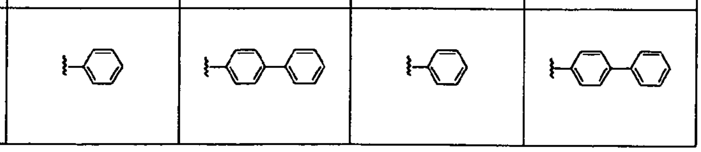
2336	
2337	
2338	
2339	
2340	
2341	
2342	
2343	

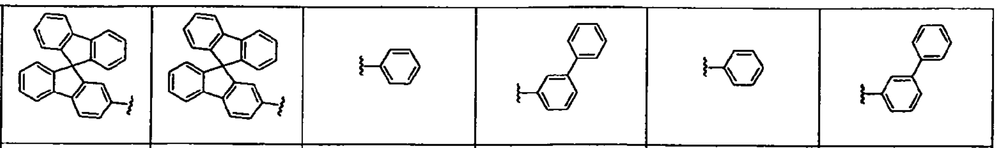
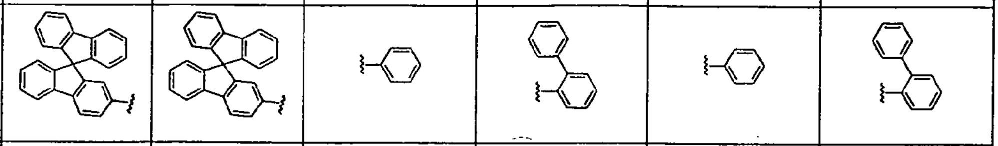
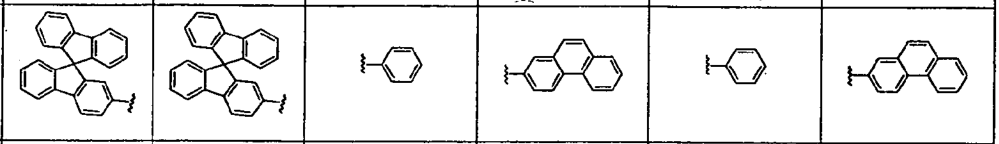
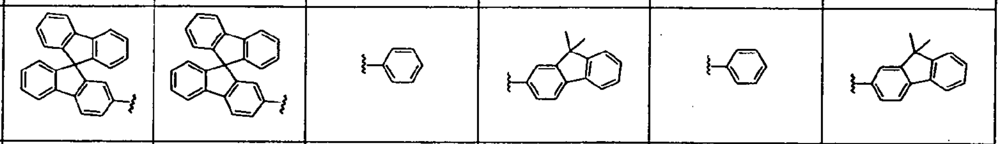
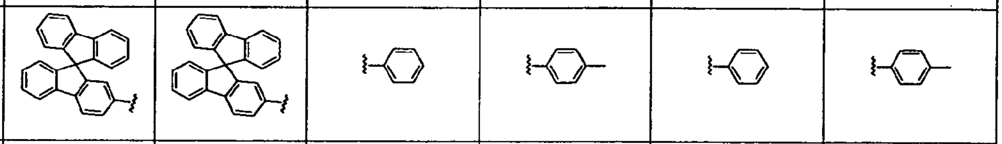
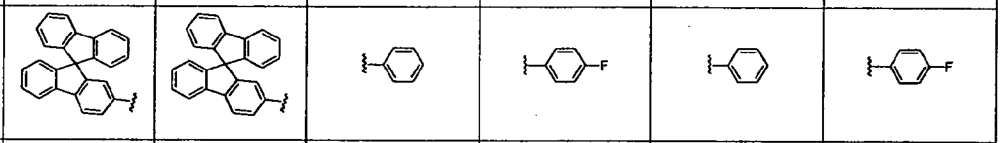
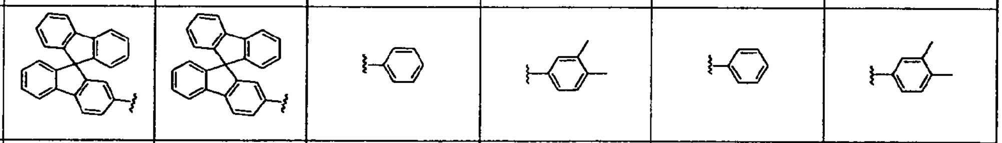
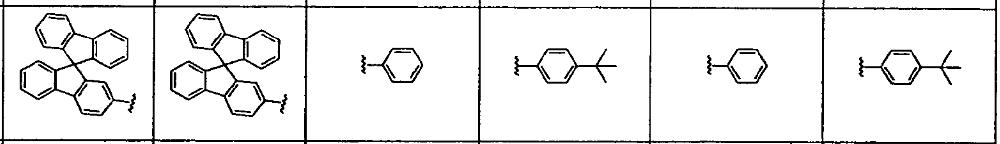
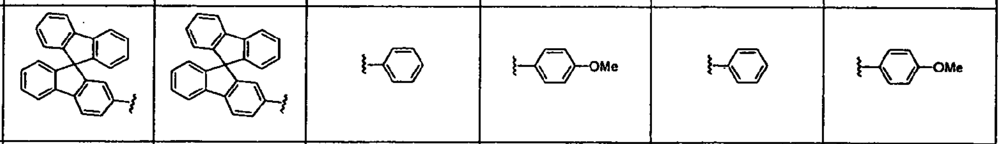
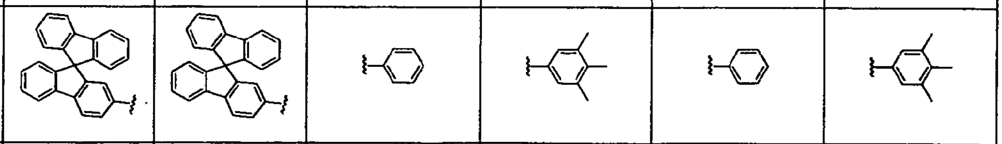
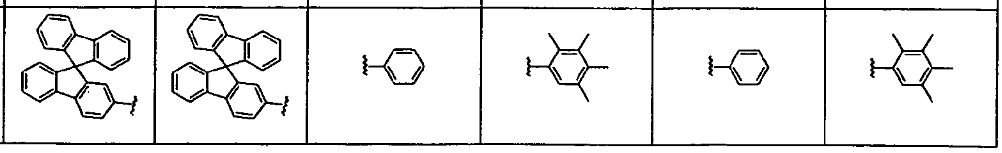
2344	
2345	
2346	
2347	
2348	
2349	
2350	
2351	

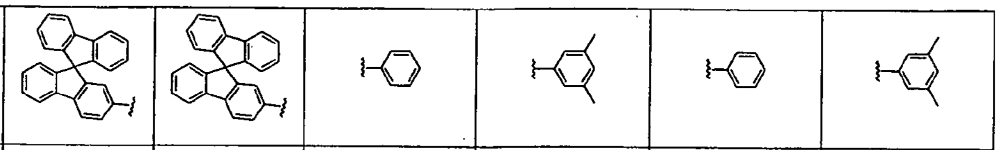
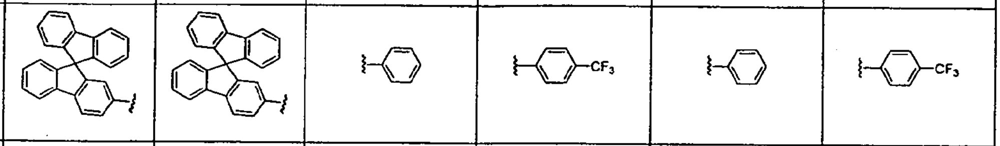
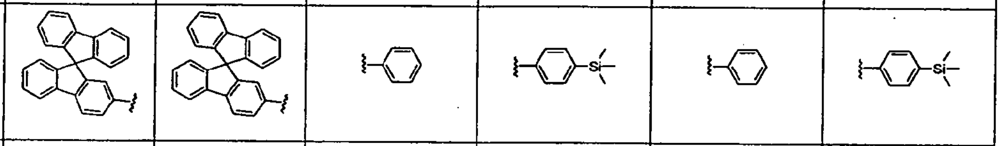
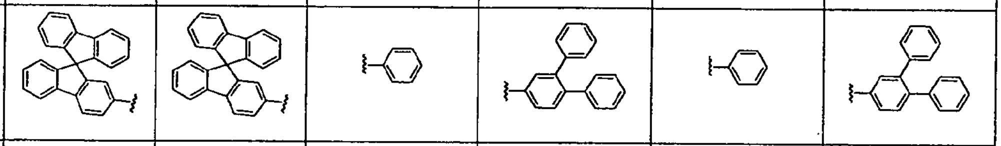
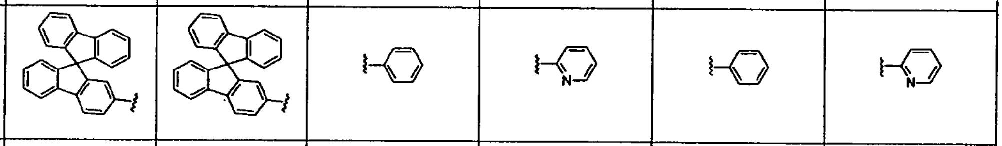
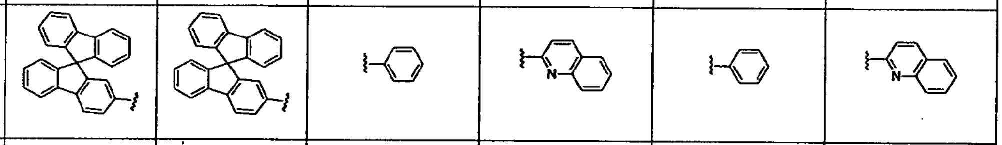
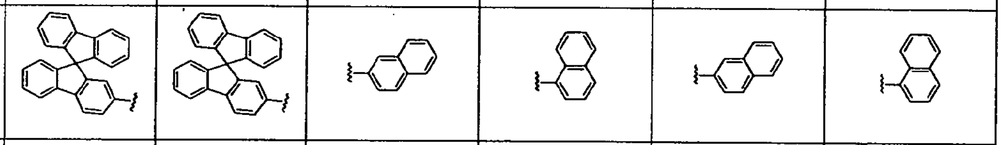
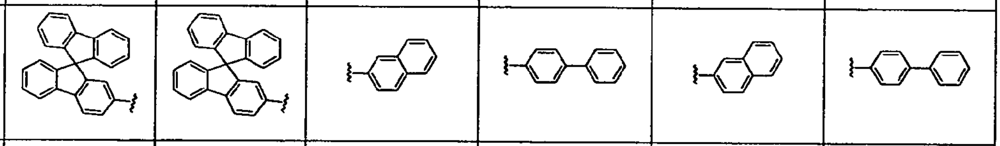
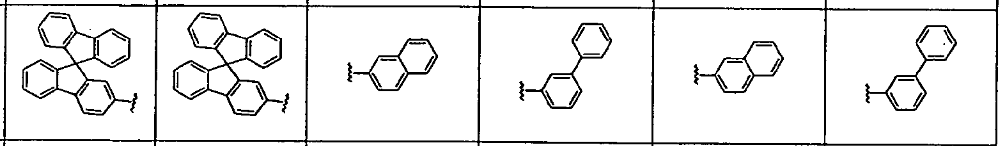
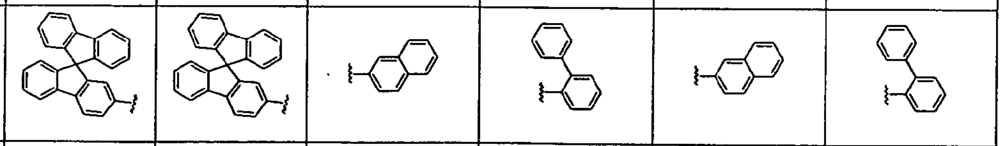
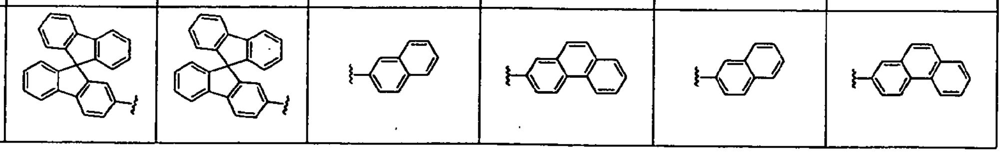
2352	
2353	
2354	
2355	
2356	
2357	
2358	
2359	

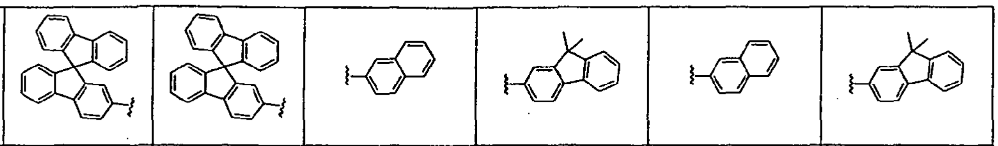
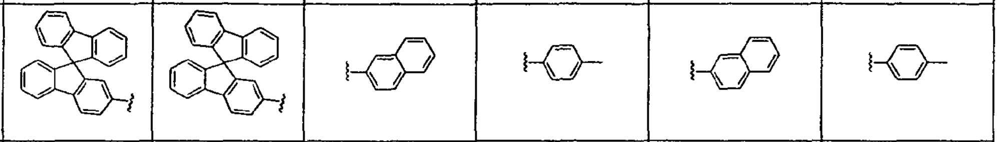
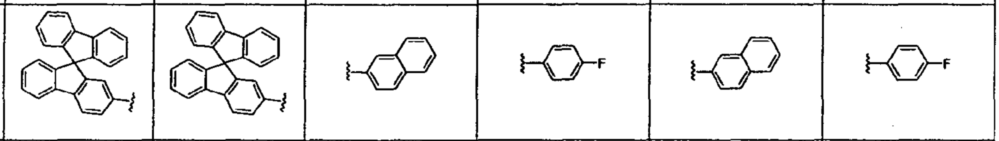
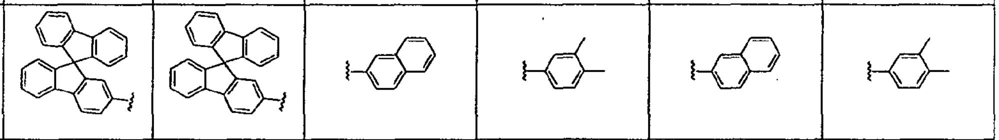
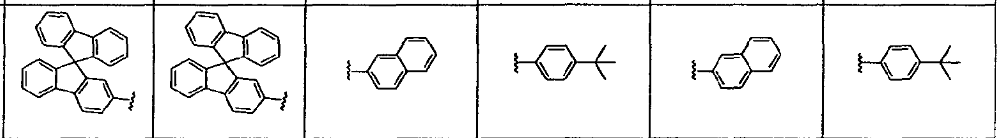
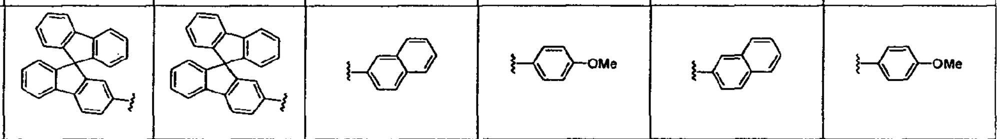
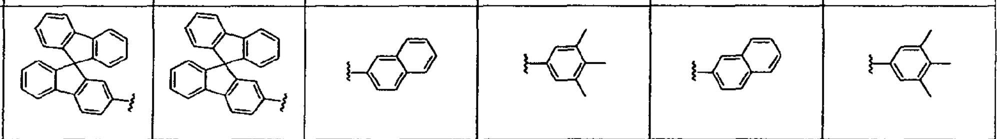
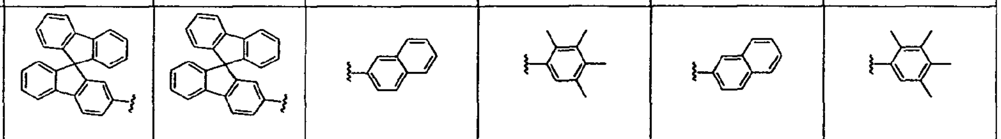
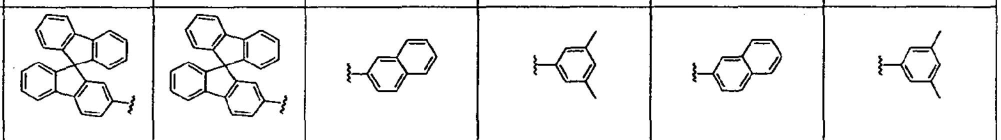
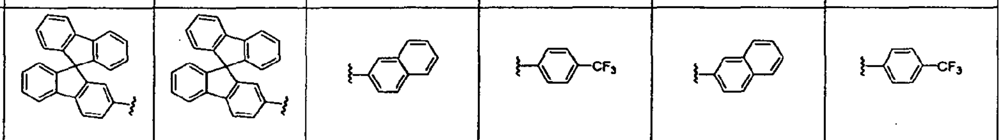
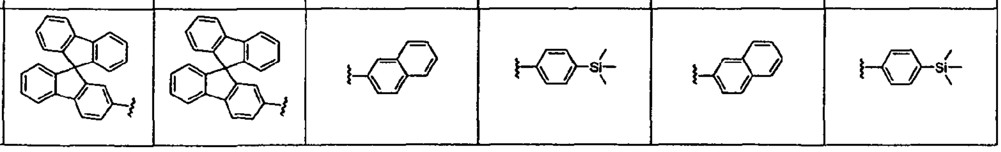
2360	
2361	
2362	
2363	
2364	
2365	
2366	
2367	

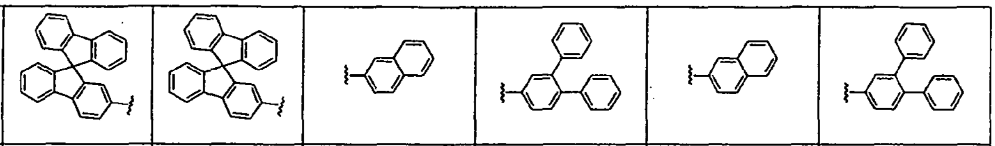
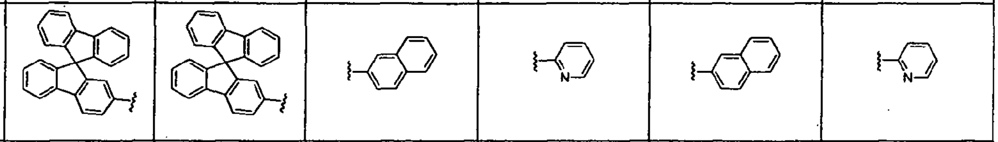
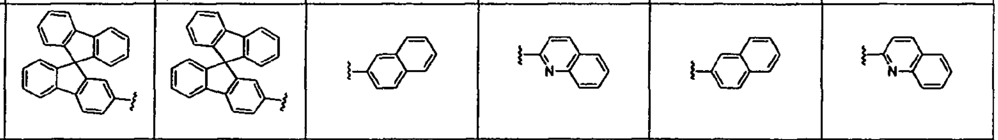
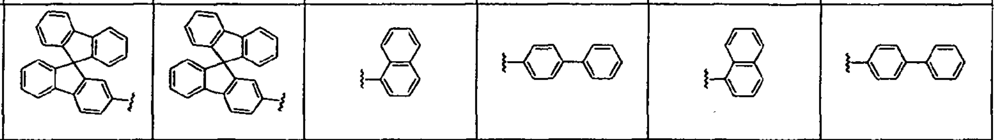
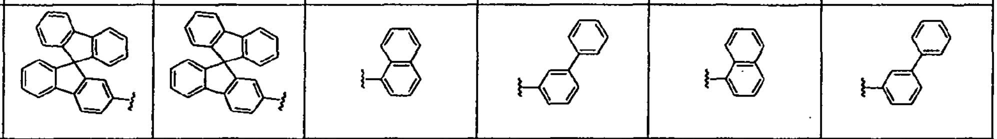
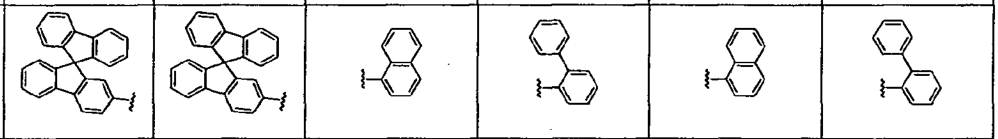
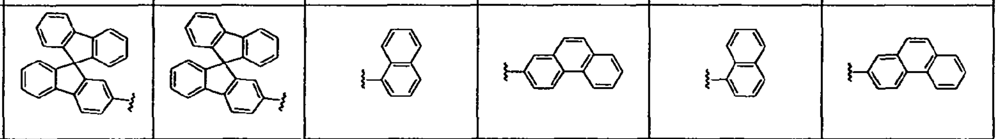
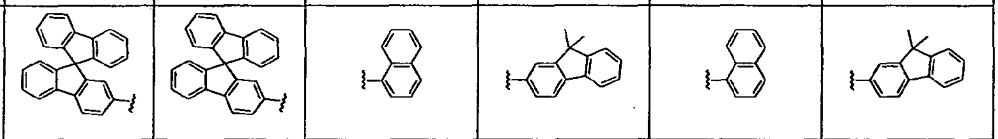
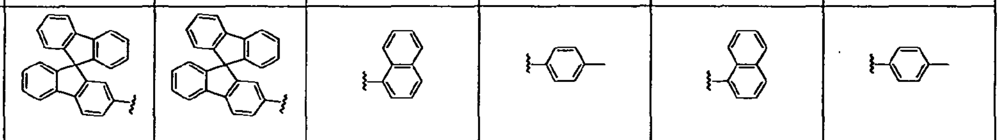
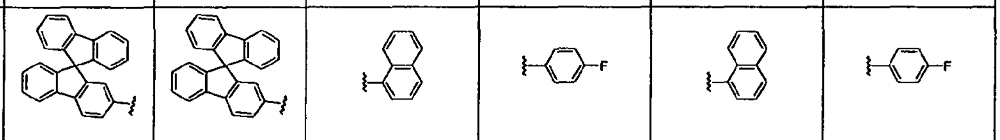
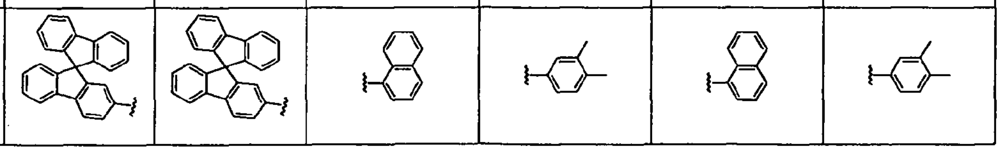
2368						
2369						
2370						
2371						
2372						
2373						
2374						
2375						
2376						
2377						
2378						

