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LIGHT EMITTING ELEMENT COMPRISING
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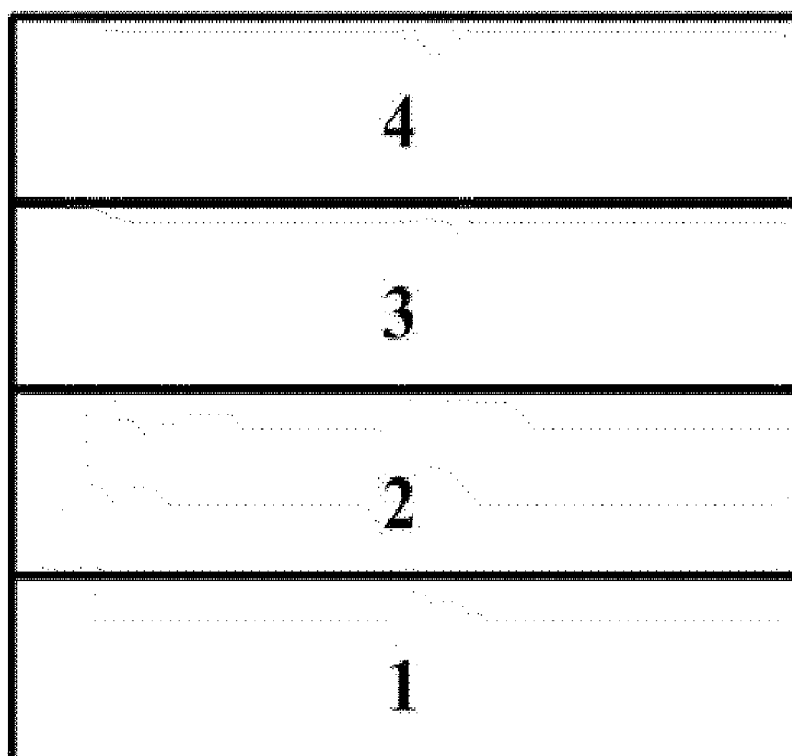
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(57)

ABSTRACTThe present specification provides a compound having a
spiro structure of Chemical Formula 1, and an organic light
emitting device including the same.

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SPIRO-TYPE COMPOUND AND ORGANIC LIGHT EMITTING ELEMENT COMPRISING SAME

TECHNICAL FIELD

[0001] This application claims priority to and the benefits of Korean Patent Application No. 10-2015-0149014, filed with the Korean Intellectual Property Office on Oct. 26, 2015, and Korean Patent Application No. 10-2016-0130731, filed with the Korean Intellectual Property Office on Oct. 10, 2016, the entire contents of which are incorporated herein by reference.

[0002] The present specification relates to a compound having a spiro structure, and an organic light emitting device including the same.

BACKGROUND ART

[0003] An organic light emission phenomenon generally refers to a phenomenon converting electrical energy to light energy using an organic material. An organic light emitting device using an organic light emission phenomenon normally has a structure including an anode, a cathode, and an organic material layer therebetween. Herein, the organic material layer is often formed in a multilayer structure formed with different materials in order to increase efficiency and stability of the organic light emitting device, and for example, may be formed with a hole injection layer, a hole transfer layer, a light emitting layer, an electron transfer layer, an electron injection layer and the like. When a voltage is applied between the two electrodes in such an organic light emitting device structure, holes and electrons are injected to the organic material layer from the anode and the cathode, respectively, and when the injected holes and electrons meet, excitons are formed, and light emits when these excitons fall back to the ground state.

[0004] Development of new materials for such an organic light emitting device has been continuously required.

DISCLOSURE

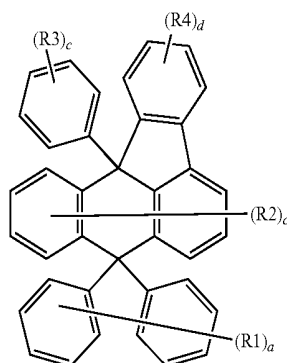
Technical Problem

[0005] The present specification describes a compound having a spiro structure, and an organic light emitting device including the same.