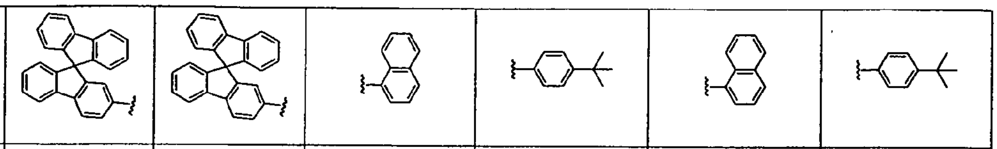
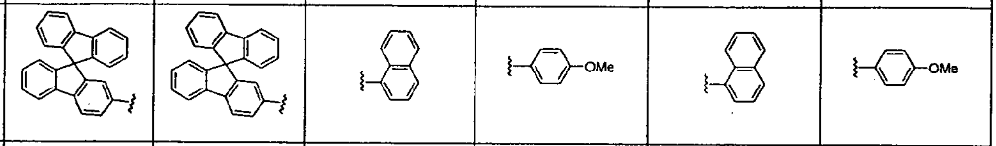
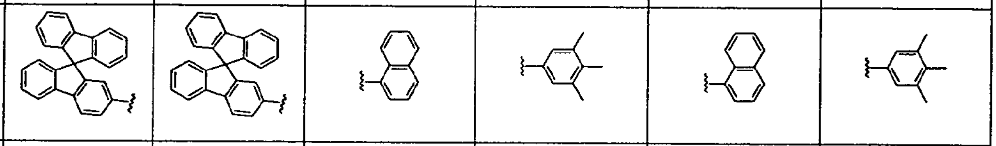
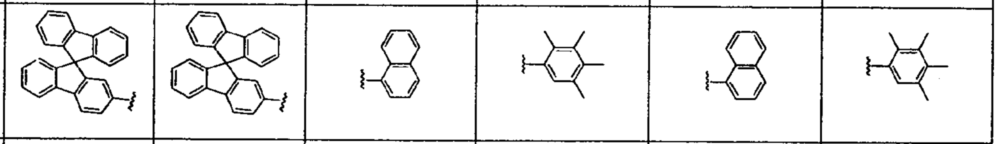
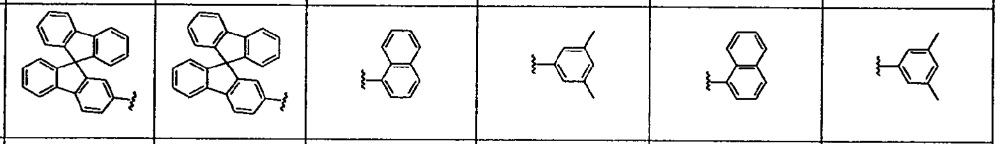
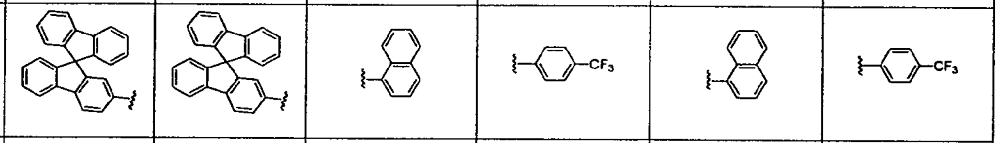
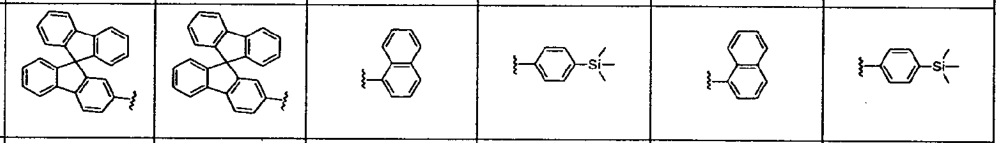
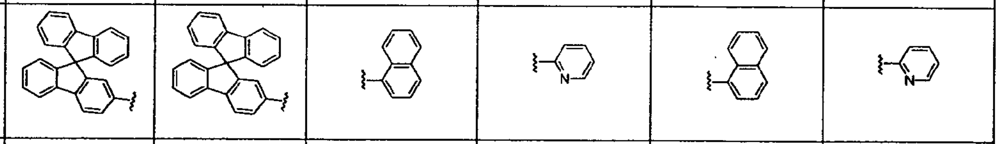
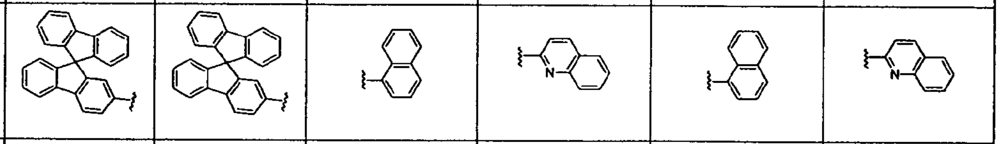
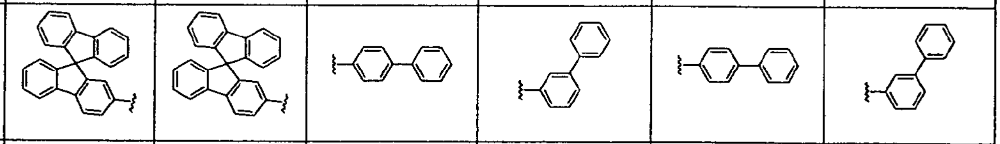
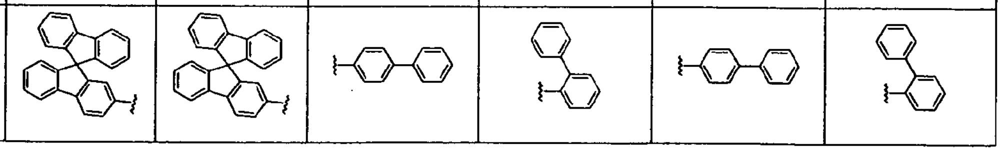
2379		
2380		
2381		
2382		
2383		
2384		
2385		
2386		
2387		
2388		
2389		

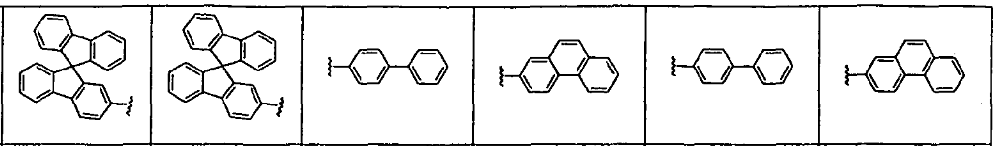
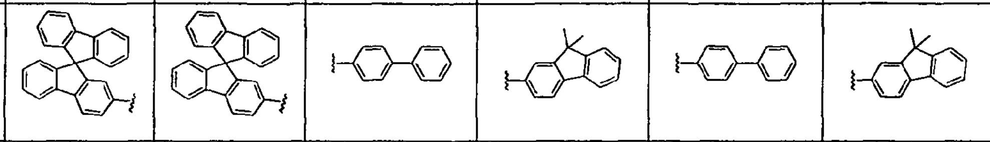
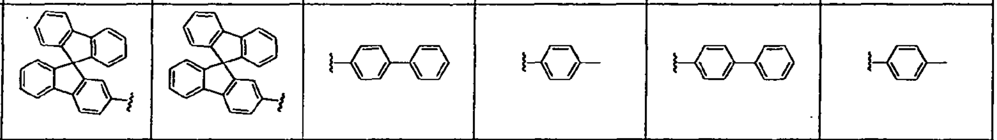
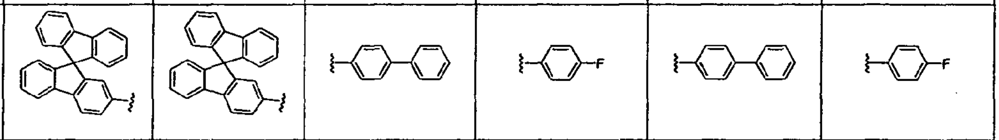
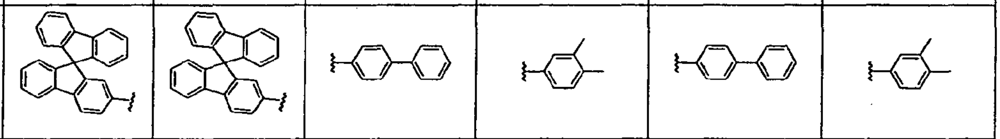
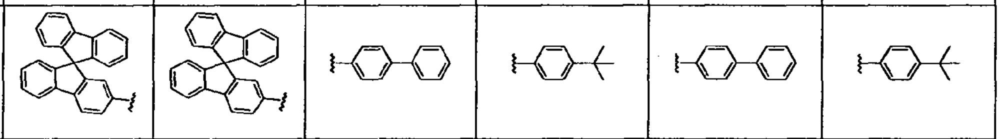
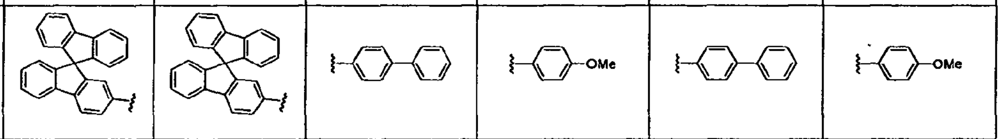
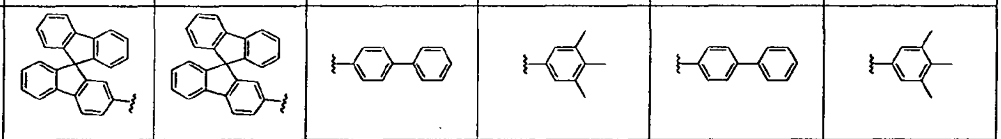
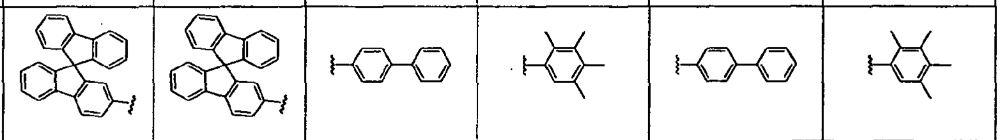
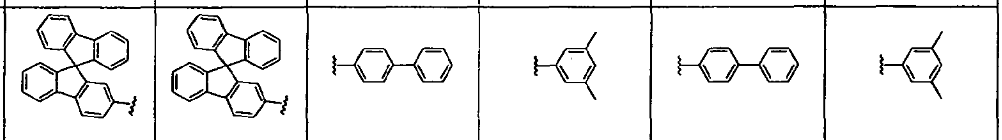
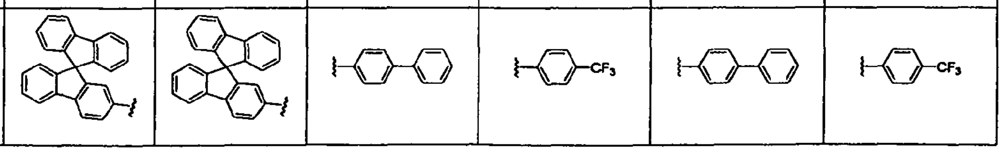
2390	
2391	
2392	
2393	
2394	
2395	
2396	
2397	
2398	
2399	
2400	

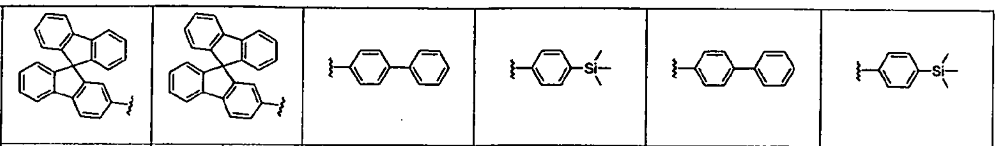
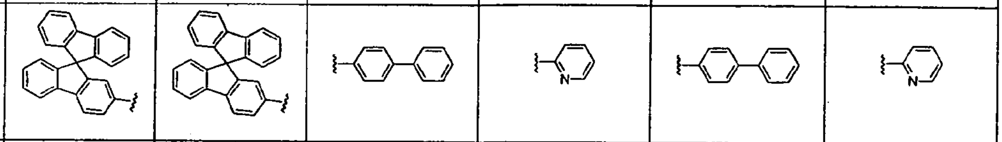
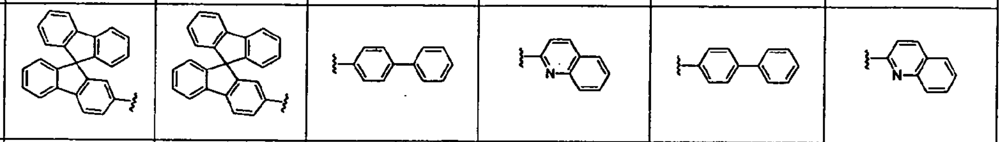
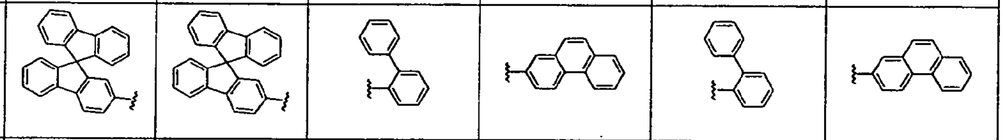
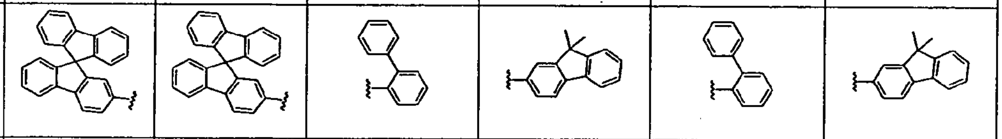
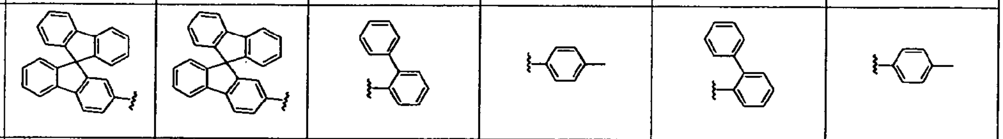
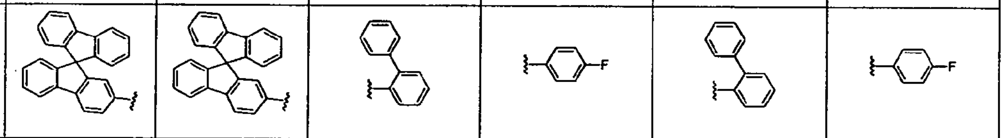
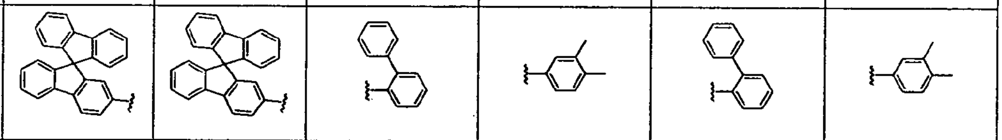
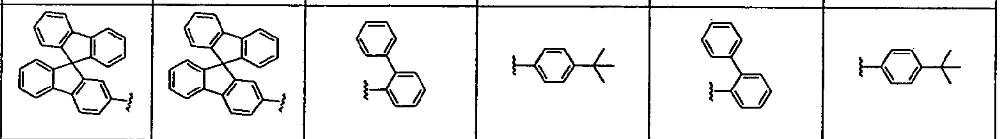
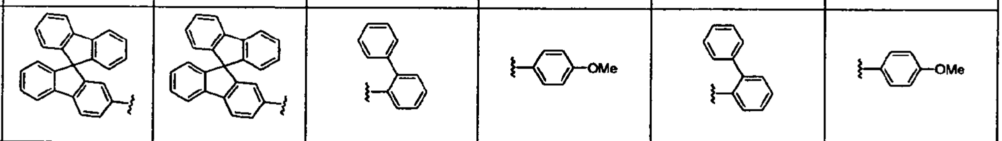
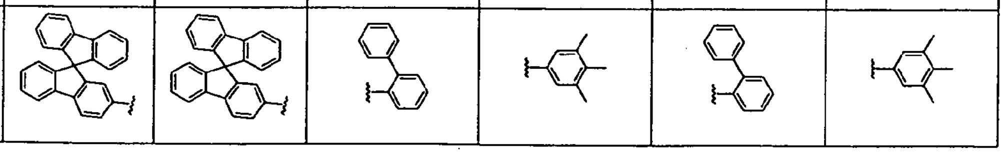
2401	
2402	
2403	
2404	
2405	
2406	
2407	
2408	
2409	
2410	
2411	

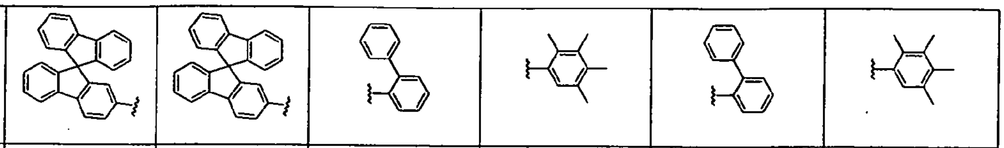
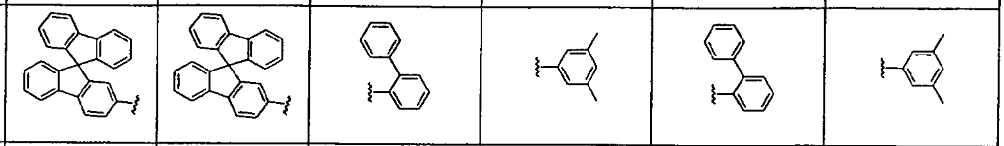
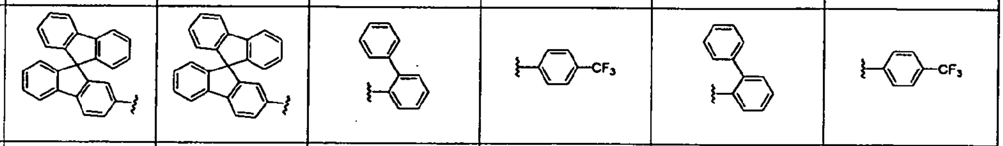
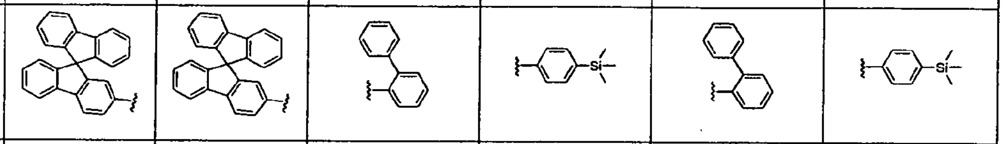
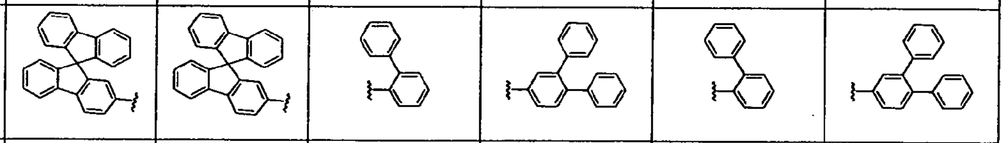
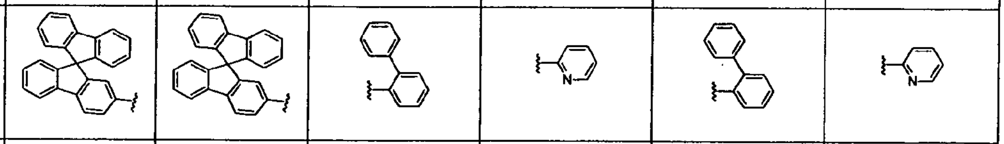
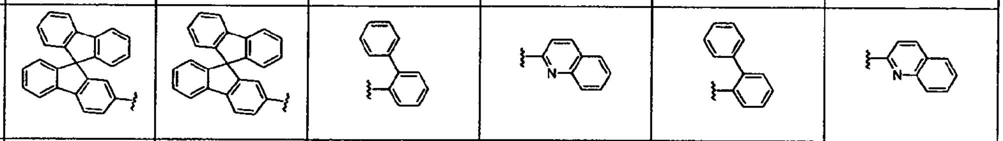
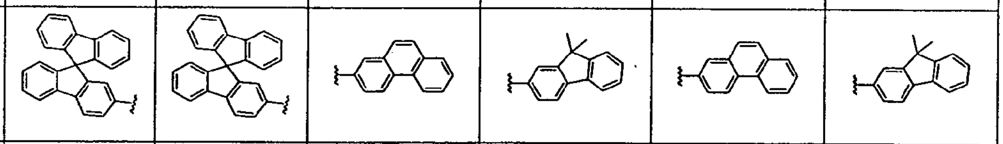
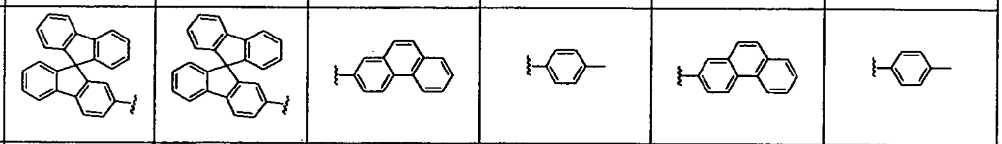
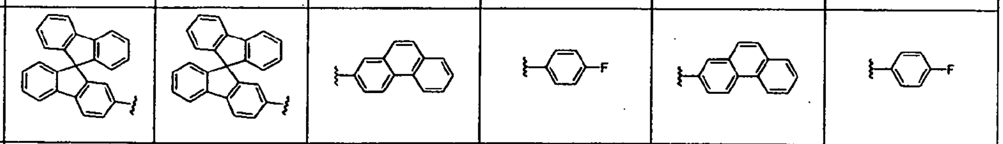
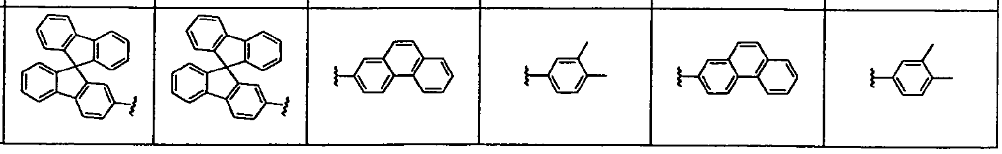
2412	
2413	
2414	
2415	
2416	
2417	
2418	
2419	
2420	
2421	
2422	

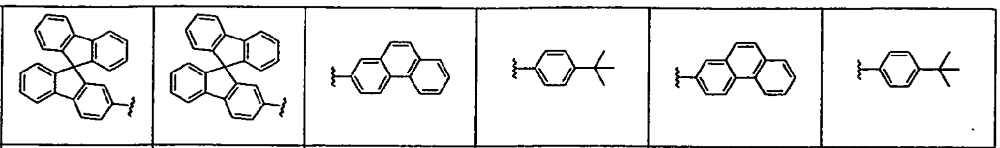
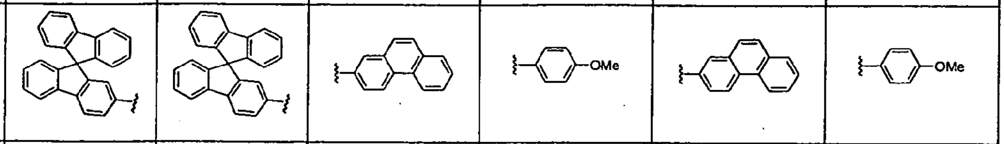
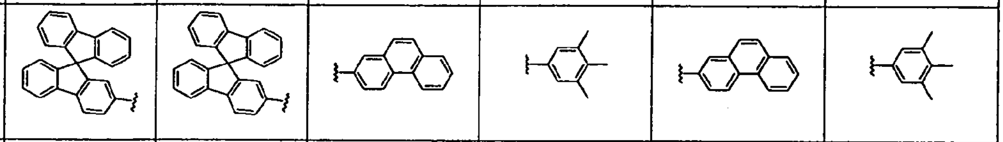
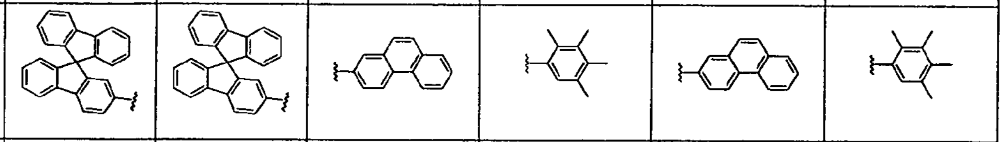
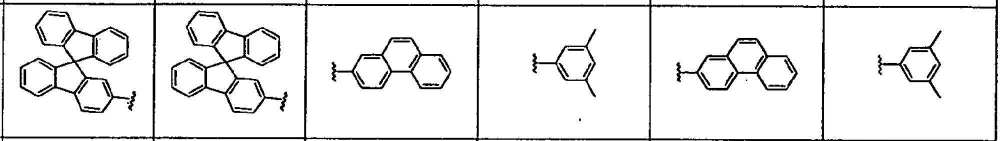
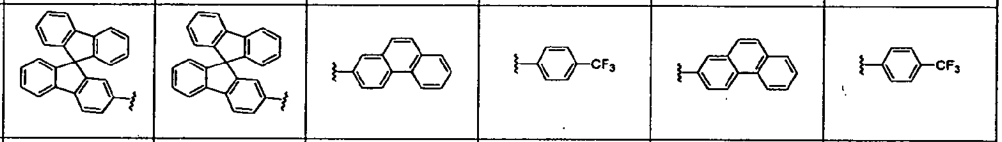
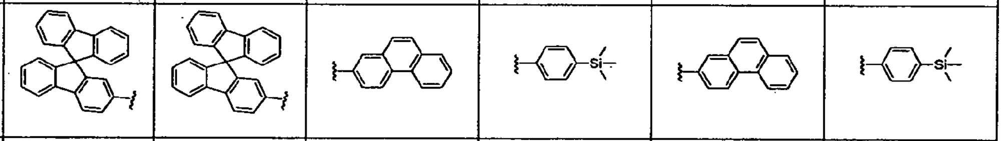
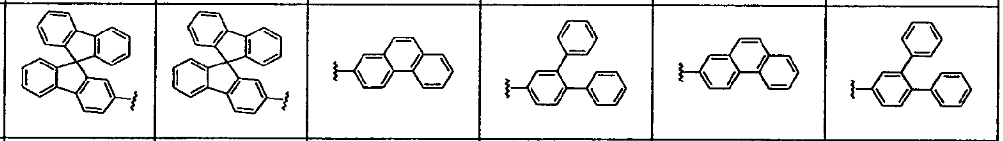
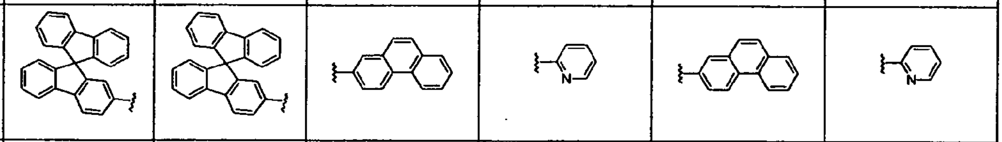
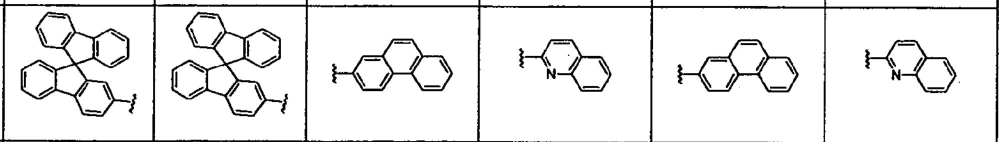
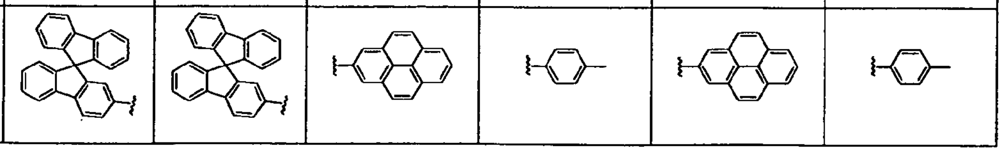
2423	
2424	
2425	
2426	
2427	
2428	
2429	
2430	
2431	
2432	
2433	

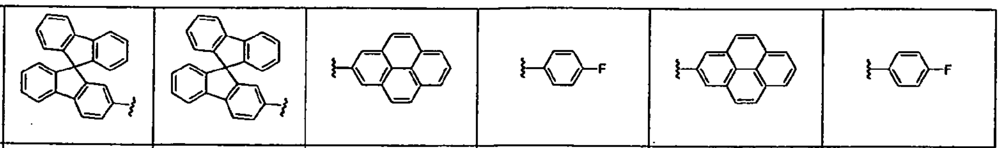
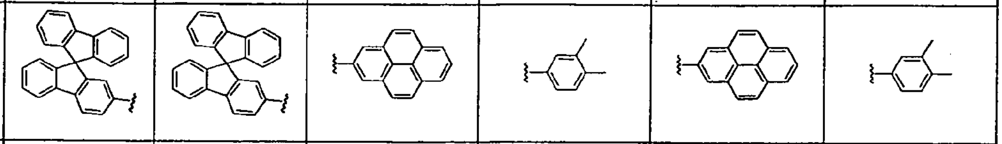
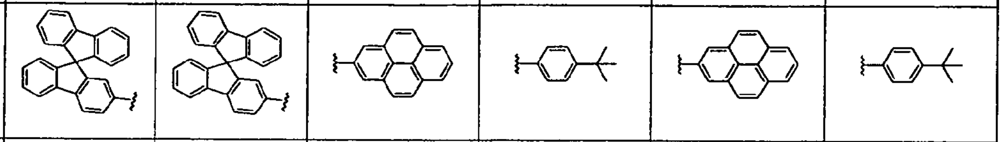
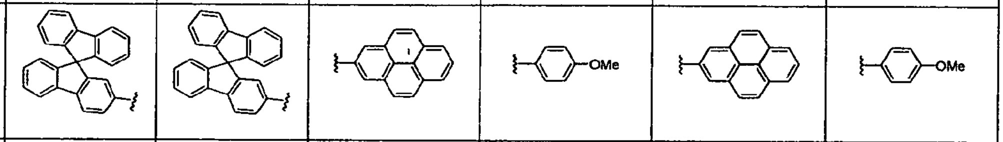
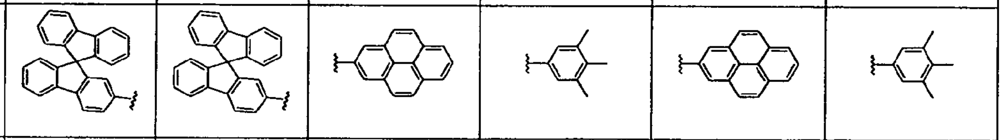
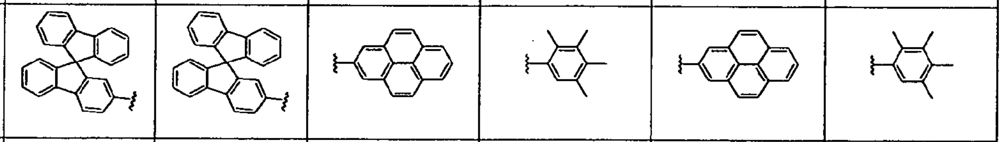
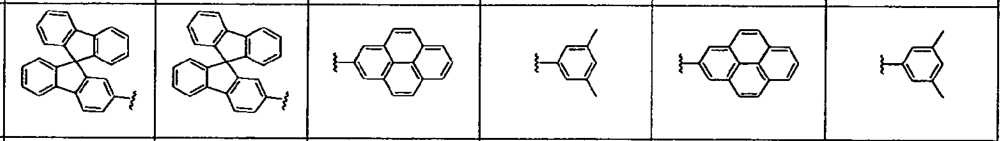
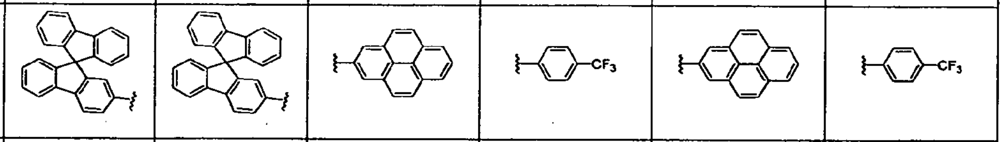
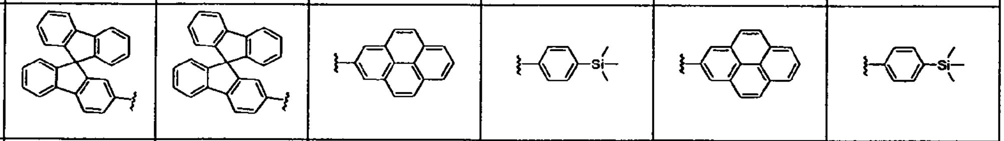
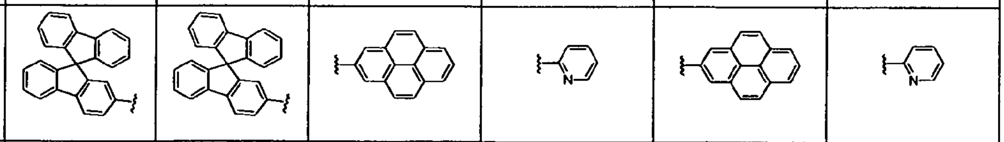
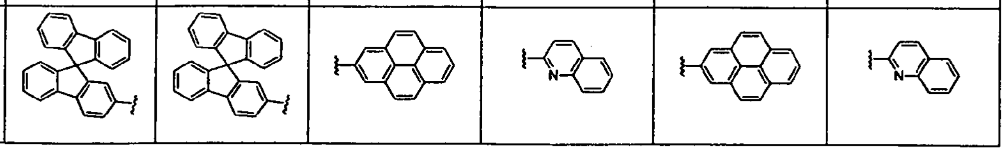
2434	
2435	
2436	
2437	
2438	
2439	
2440	
2441	
2442	
2443	
2444	

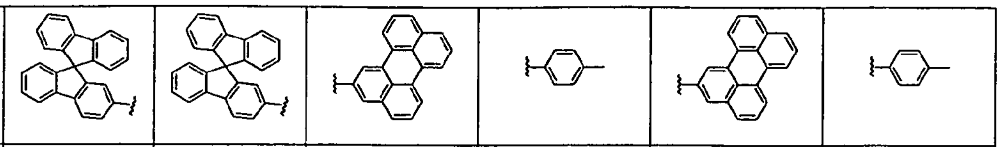
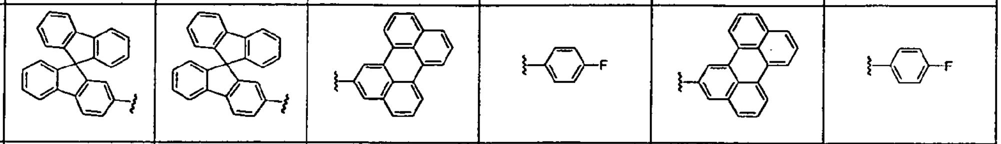
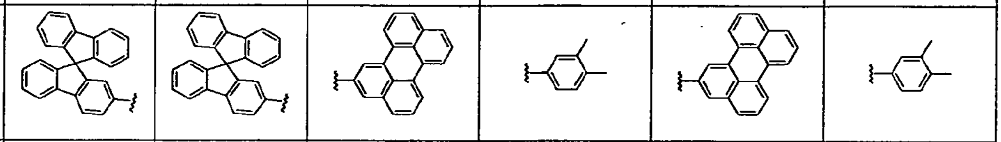
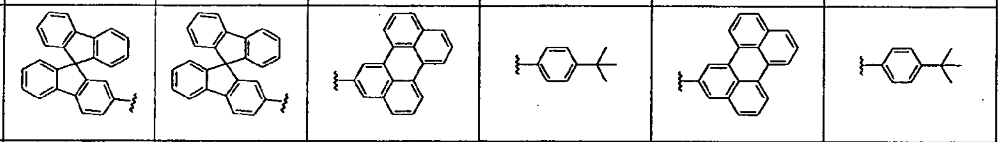
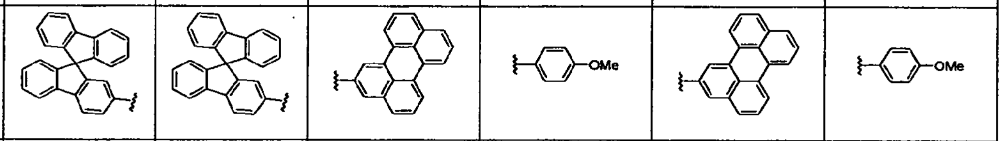
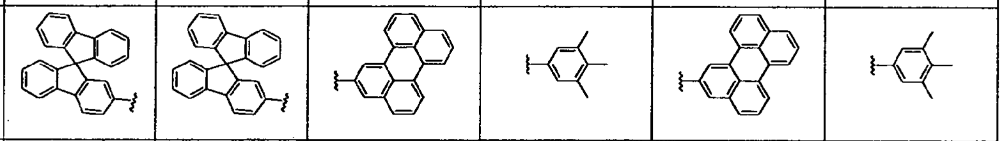
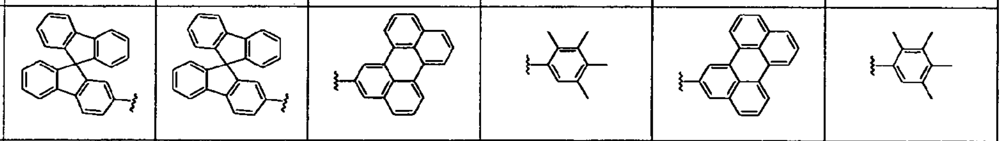
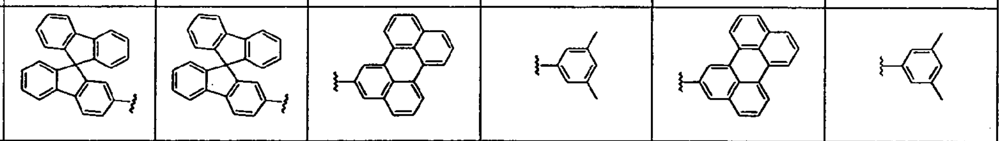
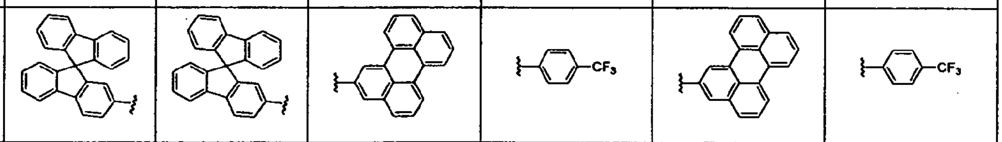
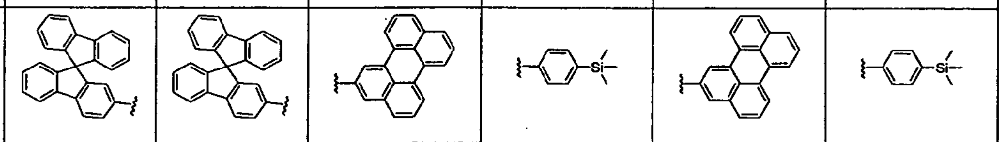
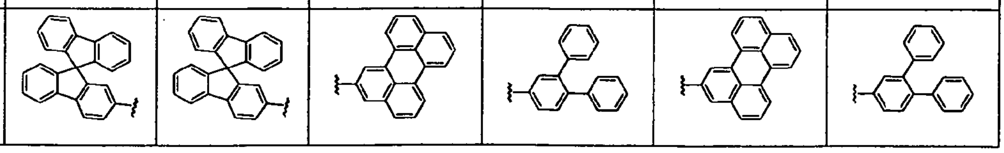
2445	
2446	
2447	
2448	
2449	
2450	
2451	
2452	
2453	
2454	
2455	

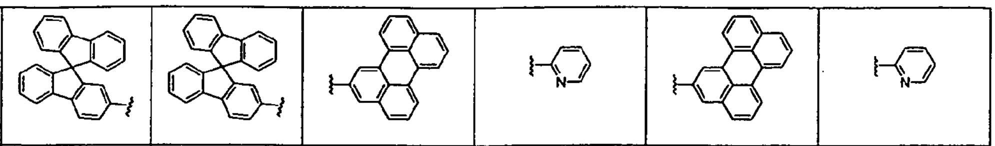
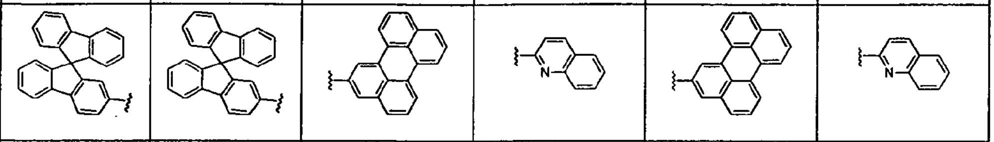
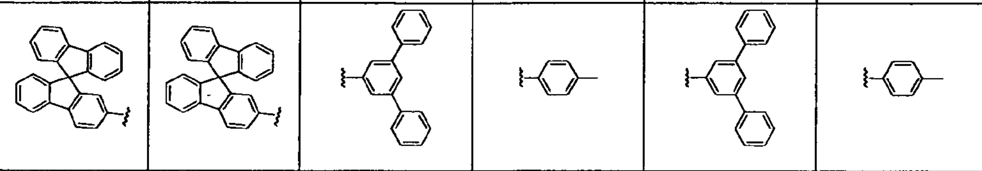
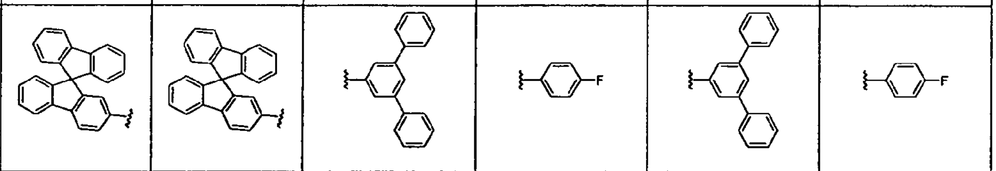
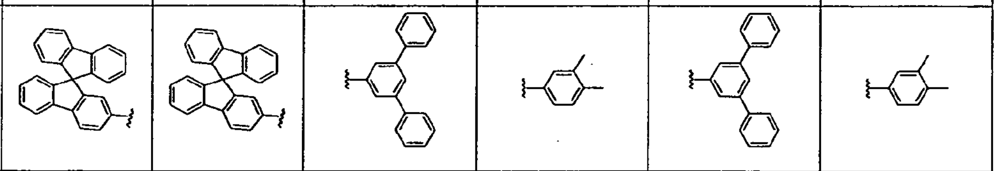
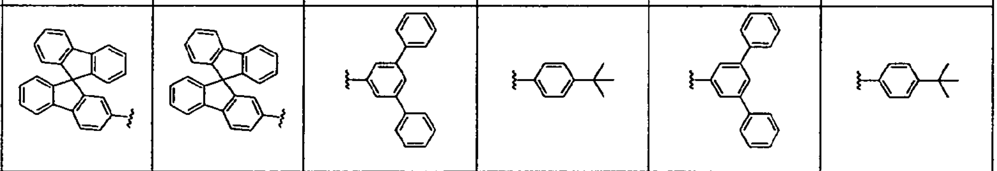
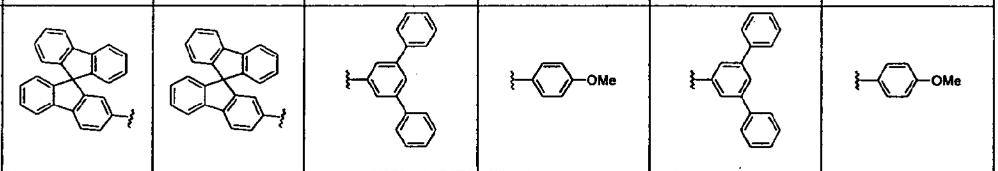
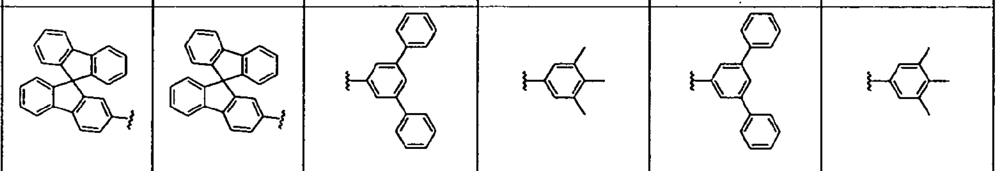
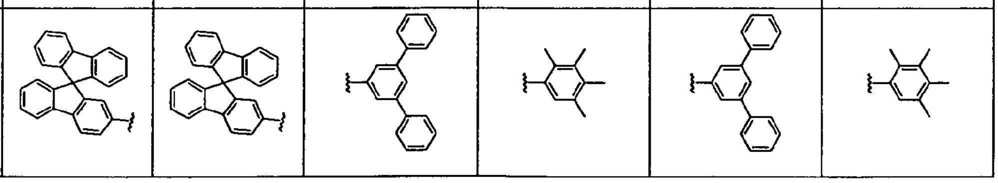
2456	
2457	
2458	
2459	
2460	
2461	
2462	
2463	
2464	
2465	
2466	

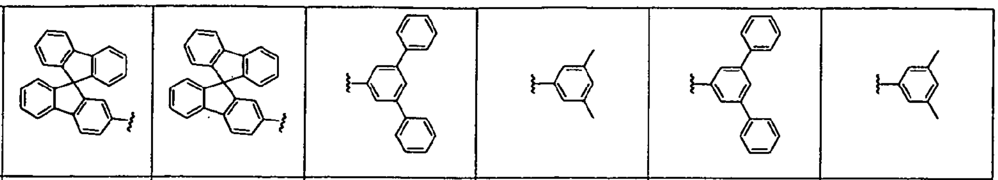
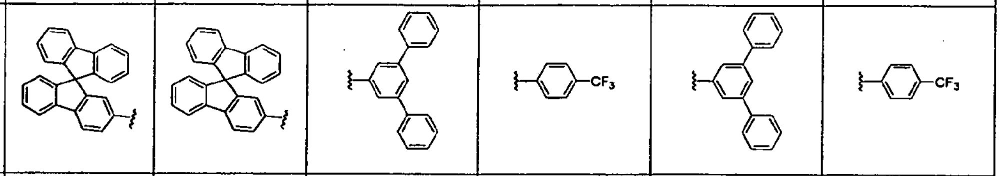
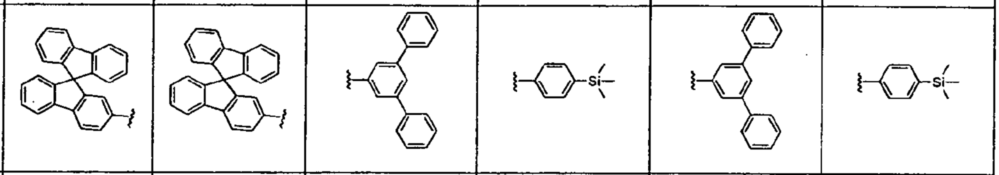
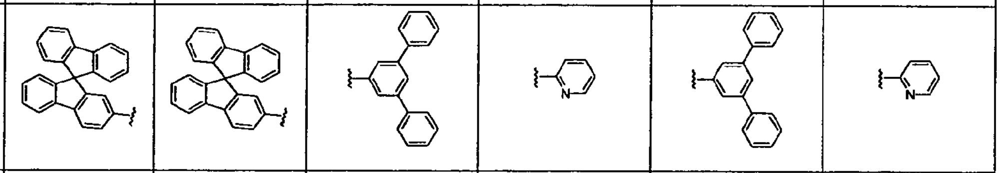
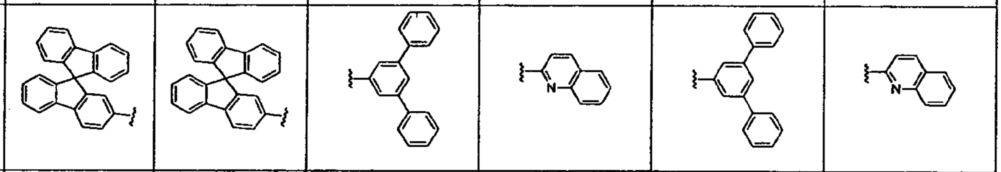
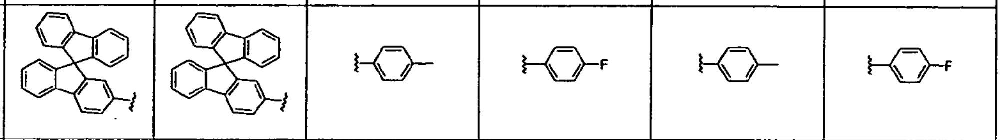
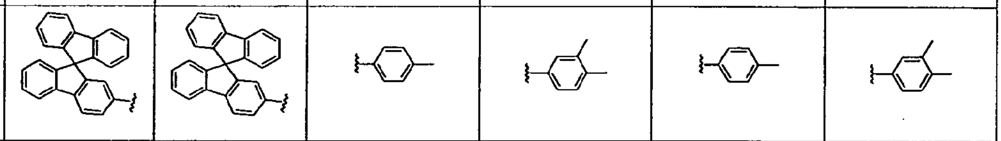
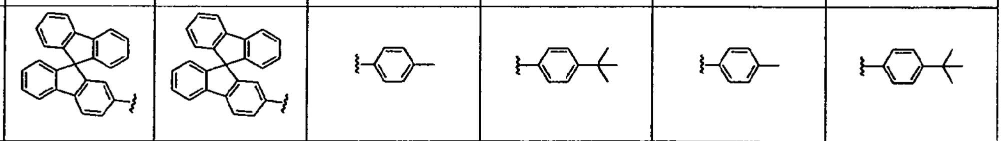
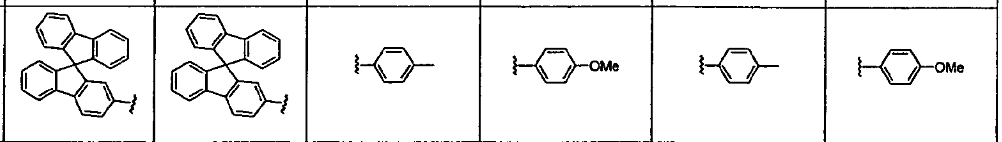
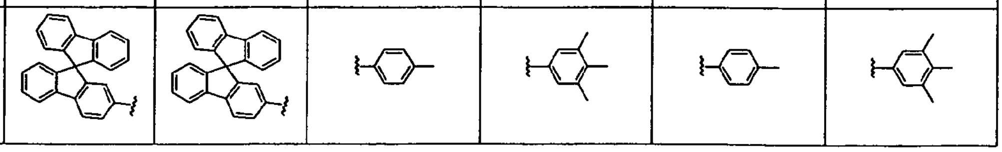
2467	
2468	
2469	
2470	
2471	
2472	
2473	
2474	
2475	
2476	
2477	

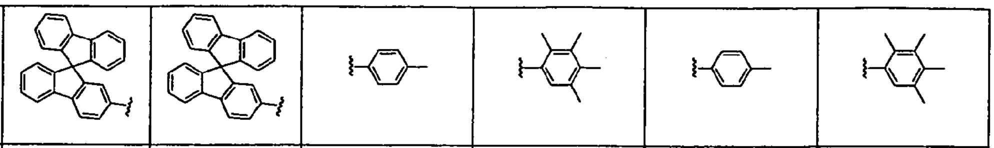
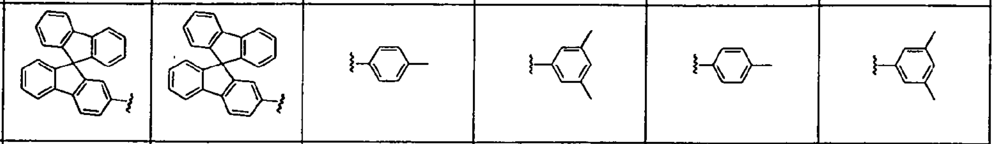
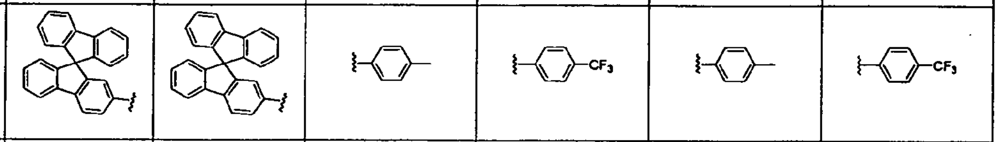
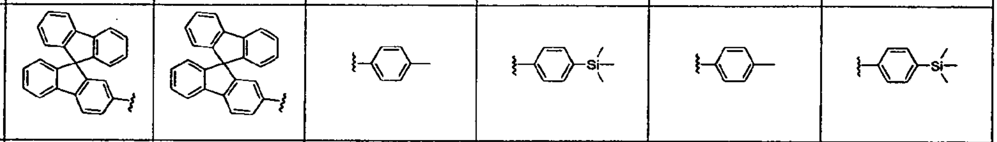
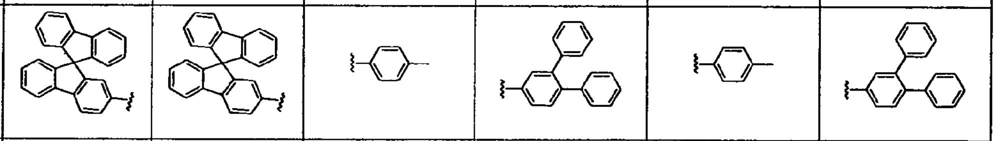
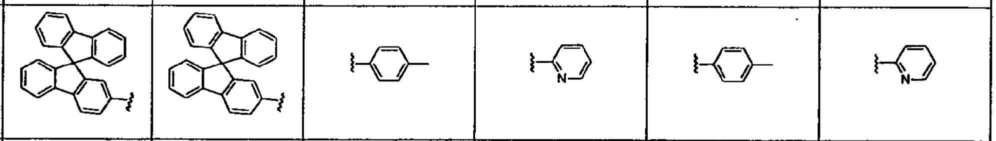
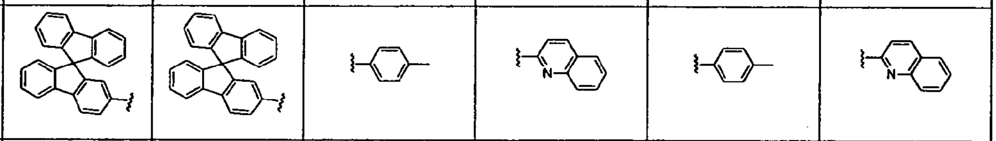
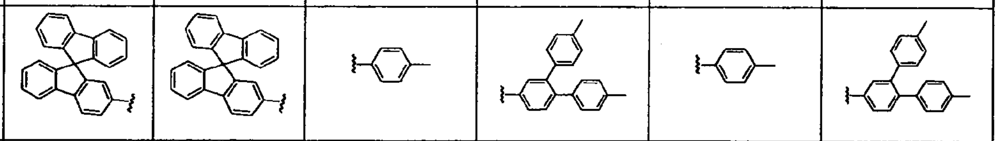
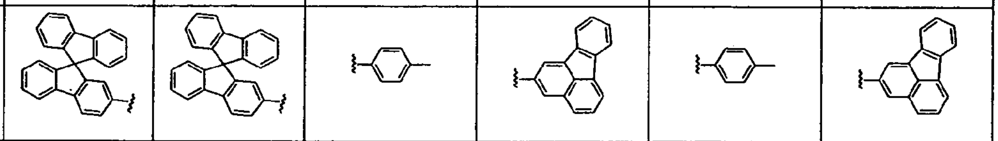
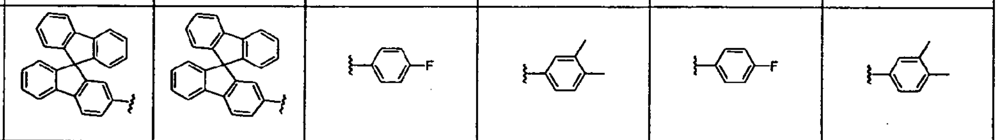
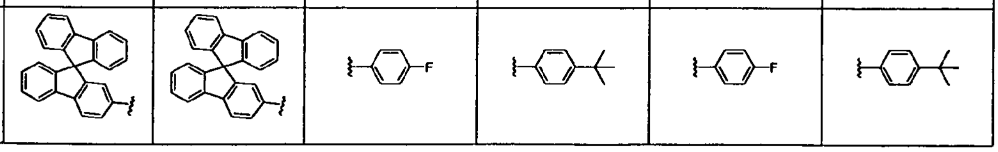
2478	
2479	
2480	
2481	
2482	
2483	
2484	
2485	
2486	
2487	
2488	

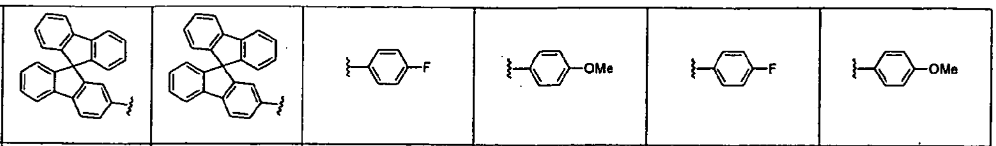
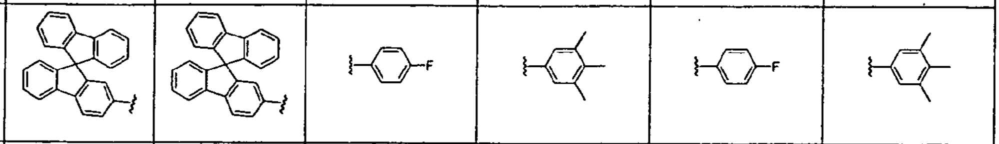
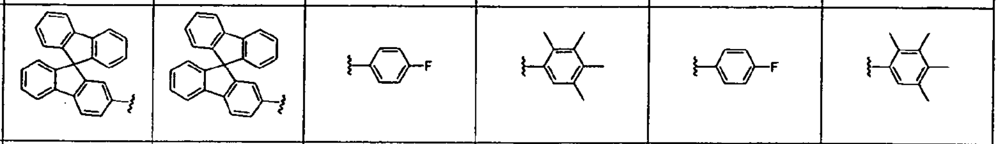
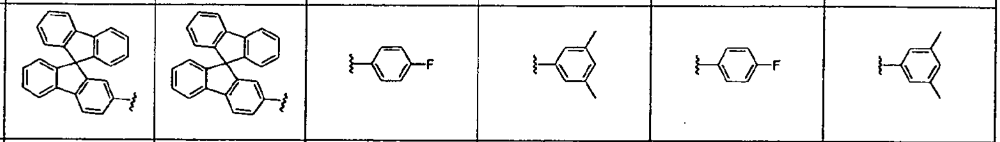
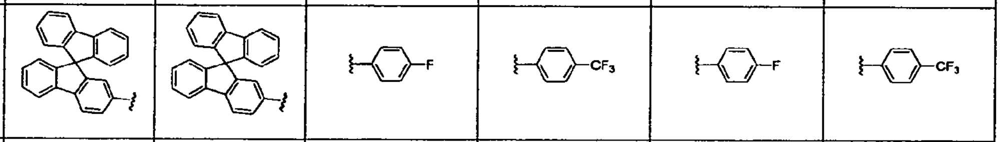
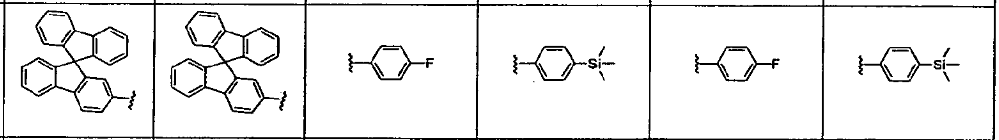
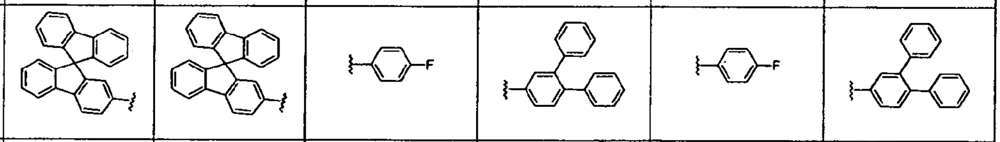
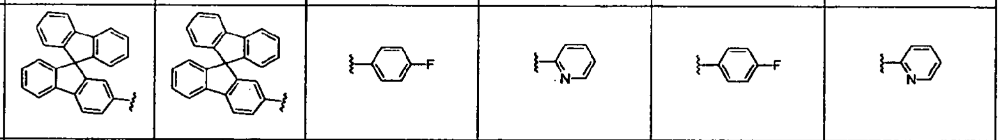
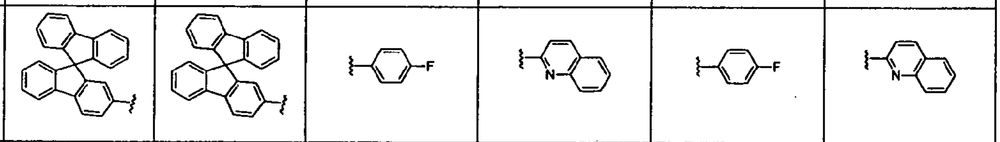
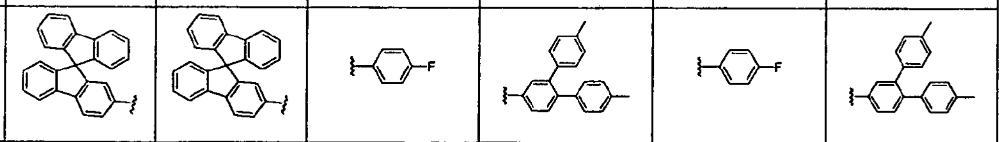
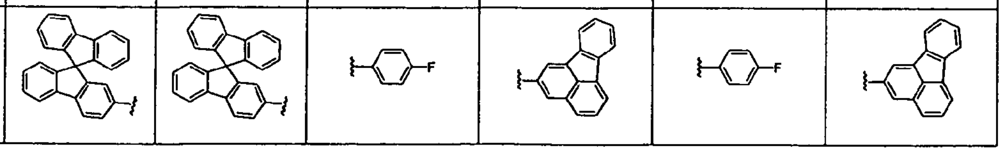
2489	
2490	
2491	
2492	
2493	
2494	
2495	
2496	
2497	
2498	
2499	

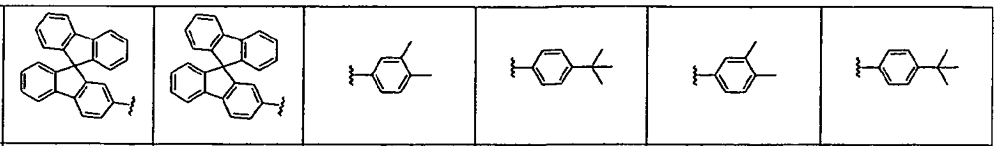
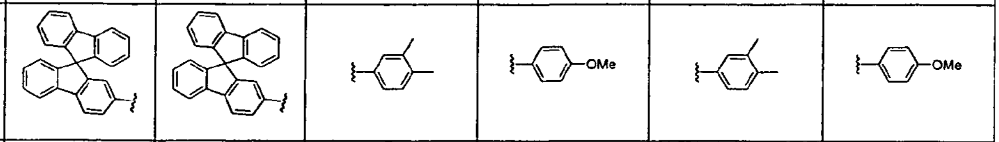
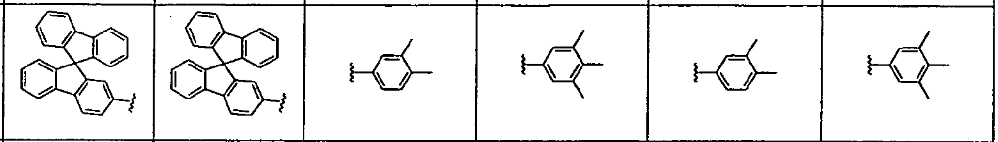
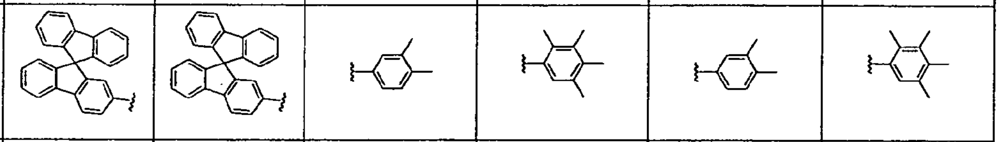
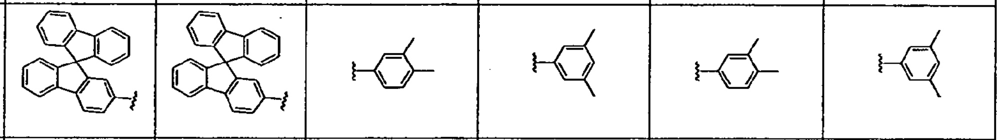
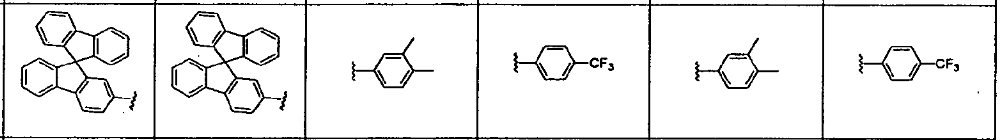
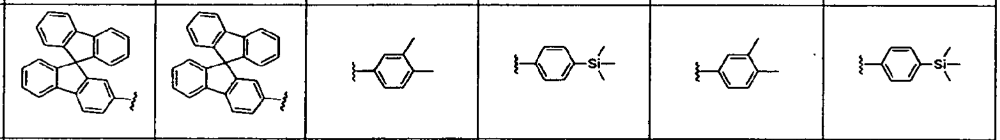
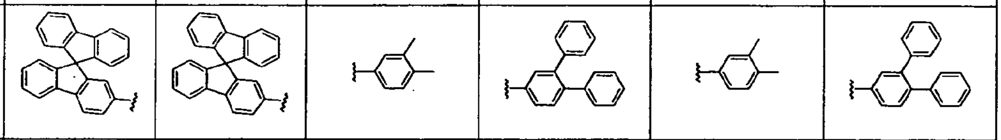
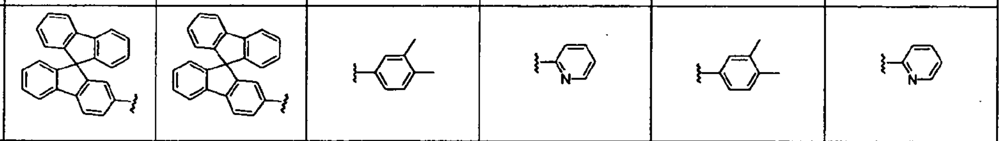
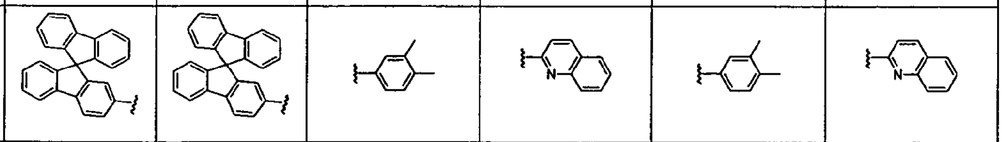
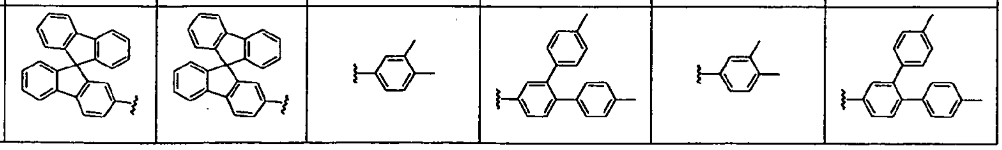
2500	
2501	
2502	
2503	
2504	
2505	
2506	
2507	
2508	
2509	
2510	

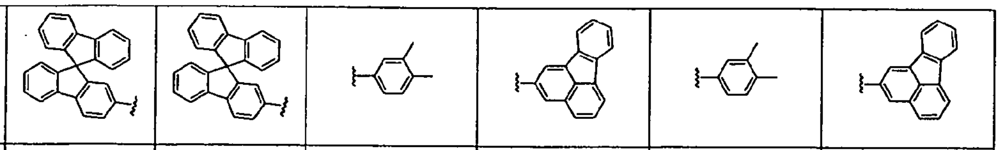
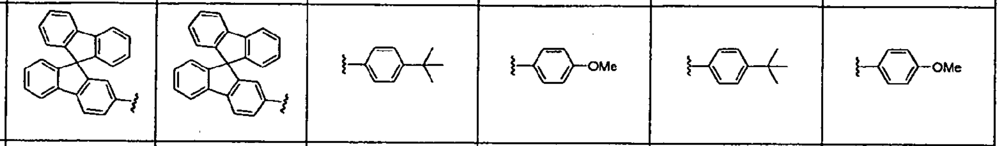
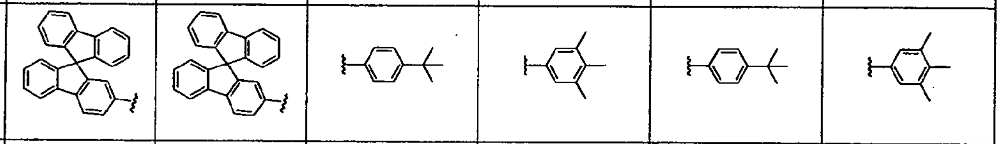
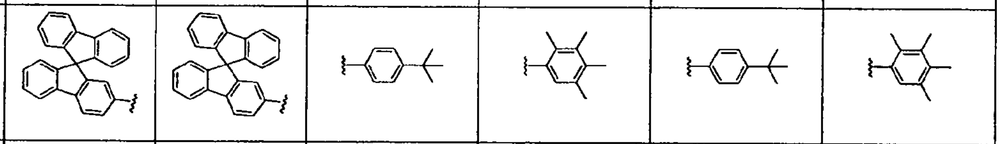
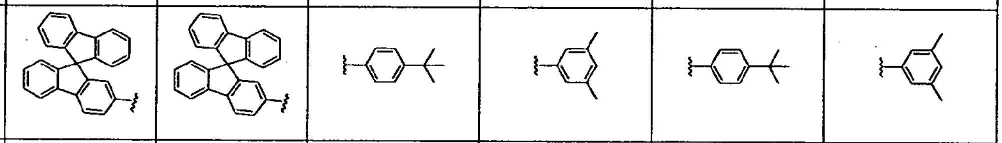
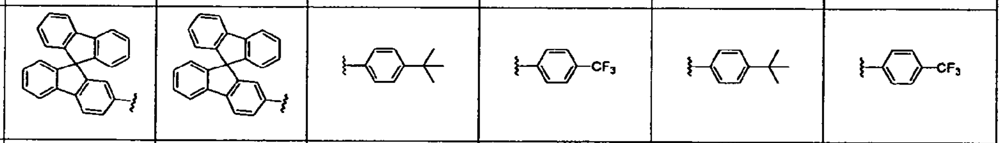
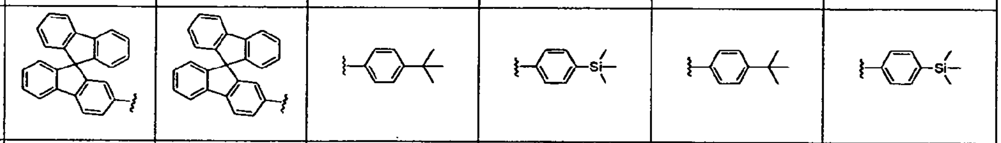
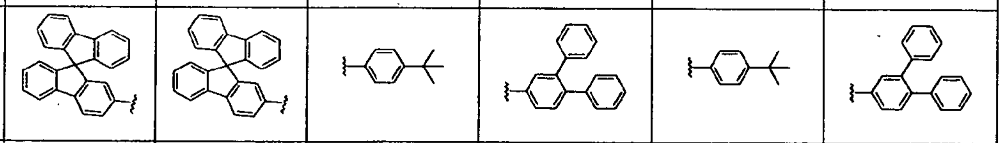
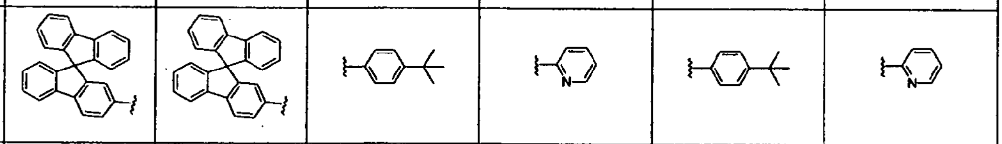
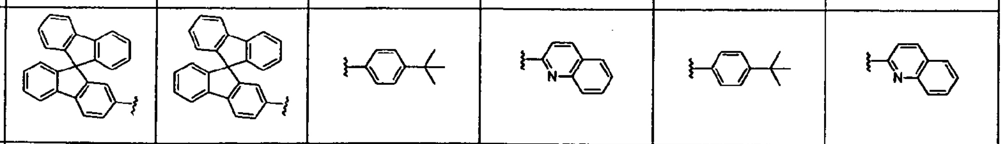
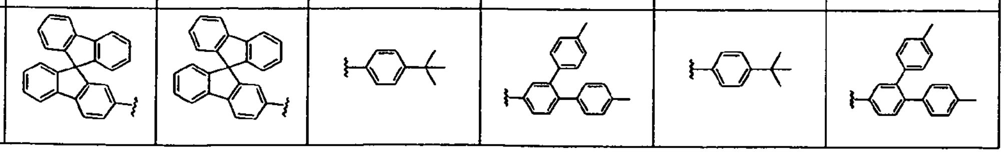
2511	
2512	
2513	
2514	
2515	
2516	
2517	
2518	
2519	

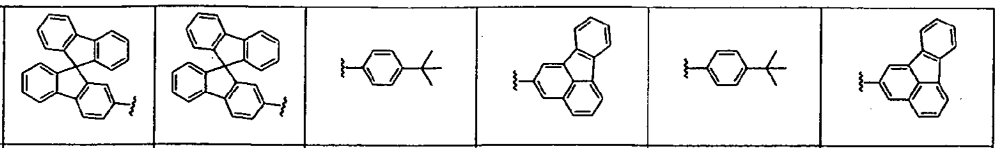
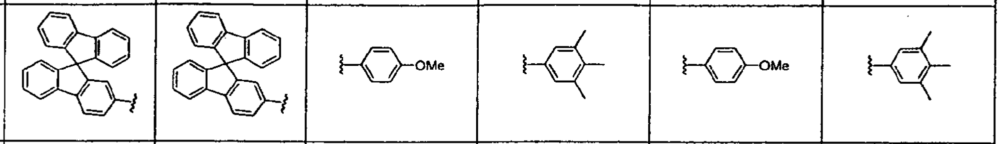
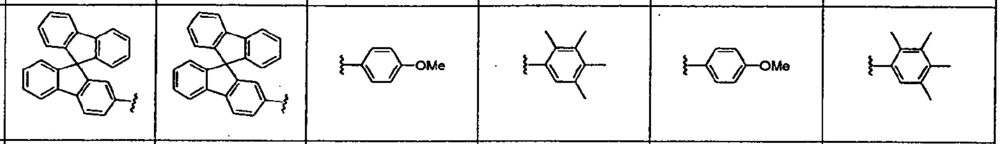
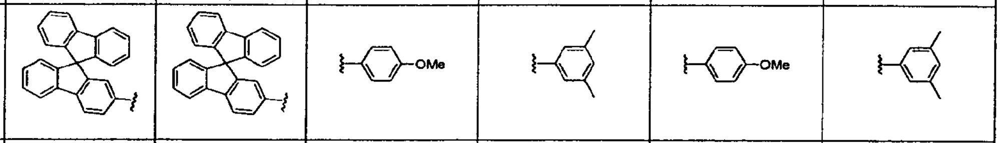
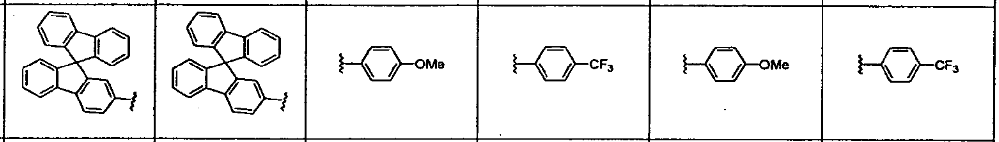
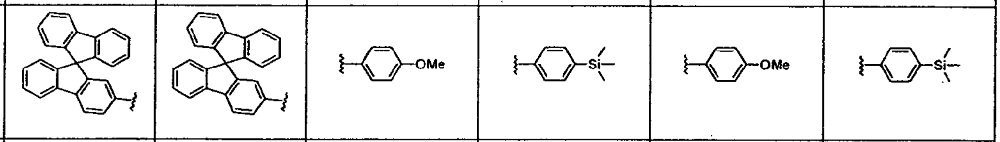
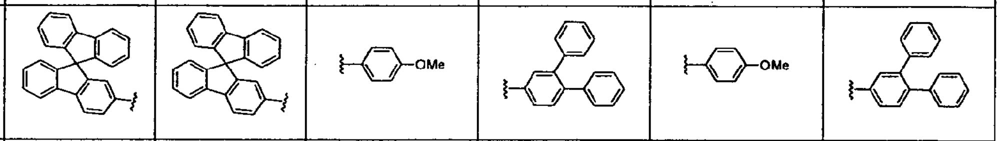
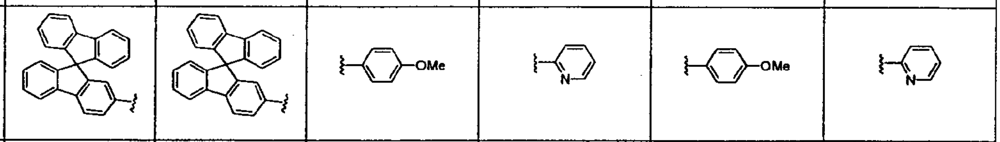
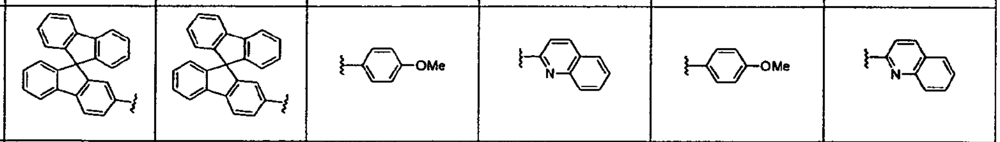
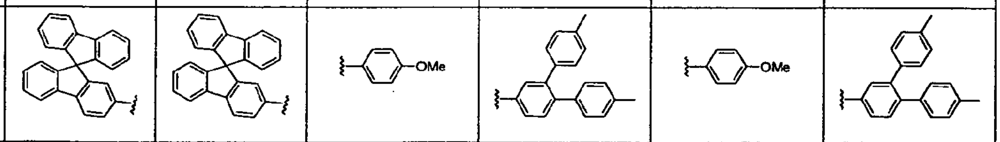
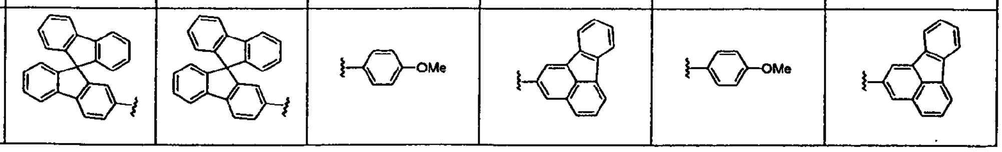
2520	
2521	
2522	
2523	
2524	
2525	
2526	
2527	
2528	
2529	

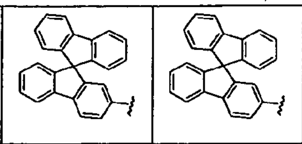
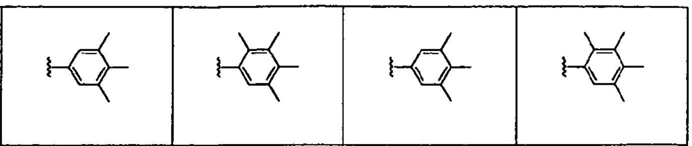
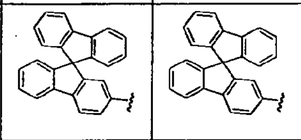
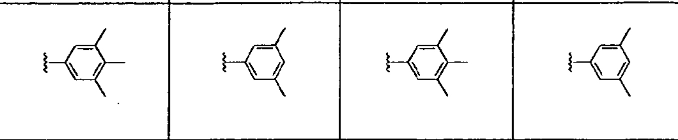
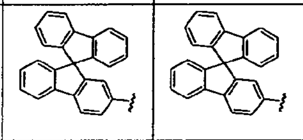
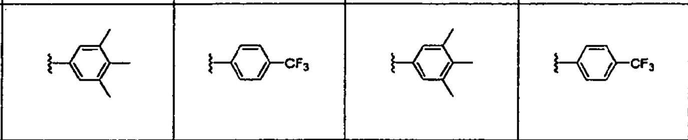
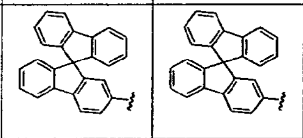
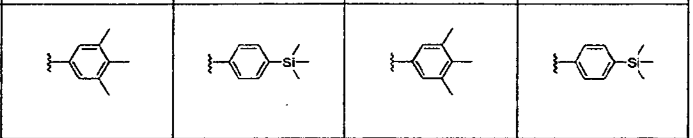
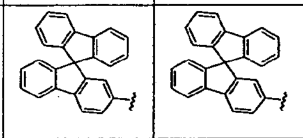
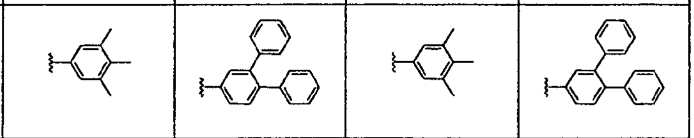
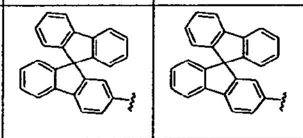
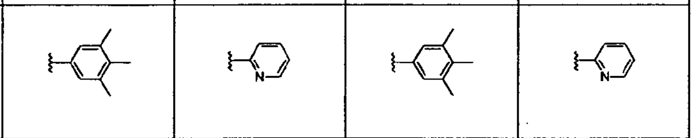
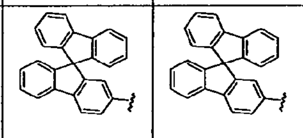
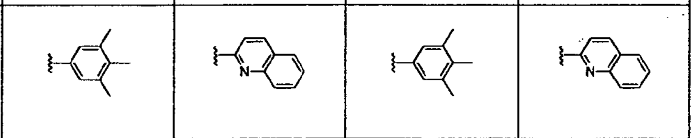
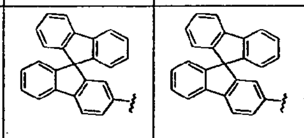
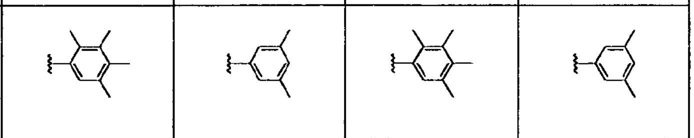
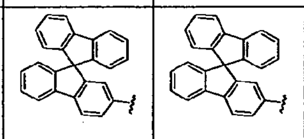
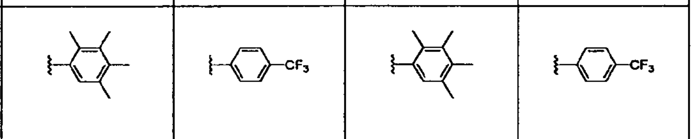
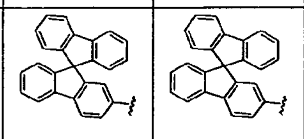
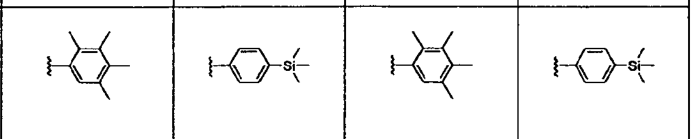
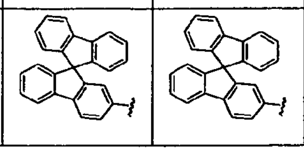
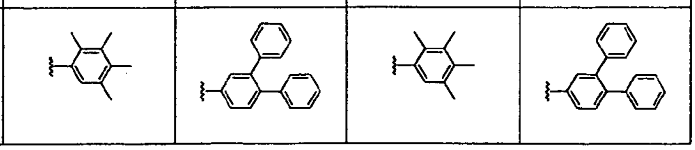
2530	
2531	
2532	
2533	
2534	
2535	
2536	
2537	
2538	
2539	
2540	

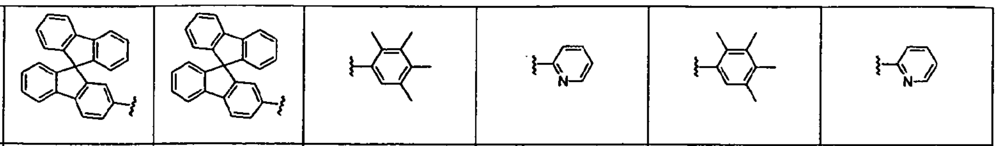
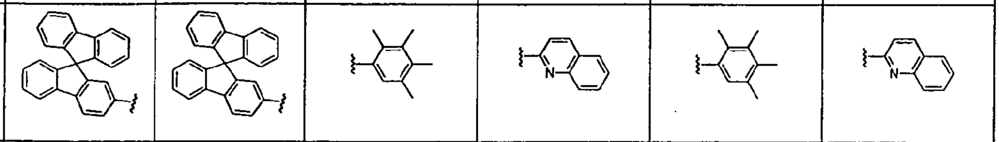
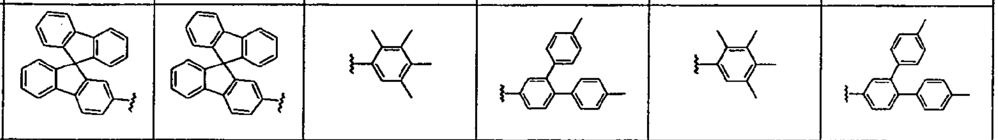
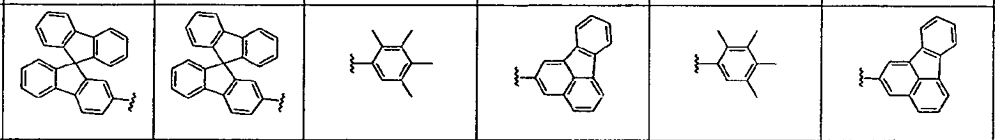
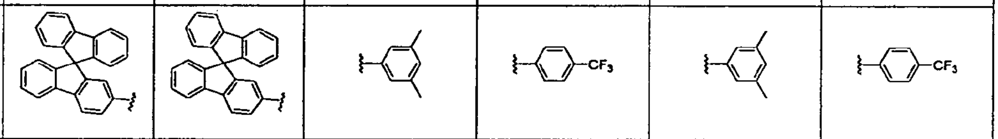
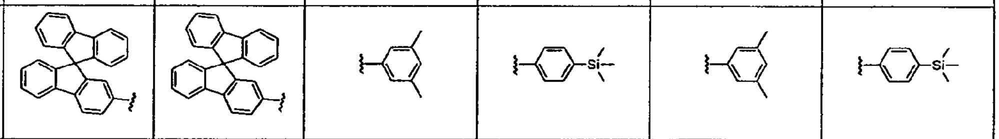
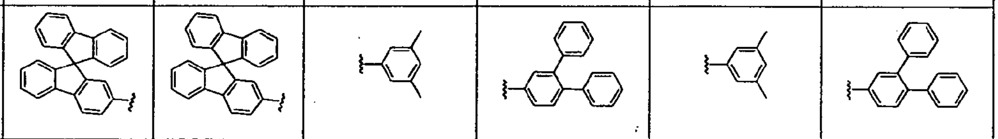
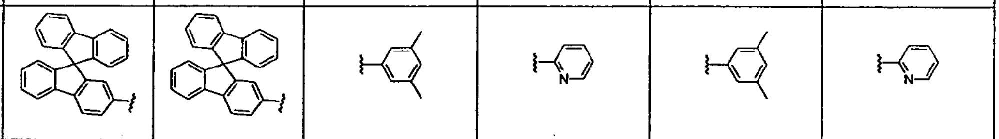
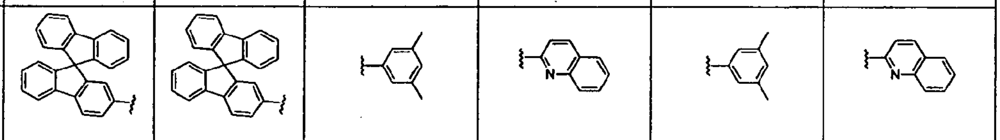
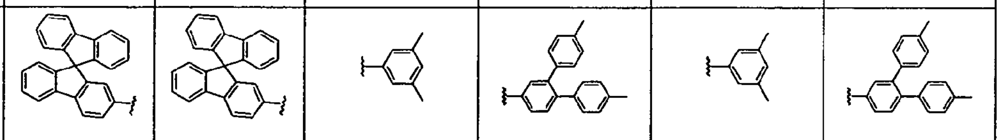
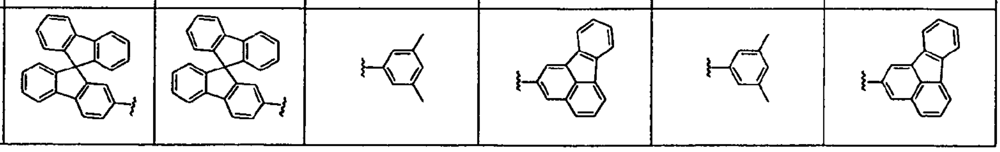
2541	
2542	
2543	
2544	
2545	
2546	
2547	
2548	
2549	
2550	
2551	

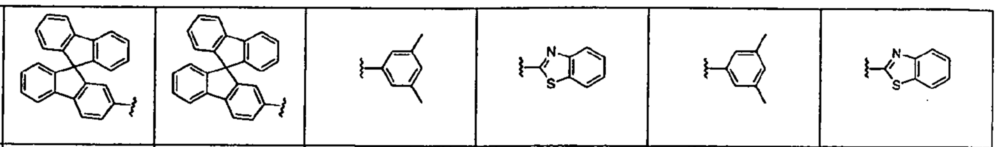
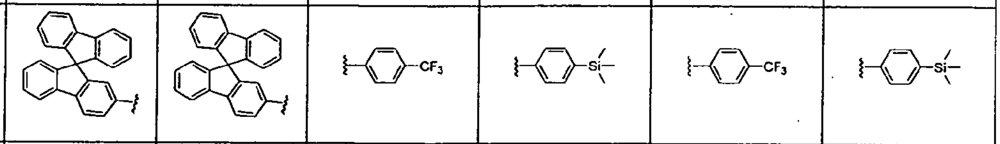
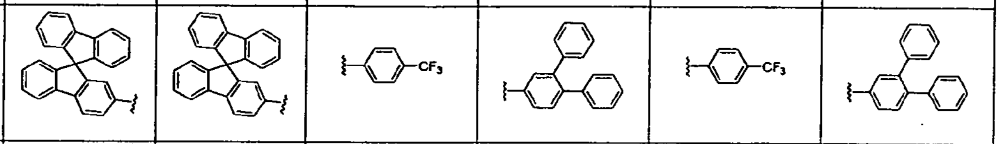
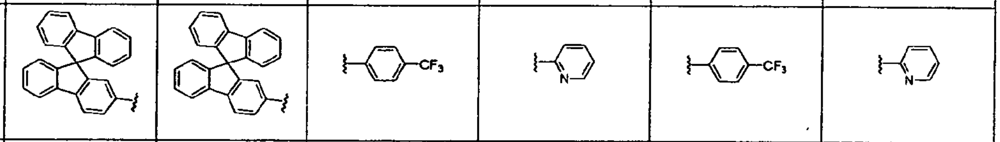
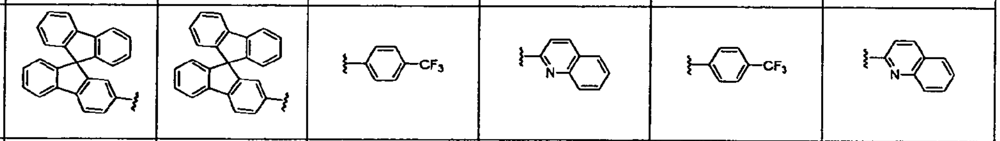
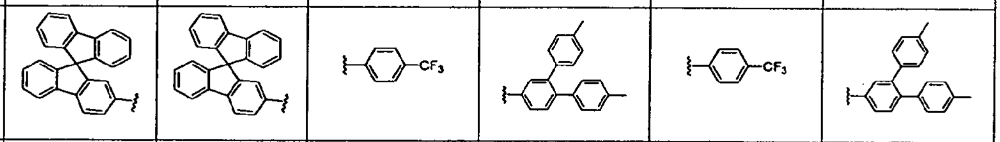
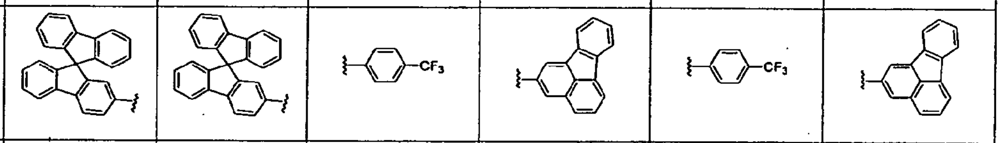
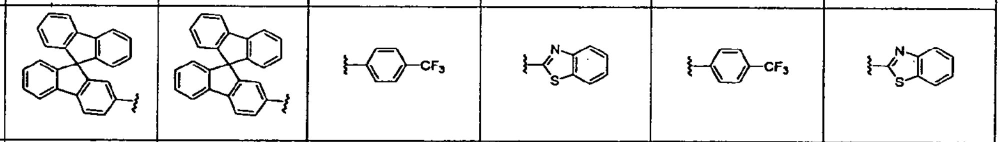
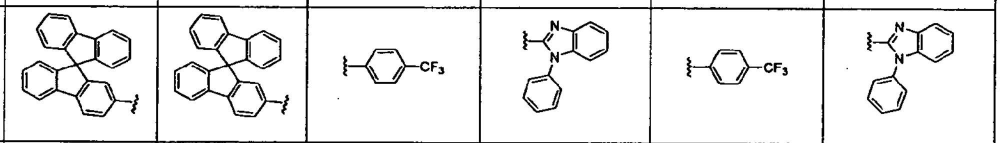
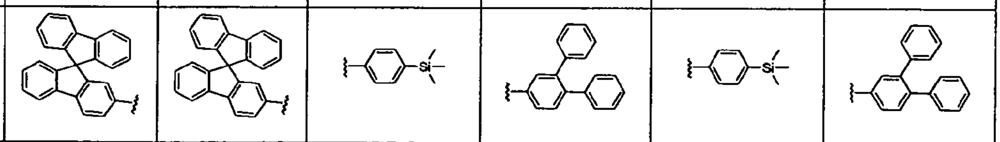
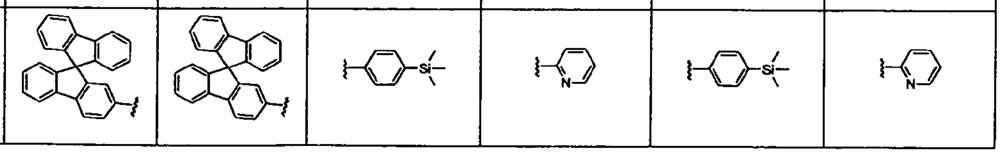
2552	
2553	
2554	
2555	
2556	
2557	
2558	
2559	
2560	
2561	
2562	

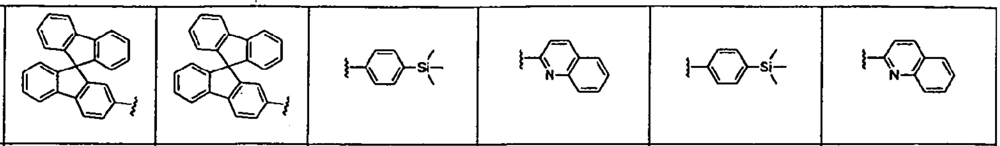
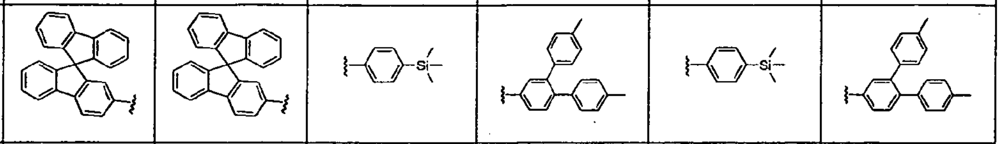
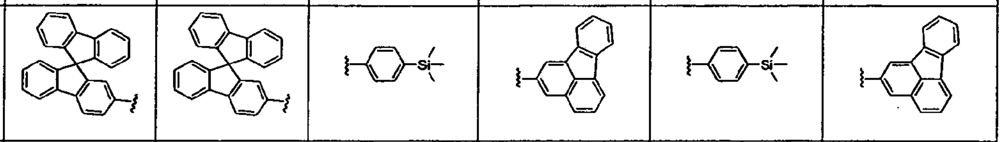
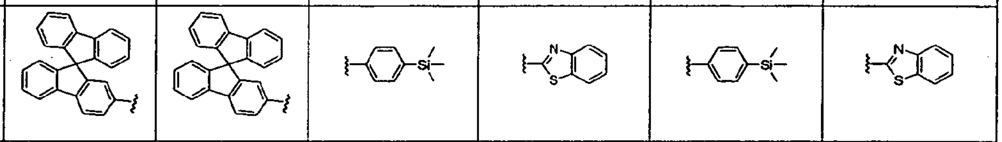
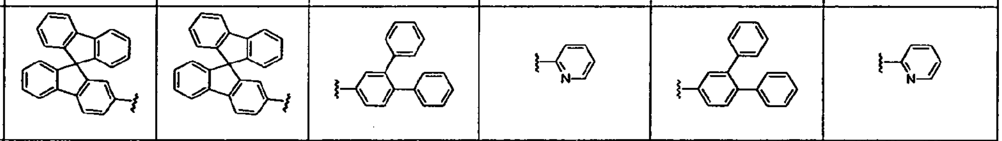
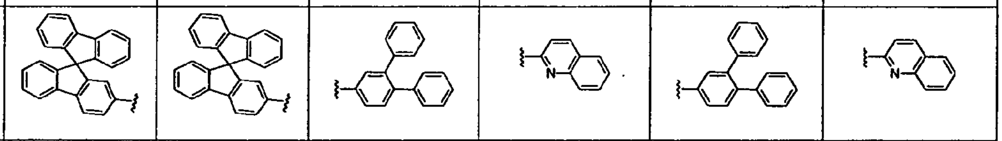
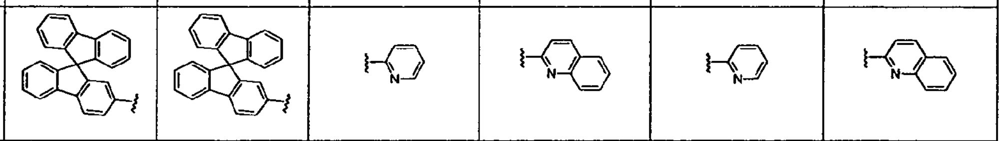
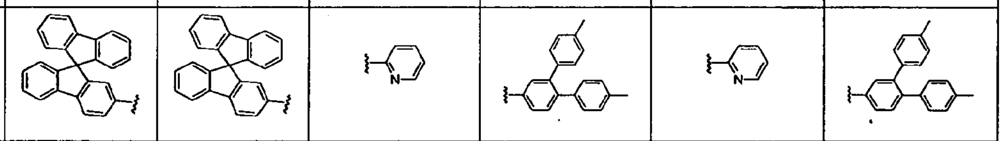
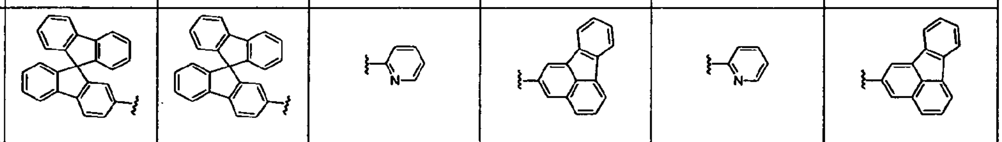
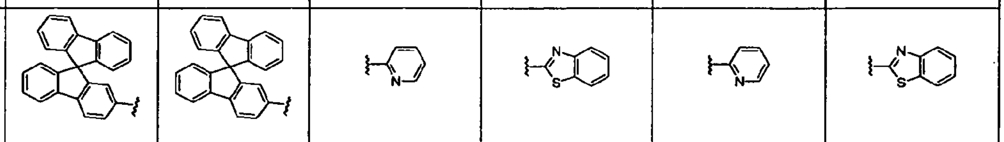
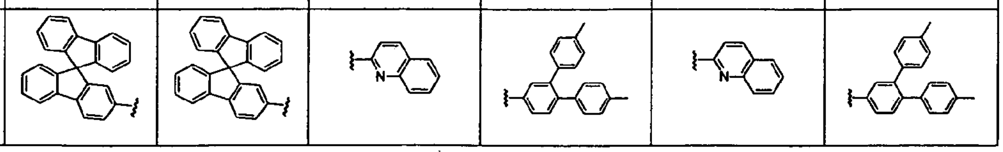
2563	
2564	
2565	
2566	
2567	
2568	
2569	
2570	
2571	
2572	
2573	

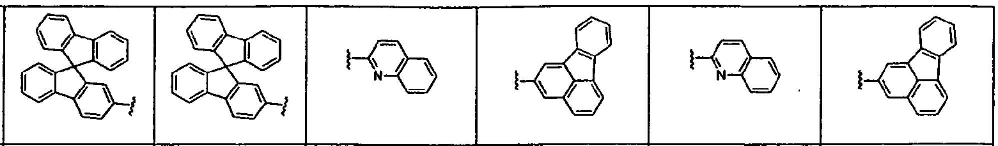
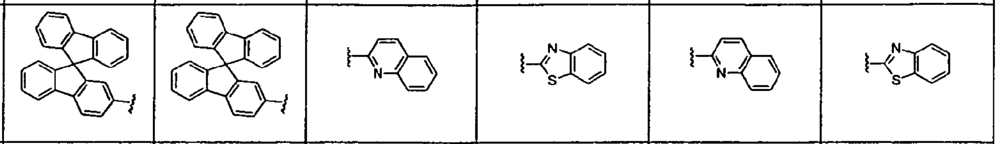
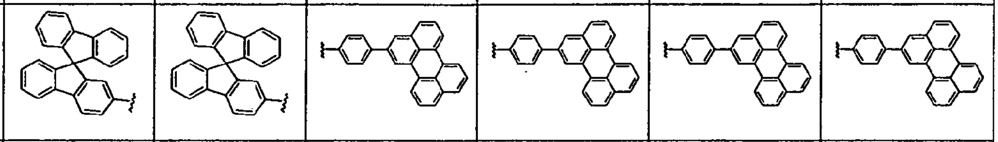
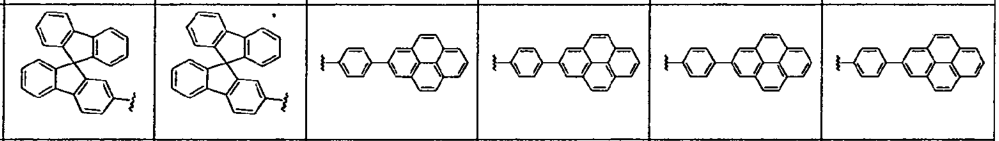
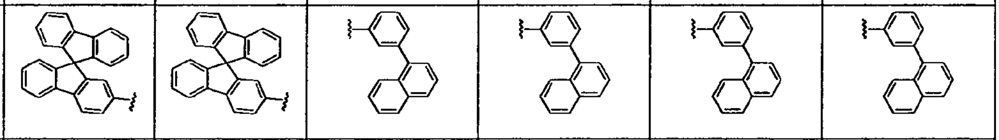
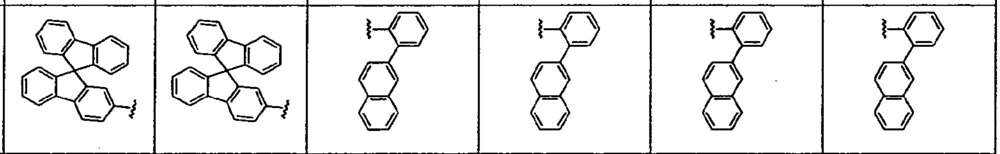
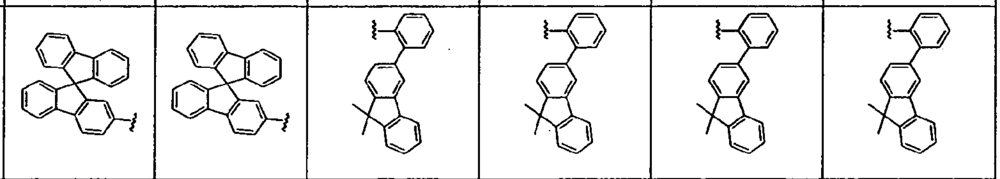
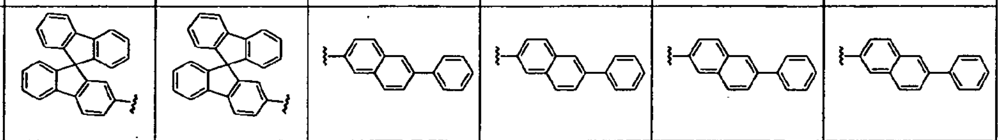
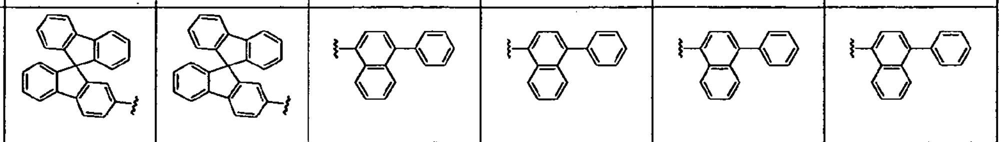
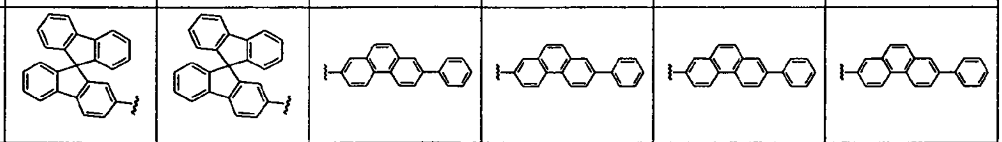
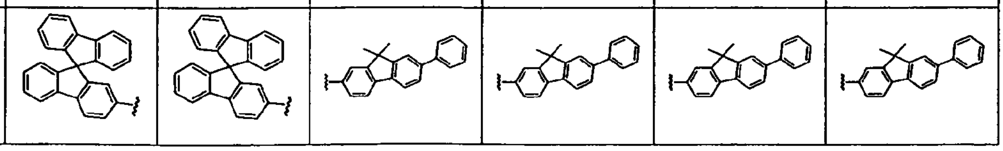
2574	
2575	
2576	
2577	
2578	
2579	
2580	
2581	
2582	
2583	
2584	

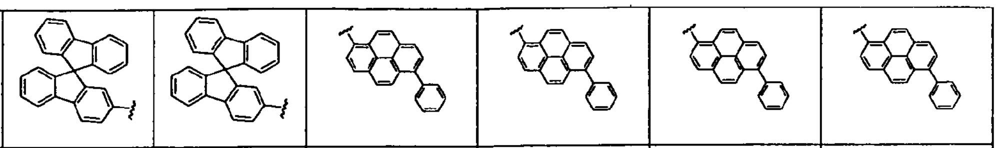
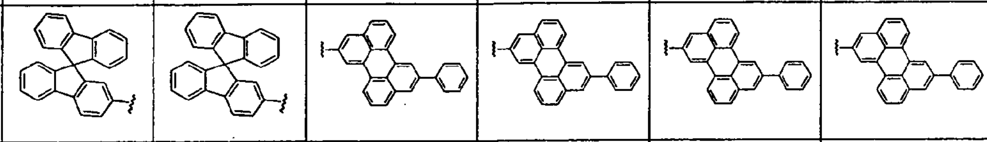
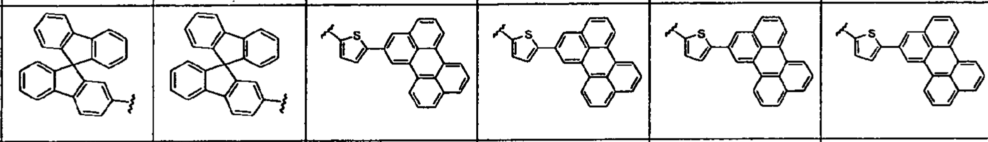
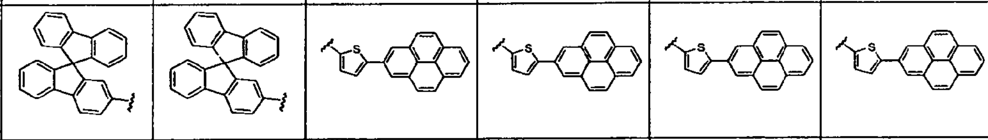
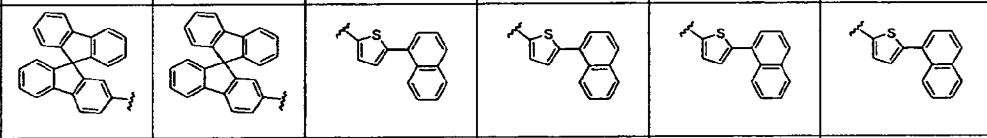
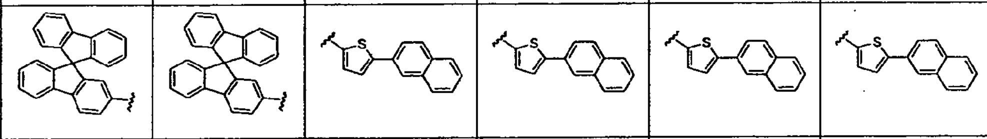
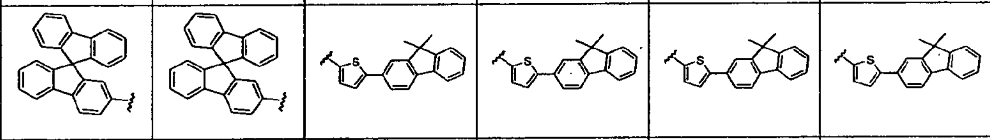
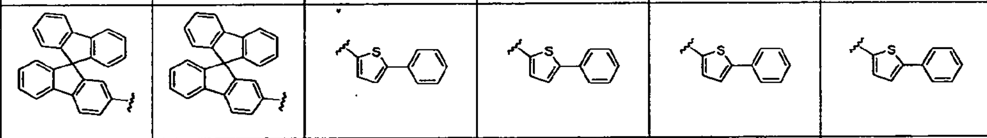
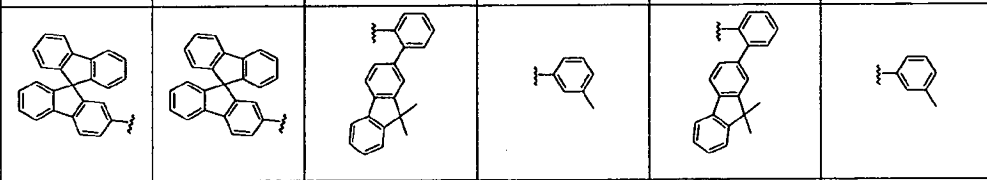
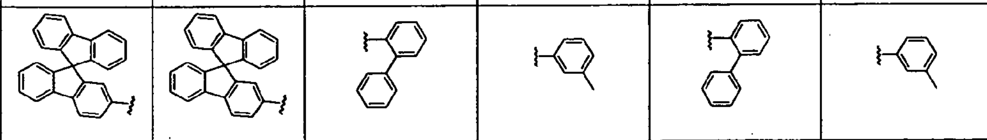
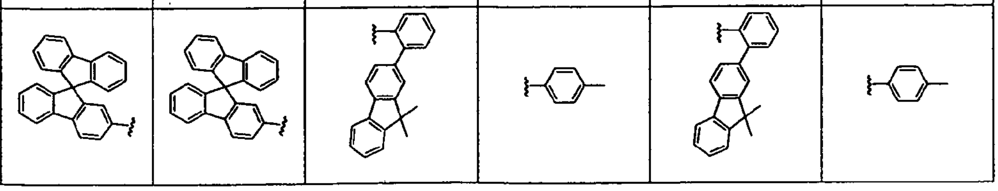
2585		
2586		
2587		
2588		
2589		
2590		
2591		
2592		
2593		
2594		
2595		

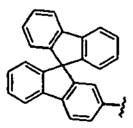
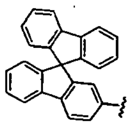
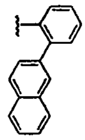
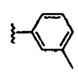
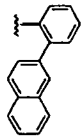
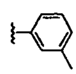
2596	
2597	
2598	
2599	
2600	
2601	
2602	
2603	
2604	
2605	
2606	

2607	
2608	
2609	
2610	
2611	
2612	
2613	
2614	
2615	
2616	
2617	

2618	
2619	
2620	
2621	
2622	
2623	
2624	
2625	
2626	
2627	
2628	

2629	
2630	
2631	
2632	
2633	
2634	
2635	
2636	
2637	
2638	
2639	

2640	
2641	
2642	
2643	
2644	
2645	
2646	
2647	
2648	
2649	
2650	

2651						

[Table 3]

compound	^{1}H NMR(CDCl$_3$, 200 MHz)	MS/FAB	
		found	calculated
3	δ = 6.83(2H, m), 6.98~7.03(6H, m), 7.11(8H, m), 7.26~7.38(20H, m), 7.53~7.63 (16H, m), 7.75~7.77(4H, m), 7.87~7.93(4H, m), 8.02~8.07(8H, m)	1345.7	1344.5
56	δ = 6.65(2H, m), 6.83(2H, m), 6.95(2H, m), 7.03(2H, m), 7.11(8H, m), 7.26~7.41 (22H, m), 7.49~7.63(18H, m), 7.74~7.79(24H, m)	1549.9	1548.6
76	δ = 6.59(2H, m), 6.69(4H, m), 6.83~6.89(6H, m), 7.03(2H, m), 7.11(8H, m), 7.26~7.44(22H, m), 7.51~7.55(22H, m), 7.63(2H, m), 7.75~7.77(4H, m), 7.87~7.93(4H, m)	1449.8	1448.6
105	δ = 6.62(2H, m), 6.69~6.7(4H, m), 6.83~6.87(4H, m), 7.03~7.16(16H, m), 7.26~7.41(18H, m), 7.51~7.55(10H, m), 7.63(2H, m), 7.75~7.77(4H, m), 7.87~7.93(4H, m), 8.07(2H, m)	1299.6	1298.5
181	δ = 6.61~6.62(6H, m), 6.7(2H, m), 6.83(2H, m), 6.99~7.03(6H, m), 7.11(8H, m), 7.26~7.38(16H, m), 7.55(4H, m), 7.63(2H, m), 7.75~7.77(4H, m), 7.87~7.93(4H, m), 8.07(2H, m)	1183.4	1182.4
229	δ = 2.12(6H, s), 2.18(12H, s), 2.34(6H, s), 6.12(2H, s), 6.62(2H, m), 6.7(2H, m), 6.83(2H, m), 7.03(2H, m), 7.11(8H, m), 7.26~7.38(16H, m), 7.55(4H, m), 7.63(2H, m), 7.75~7.77(4H, m), 7.87~7.93(4H, m), 8.07(2H, m)	1259.6	1258.6
264	δ = 6.63(8H, m), 6.81~6.83(6H, m), 7.03(2H, m), 7.11(12H, m), 7.2~7.33(34H, m), 7.75(2H, m)	1149.5	1148.5
284	δ = 6.63(4H, m), 6.81~6.83(4H, m), 6.98~7.03(4H, m), 7.11(12H, m), 7.2~7.38 (32H, m), 7.53~7.57(6H, m), 7.75(2H, m), 8.02~8.07(4H, m)	1249.6	1248.5
303	δ = 6.83(2H, m), 6.98~7.03(4H, m), 7.11(12H, m), 7.26~7.38(30H, m), 7.49~7.57(10H, m), 7.74~7.77(6H, m), 7.84~7.88(4H, m), 8.02~8.07(4H, m)	1349.7	1348.6
341	δ = 6.69(4H, m), 6.83(2H, m), 7.03~7.11(16H, m), 7.26~7.33(28H, m), 7.41 (2H, m), 7.51~7.54(12H, m), 7.71~7.75(6H, m), 7.82~7.88(4H, m), 8.12(2H, m), 8.68(2H, m), 8.93(2H, m)	1501.9	1500.6
364	δ = 2.34(12H, s), 6.36(4H, m), 6.69~6.71(4H, m), 6.83~6.87(4H, m), 7.03~7.16 (20H, m), 7.26~7.33(26H, m), 7.41(2H, m), 7.51~7.54(6H, m), 7.75(2H, m)	1357.8	1356.6
427	δ = 2.34(18H, s), 6.36(4H, m), 6.51(4H, m), 6.71(2H, m), 6.83(2H, m), 6.98~7.03(6H, m), 7.11(12H, m), 7.26~7.33(26H, m), 7.75(2H, m)	1233.6	1232.6
452	δ = 2.34(24H, s), 6.32~6.36(6H, m), 6.43(2H, m), 6.71(2H, m), 6.83~6.86(4H, m), 7.03(2H, m), 7.11(12H, m), 7.26~7.33(26H, m), 7.75(2H, m)	1261.7	1260.6
491	δ = 2.12(6H, s), 2.18(12H, s), 2.34(6H, s), 6.12(2H, s), 6.65(2H, m), 6.83(2H, m), 6.95(2H, m), 7.03(2H, m), 7.11(12H, m), 7.26~7.33(26H, m), 7.41(4H, m), 7.51(8H, m), 7.6(2H, m), 7.75~7.79(10H, m)	1566.1	1564.8
514	δ = 0.25(18H, s), 6.61(4H, m), 6.83(2H, m), 7.03(2H, m), 7.11~7.15(16H, m), 7.26~7.37(28H, m), 7.57(2H, m), 7.69~7.75(6H, m), 7.94(2H, m), 8.22(2H, m)	1395.9	1394.6

(continued)

compound	^{1}H NMR($CDCl_3$, 200 MHz)	MS/FAB	
		found	calculated
567	δ = 6.69(4H, m), 6.83(2H, m), 7.03(2H, m), 7.36~7.41(4H, m), 7.49~7.59(28H, m), 7.66(6H, m), 7.73~7.77(10H, m), 7.84~7.92(8H, m), 8(8H, m)	1421.8	1420.6
627	δ = 2.34(12H, s), 6.36(4H, m), 6.69~6.71(4H, m), 6.83~6.87(4H, m), 7.03~7.08 (6H, m), 7.16(2H, m), 7.41(2H, m), 7.51~7.59(18H, m), 7.66(6H, m), 7.73~7.75 (6H, m), 7.92(4H, m), 8(8H, m)	1377.8	1376.6
645	δ = 6.62(2H, m), 6.7(2H, m), 6.83(2H, m), 7.02~7.08(4H, m), 7.32(1H, m), 7.55~7.59(14H, m), 7.66~7.75(16H, m), 7.82~7.92(9H, m), 8(8H, m), 8.07~8.13(5H, m), 8.68(1H, m), 8.93(2H, m)	1371.7	1370.5
659	δ = 2.34(6H, s), 6.51(4H, m), 6.83(4H, m), 6.98~7.03(8H, m), 7.39(12H, m), 7.58~7.59(12H, m), 7.66(6H, m), 7.73~7.75(6H, m), 7.91~7.92(10H, m), 8(8H, m)	1545.9	1544.6
674	δ = 2.34(12H, s), 6.32(2H, m), 6.43(2H, m), 6.83~6.86(8H, m), 7.03~7.06(4H, m), 7.41(4H, m), 7.51~7.52(16H, m), 7.58~7.59(12H, m), 7.66(6H, m), 7.73~7.75(6H, m), 7.92(4H, m), 8(8H, m)	1529.9	1528.7
694	δ = 2.34(6H, s), 6.51(4H, m), 6.62(2H, m), 6.7(2H, m), 6.83(2H, m), 6.98~7.03 (6H, m), 7.55~7.59(14H, m), 7.66(6H, m), 7.73~7.75(6H, m), 7.92(4H, m), 8 (8H, m), 8.07(2H, m)	1199.5	1198.5
715	δ = 2.34(24H, s), 6.32~6.36(6H, m), 6.43(2H, m), 6.71(2H, m), 6.83~6.86(4H, m), 7.03(2H, m), 7.58~7.59(12H, m), 7.66(6H, m), 7.73~7.75(6H, m), 7.92(4H, m), 8(8H, m)	1281.7	1280.6
733	δ = 1.35(18H, s), 6.55(4H, m), 6.83(2H, m), 6.91(2H, m), 7.01~7.03(6H, m), 7.34(2H, m), 7.49(2H, m), 7.56~7.59(14H, m), 7.66~7.67(8H, m), 7.73~7.75 (6H, m), 7.92(4H, m), 8(8H, m), 8.1 (4H, m), 8.42(4H, m)	1529.9	1528.7
814	δ = 1.35(36H, s), 6.63(4H, m), 6.81~6.83(4H, m), 7.03~7.08(4H, m), 7.2(4H, m), 7.32~7.38(18H, m), 7.66~7.75(12H, m), 7.82-7.88(4H, m), 8.12(2H, m), 8.68(2H, m), 8.93(2H, m)	1393.9	1392.7
829	δ = 1.35(36H, s), 6.83(2H, m), 6.98~7.03(4H, m), 7.36~7.38(20H, m), 7.49~7.57(10H, m), 7.66(6H, m), 7.74~7.77(6H, m), 7.84~7.88(4H, m), 8.02~8.07(4H, m)	1393.9	1392.7
848	δ = 1.35(36H, s), 6.69(4H, m), 6.83(2H, m), 6.98~7.03(4H, m), 7.37~7.41(20H, m), 7.51~7.57(18H, m), 7.66(6H, m), 7.75(2H, m), 8.02~8.07(4H, m)	1446.0	1444.8
863	δ = 1.35(36H, s), 6.62(2H, m), 6.7(2H, m), 6.83(2H, m), 6.98~7.03(4H, m), 7.37~7.38(18H, m), 7.53~7.57(8H, m), 7.66(6H, m), 7.75(2H, m), 8.02~8.07 (6H, m)	1295.7	1294.7
878	δ = 0.25(18H, s), 1.35(36H, s), 6.61(4H, m), 6.69(4H, m), 6.83(2H, m), 7.03 (2H, m), 7.15(4H, m), 7.37~7.41(18H, m), 7.51~7.54(12H, m), 7.66(6H, m), 7.75(2H, m)	1490.2	1488.8
923	δ = 1.35(36H, s), 6.61(4H, m), 6.83(4H, m), 6.99~7.03(8H, m), 7.37~7.39(28H, m), 7.66(6H, m), 7.75(2H, m), 7.91(6H, m)	1578.0	1576.7
940	δ = 1.35(36H, s), 2.18(6H, s), 2.34(12H, s), 6.24(4H, m), 6.83~6.85(6H, m), 7.03~7.06(4H, m), 7.37~7.41 (20H, m), 7.51~7.52(16H, m), 7.66(6H, m), 7.75 (2H, m)	1582.2	1580.9
979	δ = 1.35(36H, s), 2.34(12H, s), 6.32(2H, m), 6.43(2H, m), 6.56(4H, m), 6.83~6.86(4H, m), 7.03(2H, m), 7.37~7.38(20H, m), 7.66(6H, m), 7.75(2H, m)	1385.7	1384.7
1032	δ = 1.35(36H, s), 6.56(4H, m), 6.62(2H, m), 6.7(2H, m), 6.83(2H, m), 7.03(2H, m), 7.37~7.38(20H, m), 7.55(2H, m), 7.66(6H, m), 7.75(2H, m), 8.07(2H, m)	1331.6	1330.6

(continued)

compound	^{1}H NMR($CDCl_3$, 200 MHz)	MS/FAB	
		found	calculated
1092	δ = 6.83(2H, m), 6.98~7.03(4H, m), 7.16~7.19(4H, m), 7.28(4H, m), 7.35~7.38 (10H, m), 7.44~7.57(18H, m), 7.74~7.88(18H, m), 8.02~8.07(4H, m)	1341.6	1340.5
1114	δ = 6.83(2H, m), 6.98~7.08(6H, m), 7.16~7.19(4H, m), 7.28~7.38(14H, m), 7.44(2H, m), 7.53~7.57(12H, m), 7.71~7.88(18H, m), 8.02~8.12(6H, m), 8.68 (2H, m), 8.93(2H, m)	1441.8	1440.5
1142	δ = 6.62(2H, m), 6.69~6.7(6H, m), 6.83(2H, m), 7.03(2H, m), 7.16~7.19(4H, m), 7.28(4H, m), 7.35~7.44(10H, m), 7.51~7.57(20H, m), 7.75~7.81(6H, m), 7.87(4H, m), 8.07(2H, m)	1295.6	1294.5
1171	δ = 6.62(2H, m), 6.7(2H, m), 6.83(2H, m), 7.03~7.08(4H, m), 7.16~7.19(4H, m), 7.28~7.38(12H, m), 7.44(2H, m), 7.55~7.57(8H, m), 7.71~7.88(18H, m), 8.07~8.12(4H, m), 8.68(2H, m), 8.93(2H, m)	1343.6	1342.5
1187	δ = 2.34(12H, s), 6.32(2H, m), 6.43(2H, m), 6.83~6.86(6H, m), 7.03(4H, m), 7.16~7.19(4H, m), 7.28(4H, m), 7.35~7.44(20H, m), 7.55~7.57(6H, m), 7.75~7.81(6H, m), 7.87~7.91(10H, m)	1545.9	1544.6
1237	δ = 1.35(18H, s), 2.34(12H, s), 6.32(2H, m), 6.43(2H, m), 6.55(4H, m), 6.83~6.86(4H, m), 7.01~7.03(6H, m), 7.16~7.19(4H, m), 7.28(4H, m), 7.35~7.38(6H, m), 7.44(2H, m), 7.55~7.57(6H, m), 7.75~7.81(6H, m), 7.87(4H, m)	1309.7	1308.6
1266	δ = 3.83(6H, s), 6.52(4H, m), 6.62(2H, m), 6.7~6.74(6H, m), 6.83(2H, m), 7.03 (2H, m), 7.16~7.19(4H, m), 7.28(4H, m), 7.35~7.38(6H, m), 7.44(2H, m), 7.55~7.57(8H, m), 7.75~7.81(6H, m), 7.87(4H, m), 8.07(2H, m)	1203.4	1202.5
1289	δ = 2.34(12H, s), 6.36(4H, m), 6.71(2H, m), 6.83(2H, m), 7.03(2H, m), 7.16~7.19(4H, m), 7.28(4H, m), 7.35~7.38(8H, m), 7.44(2H, m), 7.55~7.57(8H, m), 7.69~7.81(10H, m), 7.87(4H, m), 7.94(2H, m), 8.22(2H, m)	1299.6	1298.5
1318	δ = 6.83(2H, m), 6.98~7.03(6H, m), 7.11(8H, m), 7.26~7.38(20H, m), 7.53~7.63 (16H, m), 7.75~7.77(4H, m), 7.87~7.93(4H, m), 8.02~8.07(8H, m)	1345.7	1344.5
1371	δ = 6.65(2H, m), 6.83(2H, m), 6.95(2H, m), 7.03(2H, m). 7.11(8H, m), 7.26~7.41 (22H, m), 7.49~7.63(18H, m), 7.74~7.79(24H, m)	1549.9	1548.6
1391	δ = 6.59(2H, m), 6.69(4H, m), 6.83~6.89(6H, m), 7.03(2H, m), 7.11(8H, m), 7.26~7.44(22H, m), 7.51~7.55(22H, m), 7.63(2H, m), 7.75~7.77(4H, m), 7.87~7.93(4H, m)	1449.8	1448.6
1420	δ = 6.62(2H, m), 6.69~6.7(4H, m), 6.83~6.87(4H, m), 7.03~7.16(16H, m), 7.26~7.41(18H, m), 7.51~7.55(10H, m), 7.63(2H, m), 7.75~7.77(4H, m), 7.87~7.93(4H, m), 8.07(2H, m)	1299.6	1298.5
1496	δ = 6.61~6.62(6H, m), 6.7(2H, m), 6.83(2H, m), 6.99~7.03(6H, m), 7.11(8H, m), 7.26~7.38(16H, m), 7.55(4H, m), 7.63(2H, m), 7.75~7.77(4H, m), 7.87~7.93(4H, m), 8.07(2H, m)	1183.4	1182.4
1544	δ = 2.12(6H, s), 2.18(12H, s), 2.34(6H, s), 6.12(2H, s), 6.62(2H, m), 6.7(2H, m), 6.83(2H, m), 7.03(2H, m), 7.11(8H, m), 7.26~7.38(16H, m), 7.55(4H, m), 7.63(2H, m), 7.75~7.77(4H, m), 7.87~7.93(4H, m), 8.07(2H, m)	1259.6	1258.6
1579	δ = 6.63(8H, m), 6.81~6.83(6H, m), 7.03(2H, m), 7.11(12H, m), 7.2~7.33(34H, m), 7.75(2H, m)	1149.5	1148.5
1599	δ = 6.63(4H, m), 6.81~6.83(4H, m), 6.98~7.03(4H, m), 7.11(12H, m), 7.2~7.38 (32H, m), 7.53~7.57(6H, m), 7.75(2H, m), 8.02~8.07(4H, m)	1249.6	1248.5
1618	δ = 6.83(2H, m), 6.98~7.03(4H, m), 7.11(12H, m), 7.26~7.38(30H, m), 7.49~7.57(10H, m), 7.74~7.77(6H, m), 7.84~7.88(4H, m), 8.02~8.07(4H, m)	1349.7	1348.6

(continued)

compound	^{1}H NMR($CDCl_3$, 200 MHz)	MS/FAB	
		found	calculated
1656	δ = 6.69(4H, m), 6.83(2H, m), 7.03~7.11(16H, m), 7.26~7.33(28H, m), 7.41 (2H, m), 7.51~7.54(12H, m), 7.71~7.75(6H, m), 7.82~7.88(4H, m), 8.12(2H, m), 8.68(2H, m), 8.93(2H, m)	1501.9	1500.6
1679	δ = 2.34(12H, s), 6.36(4H, m), 6.69~6.71(4H, m), 6.83~6.87(4H, m), 7.03~7.16 (20H, m), 7.26~7.33(26H, m), 7.41(2H, m), 7.51~7.54(6H, m), 7.75(2H, m)	1357.8	1356.6
1742	δ = 2.34(18H, s), 6.36(4H, m), 6.51(4H, m), 6.71(2H, m), 6.83(2H, m), 6.98~7.03(6H, m), 7.11(12H, m), 7.26~7.33(26H, m), 7.75(2H, m)	1233.6	1232.6
1767	δ = 2.34(24H, s), 6.32~6.36(6H, m), 6.43(2H, m), 6.71(2H, m), 6.83~6.86(4H, m), 7.03(2H, m), 7.11(12H, m), 7.26~7.33(26H, m), 7.75(2H, m)	1261.7	1260.6
1806	δ = 2.12(6H, s), 2.18(12H, s), 2.34(6H, s), 6.12(2H, s), 6.65(2H, m), 6.83(2H, m), 6.95(2H, m), 7.03(2H, m), 7.11(12H, m), 7.26~7.33(26H, m), 7.41(4H, m), 7.51(8H, m), 7.6(2H, m), 7.75~7.79(10H, m)	1566.1	1564.8
1829	δ = 0.25(18H, s), 6.61(4H, m), 6.83(2H, m), 7.03(2H, m), 7.11~7.15(16H, m), 7.26~7.37(28H, m), 7.57(2H, m), 7.69~7.75(6H, m), 7.94(2H, m), 8.22(2H, m)	1395.9	1394.6
1861	δ = 6.63(4H, m), 6.81~6.83(4H, m), 7.03(2H, m), 7.2(4H, m), 7.36(2H, m), 7.49~7.5(4H, m), 7.58~7.59(12H, m), 7.66(6H, m), 7.73~7.77(10H, m), 7.84~7.92(8H, m), 8(8H, m)	1269.6	1268.5
1882	δ = 6.69(4H, m), 6.83(2H, m), 7.03(2H, m), 7.36~7.41(4H, m), 7.49~7.59(28H, m), 7.66(6H, m), 7.73~7.77(10H, m), 7.84~7.92(8H, m), 8(8H, m)	1421.8	1420.6
1942	δ = 2.34(12H, s), 6.36(4H, m), 6.69~6.71(4H, m), 6.83~6.87(4H, m), 7.03~7.08 (6H, m), 7.16(2H, m), 7.41(2H, m), 7.51~7.59(18H, m), 7.66(6H, m), 7.73~7.75 (6H, m), 7.92(4H, m), 8(8H, m)	1377.8	1376.6
1960	δ = 6.62(2H, m), 6.7(2H, m), 6.83(2H, m), 7.02~7.08(4H, m), 7.32(1H, m), 7.55~7.59(14H, m), 7.66~7.75(16H, m), 7.82~7.92(9H, m), 8(8H, m), 8.07~8.13(5H, m), 8.68(1H, m), 8.93(2H, m)	1371.7	1370.5
1974	δ = 2.34(6H, s), 6.51(4H, m), 6.83(4H, m), 6.98~7.03(8H, m), 7.39(12H, m), 7.58~7.59(12H, m), 7.66(6H, m), 7.73~7.75(6H, m), 7.91~7.92(10H, m), 8(8H, m)	1545.9	1544.6
1989	δ = 2.34(12H, s), 6.32(2H, m), 6.43(2H, m), 6.83~6.86(8H, m), 7.03~7.06(4H, m), 7.41(4H, m), 7.51~7.52(16H, m), 7.58~7.59(12H, m), 7.66(6H, m), 7.73~7.75(6H, m), 7.92(4H, m), 8(8H, m)	1529.9	1528.7
2009	δ = 2.34(6H, s), 6.51(4H, m), 6.62(2H, m), 6.7(2H, m), 6.83(2H, m), 6.98~7.03 (6H, m), 7.55~7.59(14H, m), 7.66(6H, m), 7.73~7.75(6H, m), 7.92(4H, m), 8 (8H, m), 8.07(2H, m)	1199.5	1198.5
2030	δ = 2.34(24H, s), 6.32~6.36(6H, m), 6.43(2H, m), 6.71(2H, m), 6.83~6.86(4H, m), 7.03(2H, m), 7.58~7.59(12H, m), 7.66(6H, m), 7.73~7.75(6H, m), 7.92(4H, m), 8(8H, m)	1281.7	1280.6
2079	δ = 2.34(24H, s), 6.36(4H, m), 6.65~6.71(4H, m), 6.83(2H, m), 6.95(2H, m), 7.03(2H, m), 7.29~7.33(16H, m), 7.58~7.6(14H, m), 7.66(6H, m), 7.73~7.75 (6H, m), 7.92(4H, m), 8(8H, m)	1586.0	1584.7
2129	δ = 1.35(36H, s), 6.63(4H, m), 6.81~6.83(4H, m), 7.03~7.08(4H, m), 7.2(4H, m), 7.32~7.38(18H, m), 7.66~7.75(12H, m), 7.82~7.88(4H, m), 8.12(2H, m), 8.68(2H, m), 8.93(2H, m)	1393.9	1392.7
2144	δ = 1.35(36H, s), 6.83(2H, m), 6.98~7.03(4H, m), 7.36~7.38(20H, m), 7.49~7.57(10H, m), 7.66(6H, m), 7.74~7.77(6H, m), 7.84~7.88(4H, m), 8.02~8.07(4H, m)	1393.9	1392.7

(continued)

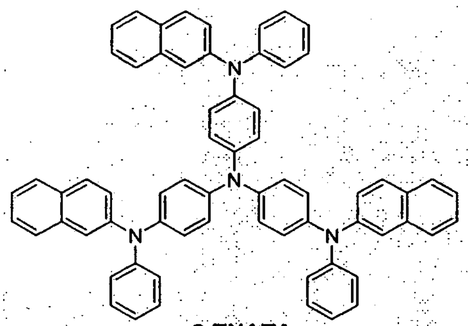
compound	^1H NMR($CDCl_3$, 200 MHz)	MS/FAB	
		found	calculated
2163	δ = 1.35(36H, s), 6.69(4H, m), 6.83(2H, m), 6.98~7.03(4H, m), 7.37~7.41(20H, m), 7.51~7.57(18H, m), 7.66(6H, m), 7.75(2H, m), 8.02~8.07(4H, m)	1446.0	1444.8
2178	δ = 1.35(36H, s), 6.62(2H, m), 6.7(2H, m), 6.83(2H, m), 6.98~7.03(4H, m), 7.37~7.38(18H, m), 7.53~7.57(8H, m), 7.66(6H, m), 7.75(2H, m), 8.02~8.07 (6H, m)	1295.7	1294.7
2193	δ = 0.25(18H, s), 1.35(36H, s), 6.61(4H, m), 6.69(4H, m), 6.83(2H, m), 7.03 (2H, m), 7.15(4H, m), 7.37~7.41(18H, m), 7.51~7.54(12H, m), 7.66(6H, m), 7.75(2H, m)	1490.2	1488.8
2238	δ = 1.35(36H, s), 6.61(4H, m), 6.83(4H, m), 6.99~7.03(8H, m), 7.37~7.39(28H, m), 7.66(6H, m), 7.75(2H, m), 7.91(6H, m)	1578.0	1576.7
2255	δ = 1.35(36H, s), 2.18(6H, s), 2.34(12H, s), 6.24(4H, m), 6.83~6.85(6H, m), 7.03~7.06(4H, m), 7.37~7.41(20H, m), 7.51~7.52(16H, m), 7.66(6H, m), 7.75 (2H, m)	1582.2	1580.9
2294	δ = 1.35(36H, s), 2.34(12H, s), 6.32(2H, m), 6.43(2H, m), 6.56(4H, m), 6.83~6.86(4H, m), 7.03(2H, m), 7.37~7.38(20H, m), 7.66(6H, m), 7.75(2H, m)	1385.7	1384.7
2347	δ = 1.35(36H, s), 6.56(4H, m), 6.62(2H, m), 6.7(2H, m), 6.83(2H, m), 7.03(2H, m), 7.37~7.38(20H, m), 7.55(2H, m), 7.66(6H, m), 7.75(2H, m), 8.07(2H, m)	1331.6	1330.6
2407	δ = 6.83(2H, m), 6.98~7.03(4H, m), 7.16~7.19(4H, m), 7.28(4H, m), 7.35~7.38 (10H, m), 7.44~7.57(18H, m), 7.74~7.88(18H, m), 8.02~8.07(4H, m)	1341.6	1340.5
2429	δ = 6.83(2H, m), 6.98~7.08(6H, m), 7.16~7.19(4H, m), 7.28~7.38(14H, m), 7.44(2H, m), 7.53~7.57(12H, m), 7.71~7.88(18H, m), 8.02~8.12(6H, m), 8.68 (2H, m), 8.93(2H, m)	1441.8	1440.5
2457	δ = 6.62(2H, m), 6.69~6.7(6H, m), 6.83(2H, m), 7.03(2H, m), 7.16~7.19(4H, m), 7.28(4H, m), 7.35~7.44(10H, m), 7.51~7.57(20H, m), 7.75~7.81(6H, m), 7.87(4H, m), 8.07(2H, m)	1295.6	1294.5
2486	δ = 6.62(2H, m), 6.7(2H, m), 6.83(2H, m), 7.03~7.08(4H, m), 7.16~7.19(4H, m), 7.28~7.38(12H, m), 7.44(2H, m), 7.55~7.57(8H, m), 7.71~7.88(18H, m), 8.07~8.12(4H, m), 8.68(2H, m), 8.93(2H, m)	1343.6	1342.5
2502	δ = 2.34(12H, s), 6.32(2H, m), 6.43(2H, m), 6.83~6.86(6H, m), 7.03(4H, m), 7.16~7.19(4H, m), 7.28(4H, m), 7.35~7.44(20H, m), 7.55~7.57(6H, m), 7.75~7.81(6H, m), 7.87~7.91(10H, m)	1545.9	1544.6
2552	δ = 1.35(18H, s), 2.34(12H, s), 6.32(2H, m), 6.43(2H, m), 6.55(4H, m), 6.83~6.86(4H, m), 7.01~7.03(6H, m), 7.16~7.19(4H, m), 7.28(4H, m), 7.35~7.38(6H, m), 7.44(2H, m), 7.55~7.57(6H, m), 7.75~7.81(6H, m), 7.87(4H, m)	1309.7	1308.6
2581	δ = 3.83(6H, s), 6.52(4H, m), 6.62(2H, m), 6.7~6.74(6H, m), 6.83(2H, m), 7.03 (2H, m), 7.16~7.19(4H, m), 7.28(4H, m), 7.35~7.38(6H, m), 7.44(2H, m), 7.55~7.57(8H, m), 7.75~7.81(6H, m), 7.87(4H, m), 8.07(2H, m)	1203.4	1202.5
2604	δ = 2.34(12H, s), 6.36(4H, m), 6.71(2H, m), 6.83(2H, m), 7.03(2H, m), 7.16~7.19(4H, m), 7.28(4H, m), 7.35~7.38(8H, m), 7.44(2H, m), 7.55~7.57(8H, m), 7.69~7.81(10H, m), 7.87(4H, m), 7.94(2H, m), 8.22(2H, m)	1299.6	1298.5
2637	δ = 6.83(2H, m), 7.03~7.04(6H, m), 7.16~7.19(4H, m), 7.28(4H, m), 7.35~7.44 (12H, m), 7.51~7.57(22H, m), 7.75~7.81(18H, m), 7.87(4H, m), 8.07(4H, m), 8.49(4H, m)	1646.0	1644.6

[Example 1] Manufacture of OLED's by using the organic electroluminescent compounds of the invention

[0069] An OLED device was manufactured by using the electroluminescent compound according to the invention.

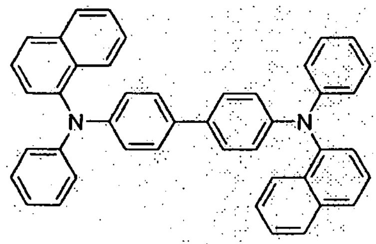
[0070] First, a transparent electrode ITO thin film (15 Ω/□) (2) prepared from glass for OLED (1) (manufactured by Samsung-Corning) was subjected to ultrasonic washing with trichloroethylene, acetone, ethanol and distilled water, sequentially, and stored in isopropanol before use.

[0071] Then, an ITO substrate was equipped in a substrate folder of a vacuum vapor-deposit device, and 4,4',4"-tris (N,N-(2-naphthyl)-phenylamino)triphenylamine (2-TNATA) (of which the structure is shown below) was placed in a cell of the vacuum vapor-deposit device, which was then ventilated up to 10^{-6} torr of vacuum in the chamber. Electric current was applied to the cell to evaporate 2-TNATA, thereby providing vapor-deposit of a hole injecting layer (3) having 60 nm of thickness on the ITO substrate.



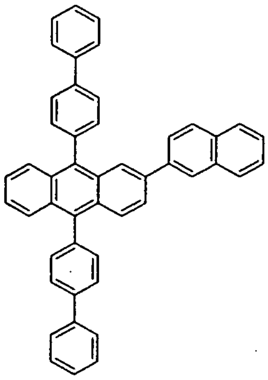
2-TNATA

[0072] Then, to another cell of the vacuum vapor-deposit device, charged was N,N'-bis(α-naphthyl)-N,N'-diphenyl-4,4'-diamine (NPB) (of which the structure is shown below), and electric current was applied to the cell to evaporate NPB, thereby providing vapor-deposit of a hole transport layer (4) having 20 nm of thickness on the hole injecting layer.

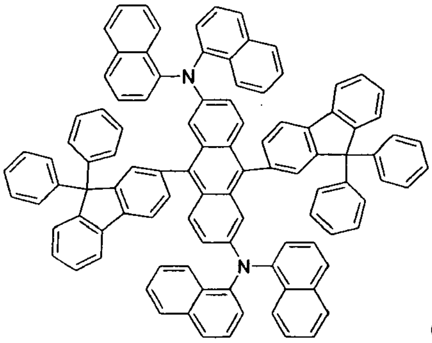


NPB

[0073] After forming the hole injecting layer and the hole transport layer, an electroluminescent layer was vapor-deposited as follows. To one cell of a vacuum vapor-deposit device, charged was H-5 (of which the structure is shown below) as a host, and a compound according to the invention (Compound 3) was charged to another cell as a dopant. Two substances were evaporated at different rates to give doping at 2 to 5mol% by weight on the basis of the host, to vapor-deposit an electroluminescent layer (5) with a thickness of 30 nm on the hole transport layer.

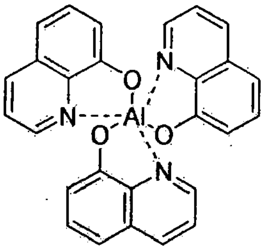


H-5

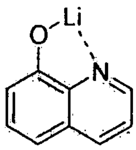


Compound 3

[0074] Then, tris(8-hydroxyquinoline)aluminum (III) (Alq) (of which the structure is shown below) was vapor-deposited as an electron transport layer (6) with a thickness of 20 nm, and lithium quinolate (Liq) (of which the structure shown below) was vapor-deposited as an electron injecting layer (7) with a thickness of 1 to 2 nm. Thereafter, an Al cathode (8) was vapor-deposited with a thickness of 150 nm by using another vacuum vapor-deposit device to manufacture an OLED.



Alq

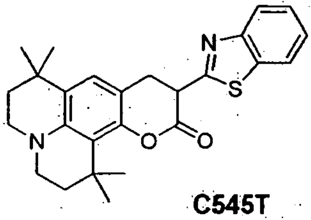


Liq

[0075] Each material employed for manufacturing an OLED was used as the electroluminescent material after being purified via vacuum sublimation at 10^{-6} torr.

[Comparative Example 1] Manufacture of an OLED by using conventional electroluminescent material

[0076] After forming a hole injecting layer and hole transport layer according to the same procedure as described in Example 1, tris(8-hydroxyquinoline)-aluminum (III) (Alq) was charged to another cell of said vacuum vapor-deposit device as electroluminescent host material, while Coumarin 545T (C545T) (of which the structure is shown below) was charged to still another cell. The two substances were evaporated at different rates to carry out doping, thereby vapor-depositing an electroluminescent layer with a thickness of 30 nm on the hole transport layer. The doping concentration preferably is from 1 to 3mol% by weight on the basis of Alq.

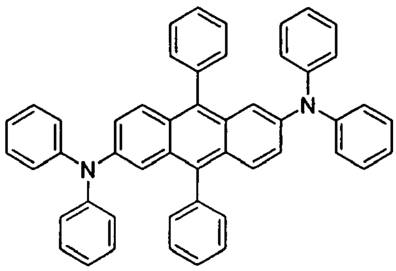


C545T

[0077] Then, an electron transport layer and an electron injecting layer were vapor-deposited according to the same procedure as in Example 1, and Al cathode was vapor-deposited by using another vacuum vapor-deposit device with a thickness of 150 nm, to manufacture an OLED.

[Comparative Example 2] Manufacture of an OLED by using conventional electroluminescent material

[0078] After forming a hole injecting layer and a hole transport layer according to the same procedure as described in Example 1, H-5 was charged to another cell of said vacuum vapor-deposit device as electroluminescent host material, while Compound (G) was charged to still another cell. The two substances were evaporated at different rates to carry out doping at a concentration of 2 to 5mol% by weight on the basis of the host, thereby vapor-depositing an electroluminescent layer with a thickness of 30 nm on the hole transport layer.



compound **G**

[0079] Then, an electron transport layer and an electron injecting layer were vapor-deposited according to the same procedure as in Example 1, and Al cathode was vapor-deposited by using another vacuum vapor-deposit device with a thickness of 150 nm, to manufacture an OLED.

[Example 2] Electroluminescent properties of OLED's manufactured

[0080] The luminous efficiencies of the OLED's comprising the organic electroluminescent compound according to the present invention (Examples 1) or conventional EL compounds (Comparative Examples 1 and 2) were measured at 5,000 cd/m^2 and 20,000 cd/m^2, respectively, and the results are shown in Table 4. Since the electroluminescent properties in high luminance region are very important, particularly in case of green electroluminescent materials, the data at high luminance (about 20,000 cd/m^2) are attached in order to reflect the properties.

[Table 4]

No.	Host	Dopant	Doping Conc. (mol%)	Efficiency(cd/A)		Color
				@5,000 cd/m^2	@20,000 cd/m^2	
1	H-5	3	3	21.9	21.0	Green
2	H-5	27	3	18.1	17.3	Green
3	H-5	540	3	16.6	15.8	Green
4	H-5	687	3	19.7	19.1	Green
5	H-5	1291	3	19.0	18.1	Green
6	H-5	1469	3	19.0	18.5	Green
7	H-5	1803	3	20.0	18.4	Green
8	H-5	2769	3	21.0	20.8	Green
9	H-27	2871	3	20.4	19.5	Green
10	H-27	4467	3	16.7	16.1	Green
11	H-27	5066	3	16.4	16.0	Green

(continued)

No.	Host	Dopant	Doping Conc. (mol%)	Efficiency(cd/A)		Color
				@5,000 cd/m^2	@20,000 cd/m^2	
12	H-27	6162	3	19.9	19.1	Green
Comp. 1	Alq	Compound C545T	1.0	10.3	9.1	Green
Comp. 2	H-5	Compound G	3.0	16.3	14.1	Green

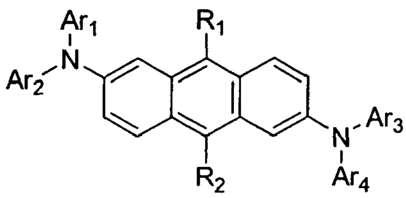
[0081] As can be seen from Table 4, it is found that Compound (H-5) with 3.0% doping of Compound (3) exhibited highest luminous efficiency, which is more than twice of that of conventional Alq:C545T (Comparative Example 1), being corresponding to 20~30% increase of luminous efficiency as compared to Compound (3) (Comparative Example 2).

[0082] The high performance electroluminescent materials according to the invention showing the decrease of the efficiency within 1 ~ 2 cd/A at high luminance of about 20,000 cd/m^2, suggests that they have excellent material properties to maintain good feature even at high luminance. Thus the materials can exhibit advantageous properties for both passive and active organic electroluminescent devices.

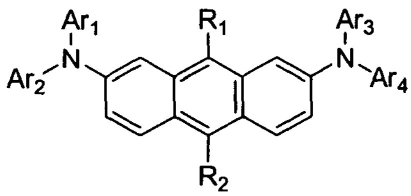
Claims

1. An organic electroluminescent compound represented by Chemical Formula (1) or Chemical Formula (2):

Chemical Formula 1



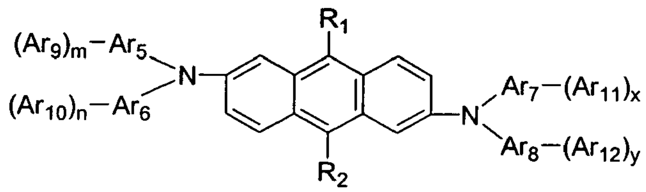
Chemical Formula 2



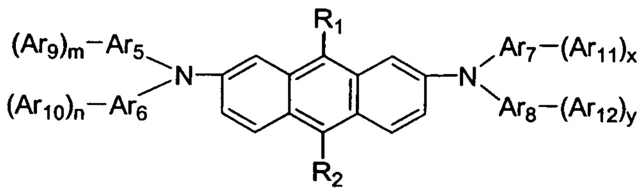
wherein, R_1 and R_2 independently represent (C6-C60)aryl or (C5-C60)heteroaryl, and the aryl and heteroaryl may be further substituted by one or more substituent(s) selected from halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, halo(C1-C30)alkyl, halo(C1-C30)alkoxy, (C1-C30)alkyl(C6-C30)aryl, (C6-C30)ar(C1-C30) alkyl, (C6-C30)ar(C1-C30)alkoxy, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60) alkoxycarbonyl, carboxyl, nitro and hydroxyl, provided that the total number of carbons in R_1 or R_2 is from 21 to 60; Ar_1 through Ar_4 independently represent hydrogen, halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60) cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C1-C60) alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro and hydroxyl; and the alkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, arylsilyl, alkylsilyl, alkylamino and arylamino of Ar_1 through Ar_4 may be further substituted by one or more substituent(s) selected from halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro and hydroxyl.

2. The organic electroluminescent compound according to claim 1, which is represented by Chemical Formula (3) or Chemical Formula (4):

Chemical Formula 3

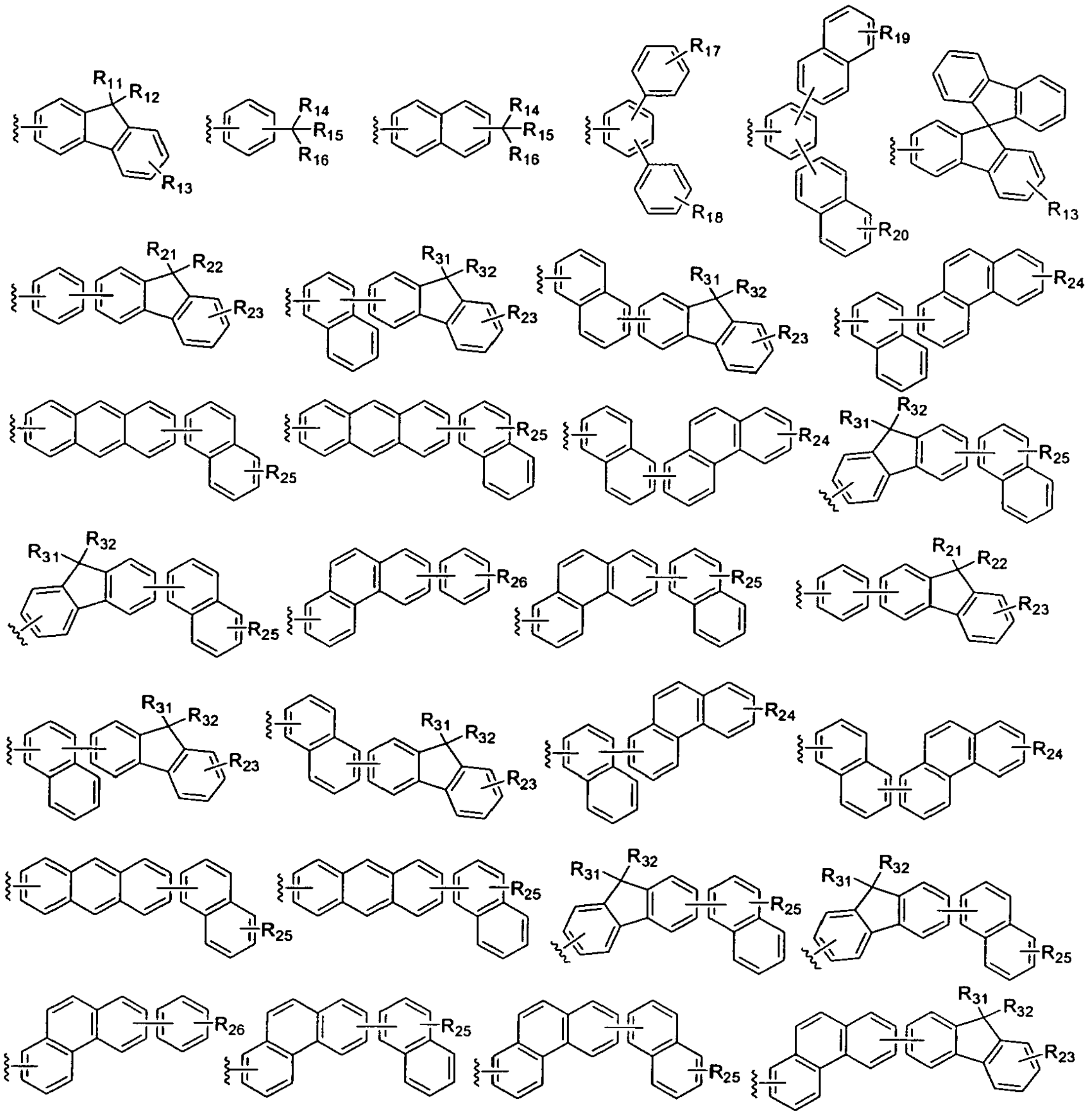


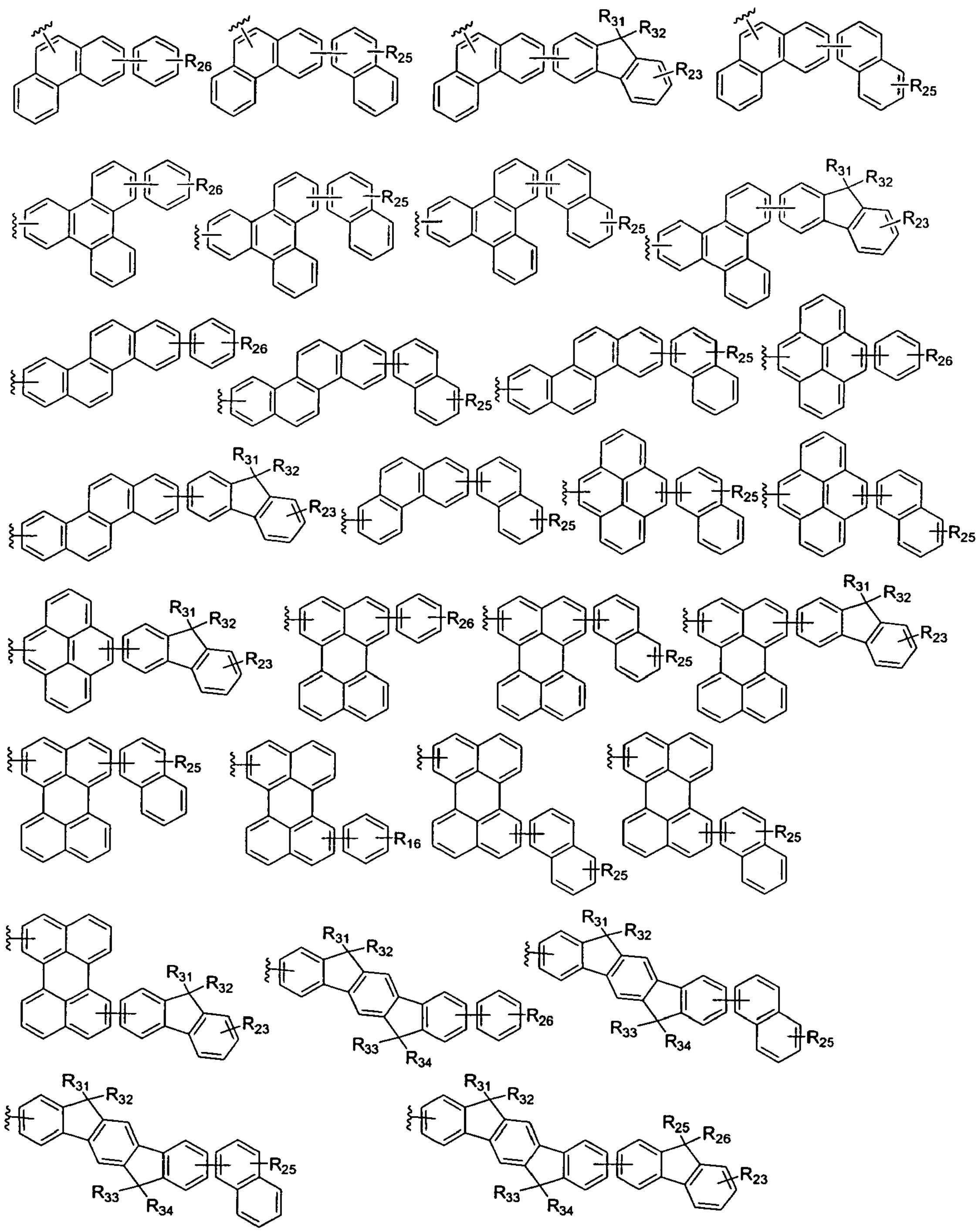
Chemical Formula 4



wherein, R_1 and R_2 are defined as in claim 1;
Ar_5 through Ar_8 independently represent (C6-C60)aryl, (C4-C60)heteroaryl, (C3-C60)cycloalkyl, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C6-C60)arylene or (C4-C60)heteroarylene; the aryl, heteroaryl, arylene or heteroarylene of Ar_5 through Ar_8 may be further substituted by one or more substituent(s) selected from a group consisting of (C1-C60)alkyl, halo(C1-C30)alkyl, (C1-C30)alkoxy, halo(C1-C30)alkoxy, (C3-C60)cycloalkyl, halogen, cyano, (C1-C30)alkyl(C6-C30)aryl, (C6-C30)ar(C1-C30)alkyl, (C6-C30)ar(C1-C30)alkoxy, tri(C1-C30)alkylsilyl, di(C1-C30)alkyl(C6-C30)arylsilyl and tri(C6-C30)arylsilyl;
Ar_9 through Ar_{12} independently represent (C6-C60)aryl or (C4-C60)heteroaryl; the aryl or heteroaryl of Ar_9 through Ar_{12} may be further substituted by one or more substituent(s) selected from a group consisting of (C1-C60)alkyl, halo(C1-C30)alkyl, (C1-C30)alkoxy, halo(C1-C30)alkoxy, (C3-C60)cycloalkyl, halogen, cyano, (C1-C30)alkyl(C6-C30)aryl, (C6-C30)ar(C1-C30)alkyl, (C6-C30)ar(C1-C30)alkoxy, tri(C1-C30)alkylsilyl, di(C1-C30)alkyl(C6-C30)arylsilyl and tri(C6-C30)arylsilyl;
provided that m is 0 when Ar_5 represents (C6-C60)aryl, (C4-C60)heteroaryl, (C3-C60)cycloalkyl or 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, while m is an integer from 1 to 4 when Ar_5 represents (C6-C60)arylene or (C4-C60)heteroarylene;
n is 0 when Ar_6 represents (C6-C60)aryl, (C4-C60)heteroaryl, (C3-C60)cycloalkyl or 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, while n is an integer from 1 to 4 when Ar_6 represents (C6-C60)arylene or (C4-C60)heteroarylene;
x is 0 when Ar_{11} represents (C6-C60)aryl, (C4-C60)heteroaryl, (C3-C60)cycloalkyl or 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, while x is an integer from 1 to 4 when Ar_{11} represents (C6-C60)arylene or (C4-C60)heteroarylene; and
y is 0 when Ar_{12} represents (C6-C60)aryl, (C4-C60)heteroaryl, (C3-C60)cycloalkyl or 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, while y is an integer from 1 to 4 when Ar_{12} represents (C6-C60)arylene or (C4-C60)heteroarylene.

3. The organic electroluminescent compound according to claim 2, wherein R_1 and R_2 are independently selected from the following structures:

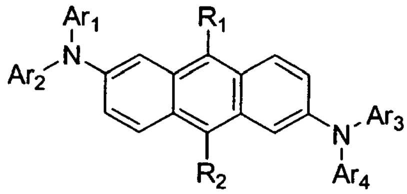




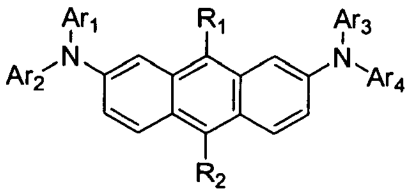
wherein, R_{11} and R_{12} independently represent (C6-C60)aryl, (C1-C30)alkyl(C6-C30)aryl or (C6-C30)ar(C1-C30)alkyl; R_{13} represents hydrogen, (C1-C60)alkyl, (C6-C60)aryl, (C1-C30)alkyl(C6-C30)aryl or (C6-C30)ar(C1-C30)alkyl; R_{14} through R_{16} independently represent (C6-C60)aryl, (C1-C30)alkyl(C6-C30)aryl or (C6-C30)ar(C1-C30)alkyl; R_{17} and R_{18} independently represent (C1-C60)alkyl; R_{19} and R_{20} independently represent hydrogen or (C1-C60)alkyl; R_{21} through R_{26} independently represent (C1-C60)alkyl; and R_{31} through R_{34} independently represent hydrogen or (C1-C60)alkyl.

4. An organic electroluminescent device which is comprised of a first electrode; a second electrode; and at least one organic layer(s) interposed between the first electrode and the second electrode; wherein the organic layer comprises an electroluminescent layer comprising an organic electroluminescent compound represented by Chemical Formula (1) or Chemical Formula (2):

Chemical Formula 1

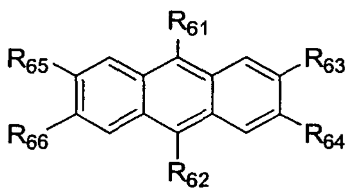


Chemical Formula 2

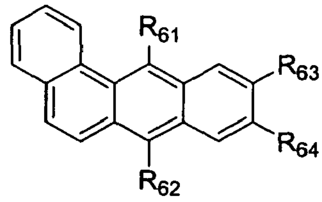


wherein, R_1 and R_2 independently represent (C6-C60)aryl or (C5-C60)heteroaryl, and the aryl and heteroaryl may be further substituted by one or more substituent(s) selected from halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, halo(C1-C30)alkyl, halo(C1-C30)alkoxy, (C1-C30)alkyl(C6-C30)aryl, (C6-C30)ar(C1-C30) alkyl, (C6-C30)ar(C1-C30)alkoxy, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60) alkoxycarbonyl, carboxyl, nitro and hydroxyl, provided that the total number of carbons in R_1 or R_2 is from 21 to 60; Ar1 through Ar4 independently represent hydrogen, halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5-or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60) cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro and hydroxyl; and the alkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, arylsilyl, alkylsilyl, alkylamino and arylamino of Ar1 through Ar4 may be further substituted by one or more substituent(s) selected from halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60) arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro and hydroxyl and one or more host(s) selected from the compounds represented by Chemical Formula (5) to (7):

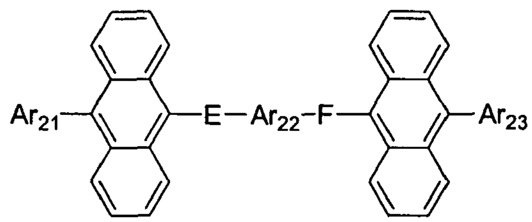
Chemical Formula 5



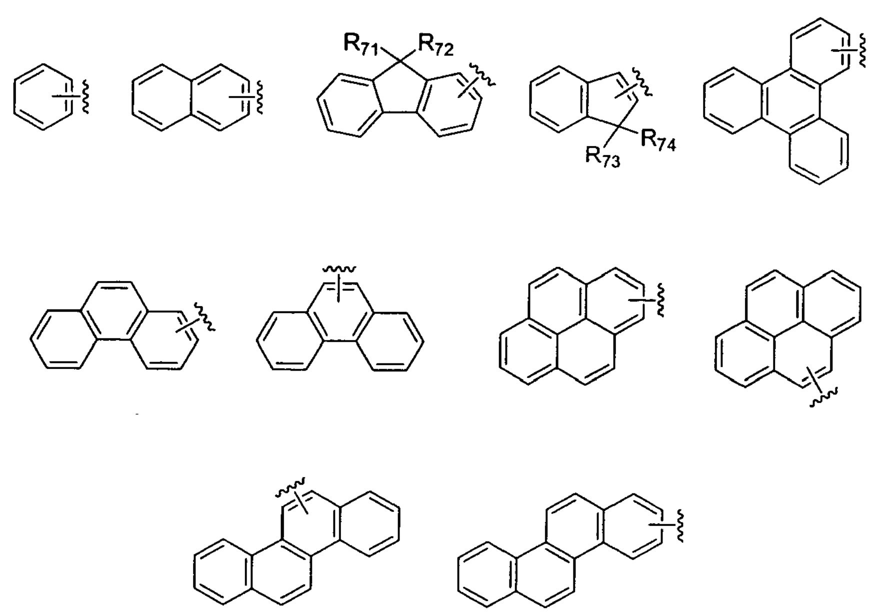
Chemical Formula 6



Chemical Formula 7

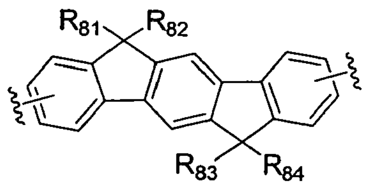


wherein, R_{61} and R_{62} independently represent (C6-C60)aryl, (C4-C60)heteroaryl, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, or (C3-C60)cycloalkyl; and the aryl or heteroaryl of R_{61} and R_{62} may be further substituted by one or more substituent(s) selected from a group consisting of (C1-C60)alkyl, halo(C1-C60)alkyl, (C1-C60)alkoxy, (C3-C60)cycloalkyl, (C6-C60)aryl, (C4-C60) heteroaryl, halogen, cyano, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl and tri(C6-C60)arylsilyl;
R_{63} through R_{66} represent hydrogen, (C1-C60)alkyl, (C1-C60)alkoxy, halogen, (C4-C60)heteroaryl, (C5-C60) cycloalkyl or (C6-C60)aryl; and the heteroaryl, cycloalkyl or aryl of R_{63} through R_{66} may be further substituted by one or more substituent(s) selected from a group consisting of (C1-C60)alkyl with or without halogen substituent(s), (C1-C60)alkoxy, (C3-C60)cycloalkyl, halogen, cyano, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60) arylsilyl and tri(C6-C60)arylsilyl;
E and F independently represent a chemical bond, or (C6-C60)arylene with or without one or more substituent (s) selected from (C1-C60)alkyl, (C1-C60)alkoxy, (C6-C60)aryl, (C4-C60)heteroaryl and halogen;
Ar_{21} and Ar_{23} represent aryl selected from the following structures, or (C4-C60)heteroaryl:



the aryl or heteroaryl of Ar_{21} and Ar_{23} may be substituted by one or more substituent(s) selected from (C1-C60) alkyl, (C1-C60)alkoxy, (C6-C60)aryl and (C4-C60)heteroaryl;

Ar_{22} represents (C6-C60)arylene, (C4-C60)heteroarylene, or a compound represented by the following structural formula:



the arylene or heteroarylene of Ar_{22} may be substituted by one or more substituent(s) selected from (C1-C60) alkyl, (C1-C60)alkoxy, (C6-C60)aryl, (C4-C60)heteroaryl and halogen;

R_{71} through R_{74} independently represent hydrogen, (C1-C60)alkyl or (C6-C60)aryl, or each of them may be linked to an adjacent substituent via (C3-C60)alkylene or (C3-C60)alkenylene with or without a fused ring to form an alicyclic ring, or a monocyclic or polycyclic aromatic ring;

R_{81} through R_{84} independently represent hydrogen, (C1-C60)alkyl, (C1-C60)alkoxy, (C6-C60)aryl, (C4-C60) heteroaryl or halogen, or each of them may be linked to an adjacent substituent via (C3-C60)alkylene or (C3-C60)alkenylene with or without a fused ring to form an alicyclic ring, or a monocyclic or polycyclic aromatic ring.

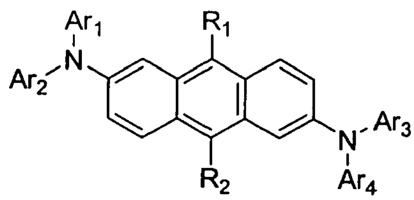
5. The organic electroluminescent device according to claim 4, wherein the organic layer comprises one or more compound(s) selected from a group consisting of arylamine compounds and styrylarylamine compounds.

6. The organic electroluminescent device according to claim 4, wherein the organic layer comprises one or more metal (s) selected from a group consisting of organic metals of Group 1, Group 2, 4th period and 5th period transition metals, lanthanide metals and d-transition elements from the Periodic Table of Elements.

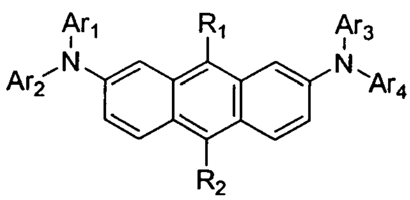
7. The organic electroluminescent device according to claim 4, wherein the organic layer comprises a charge generating layer as well as the electroluminescent layer.

8. The white electroluminescent device which comprises an organic electroluminescent compound represented by Chemical Formula (1) or Chemical Formula (2):

Chemical Formula 1



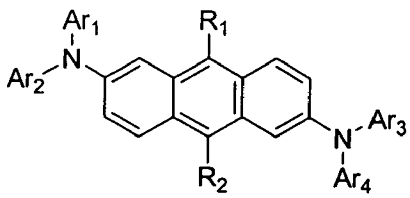
Chemical Formula 2



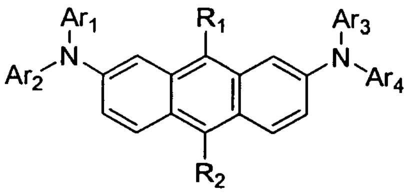
wherein, R_1 and R_2 independently represent (C6-C60)aryl or (C5-C60)heteroaryl, and the aryl and heteroaryl may be further substituted by one or more substituent(s) selected from halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, halo(C1-C30)alkyl, halo(C1-C30)alkoxy, (C1-C30)alkyl(C6-C30)aryl, (C6-C30)ar(C1-C30) alkyl, (C6-C30)ar(C1-C30)alkoxy, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60) alkoxycarbonyl, carboxyl, nitro and hydroxyl, provided that the total number of carbons in R_1 or R_2 is from 21 to 60; Ar_1 through Ar_4 independently represent hydrogen, halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60) cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro and hydroxyl; and the alkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, arylsilyl, alkylsilyl, alkylamino and arylamino of Ar_1 through Ar_4 may be further substituted by one or more substituent(s) selected from halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60) arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro and hydroxyl.

9. An organic solar cell which comprises an organic electroluminescent compound represented by Chemical Formula (1) or Chemical Formula (2):

Chemical Formula 1



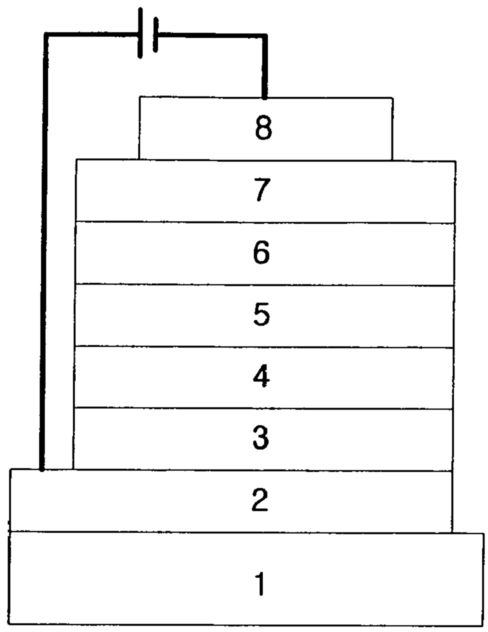
Chemical Formula 2



wherein, R_1 and R_2 independently represent (C6-C60)aryl or (C5-C60)heteroaryl, and the aryl and heteroaryl may be further substituted by one or more substituent(s) selected from halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, halo(C1-C30)alkyl, halo(C1-C30)alkoxy, (C1-C30)alkyl(C6-C30)aryl, (C6-C30)ar(C1-C30) alkyl, (C6-C30)ar(C1-C30)alkoxy, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60) alkoxycarbonyl, carboxyl, nitro and hydroxyl, provided that the total number of carbons in R_1 or R_2 is from 21 to 60; Ar_1 through Ar_4 independently represent hydrogen, halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5- or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60) cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-

C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro and hydroxyl; and the alkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, arylsilyl, alkylsilyl, alkylamino and arylamino of Ar_1 through Ar_4 may be further substituted by one or more substituent(s) selected from halogen, (C1-C60)alkyl, (C6-C60)aryl, (C4-C60)heteroaryl, 5-or 6-membered heterocycloalkyl containing one or more heteroatom(s) selected from N, O and S, (C3-C60)cycloalkyl, tri(C1-C60)alkylsilyl, di(C1-C60)alkyl(C6-C60)arylsilyl, tri(C6-C60)arylsilyl, adamantyl, (C7-C60)bicycloalkyl, (C2-C60)alkenyl, (C2-C60)alkynyl, (C1-C60)alkoxy, cyano, (C1-C60)alkylamino, (C6-C60)arylamino, (C6-C60)ar(C1-C60)alkyl, (C6-C60)aryloxy, (C6-C60)arylthio, (C1-C60)alkoxycarbonyl, carboxyl, nitro and hydroxyl.

Fig. 1



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EUROPEAN SEARCH REPORT

Application Number
EP 09 25 0836

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The present search report has been drawn up for all claims

3

Place of search	Date of completion of the search	Examiner
Munich	16 June 2009	Saldamli, Saltuk

CATEGORY OF CITED DOCUMENTS

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EUROPEAN SEARCH REPORT

Application Number
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Place of search	Date of completion of the search	Examiner
Munich	16 June 2009	Saldamli, Saltuk

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16-06-2009

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patsnap

专利名称(译)	新型有机电致发光化合物和使用其的有机电致发光器件		
公开(公告)号	[EP2108690A1](EP2108690A1)	公开(公告)日	2009-10-14
申请号	EP2009250836	申请日	2009-03-24
申请(专利权)人(译)	GRACEL显示增量.		
当前申请(专利权)人(译)	GRACEL显示增量.		
[标]发明人	LEE MI AE CHO YOUNG JUN KWON HYUCK JOO KIM BONG OK KIM SUNG MIN YOON SEUNG SOO		
发明人	LEE, MI AE CHO, YOUNG JUN KWON, HYUCK JOO KIM, BONG OK KIM, SUNG MIN YOON, SEUNG SOO		
IPC分类号	C09K11/06		
CPC分类号	C09K11/06 C09B57/008 C09K2211/1011 C09K2211/1014		
优先权	1020080030977 2008-04-02 KR		
外部链接	Espacenet		

摘要(译)

本发明涉及新型有机电致发光化合物，以及在电致发光层中使用其的有机电致发光器件。具体地，根据本发明的有机电致发光化合物的特征在于它们由化学式（1）或化学式（2）表示：条件是R1或R2中的碳的总数为21至60。根据本发明的电致发光化合物具有良好的发光效率和优异的材料寿命，可以由此制造具有高色纯度和亮度以及非常好的使用寿命的有机电致发光器件。

Chemical Formula 2