Technical Solution

[0006] One embodiment of the present specification provides a compound represented by the following Chemical Formula 1:

[Chemical Formula 1]



[0007] In Chemical Formula 1,

[0008] R1 to R4 are the same as or different from each other, and each independently hydrogen; deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a substituted or unsubstituted silyl group; a substituted or unsubstituted boron group; a substituted or unsubstituted alkyl group; a substituted or unsubstituted cycloalkyl group; a substituted or unsubstituted alkoxy group; a substituted or unsubstituted aryloxy group; a substituted or unsubstituted alkylthio group; a substituted or unsubstituted arylthio group; a substituted or unsubstituted alkylsulfoxy group; a substituted or unsubstituted arylsulfoxy group; a substituted or unsubstituted alkenyl group; a substituted or unsubstituted aralkyl group; a substituted or unsubstituted aralkenyl group; a substituted or unsubstituted alkylaryl group; a substituted or unsubstituted alkylamine group; a substituted or unsubstituted aralkylamine group; a substituted or unsubstituted heteroarylamine group; a substituted or unsubstituted arylamine group; a substituted or unsubstituted aryl-heteroarylamine group; a substituted or unsubstituted arylphosphine group; a substituted or unsubstituted phosphine oxide group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group, or may bond to an adjacent group to form a substituted or unsubstituted ring,

[0009] a is an integer of 0 to 10,

[0010] b is an integer of 0 to 7,

[0011] c is an integer of 0 to 5,

[0012] d is an integer of 0 to 4, and

[0013] when a, b, c and d are each 2 or greater, structures in the parentheses are the same as or different from each other.

[0014] Another embodiment of the present specification provides an organic light emitting device including a first electrode; a second electrode provided opposite to the first electrode; and one or more organic material layers provided between the first electrode and the second electrode, wherein one or more layers of the organic material layers include the compound of Chemical Formula 1.

Advantageous Effects

[0015] Compounds described in the present specification can be used as a material of an organic material layer of an organic light emitting device. Compounds according to at least one embodiment are capable of enhancing efficiency, low driving voltage and/or enhancing lifespan properties in an organic light emitting device. Particularly, compounds described in the present specification can be used as a material of hole injection, hole transfer, hole injection and hole transfer, light emission, electron transfer or electron injection. In addition, compounds described in the present specification can be preferably used as a material of a light emitting layer, electron transfer or electron injection. More preferably, when using compounds described in the present specification as a material of hole injection, hole transfer and electron suppression layer, properties of low voltage, high efficiency and/or long lifespan are exhibited.

DESCRIPTION OF DRAWINGS

[0016] FIG. 1 illustrates an organic light emitting device formed with a substrate (1), an anode (2), a light emitting layer (3) and a cathode (4).

[0017] FIG. 2 illustrates an organic light emitting device formed with a substrate (1), an anode (2), a hole injection layer (5), a hole transfer layer (6), a light emitting layer (7), an electron transfer layer (8) and a cathode (4).

[0018] 1: Substrate

[0019] 2: Anode

[0020] 3: Light Emitting Layer

[0021] 4: Cathode

[0022] 5: Hole Injection Layer

[0023] 6: Hole Transfer Layer

[0024] 7: Electron Transfer Layer

MODE FOR DISCLOSURE

[0025] Hereinafter, the present specification will be described in more detail.

[0026] One embodiment of the present specification provides a compound represented by Chemical Formula 1.

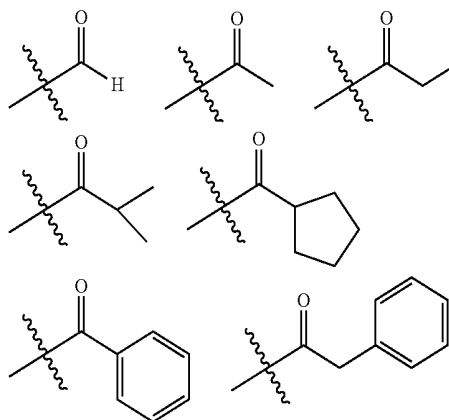
[0027] Examples of the substituents are described below, however, the substituents are not limited thereto.

[0028] In the present specification, the term “substituted or unsubstituted” means being substituted with one or more substituents selected from the group consisting of deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; an amine group; a phosphine oxide group; an alkoxy group; an aryloxy group; an alkylthioxy group; an arylthioxy group; an alkylsulfoxy group; an arylsulfoxy group; a silyl group unsubstituted or substituted with an alkyl group; a boron group; an alkyl group; a cycloalkyl group; an alkenyl group; an aryl group; an aralkyl group; an aralkenyl group; an alkylaryl group; an alkylamine group; an aralkylamine group; a heteroarylamine group; an arylamine group; an arylphosphine group; and a heterocyclic group, or being unsubstituted, or being substituted with a substituent linking two or more substituents among the substituents illustrated above, or being unsubstituted. For example, “a substituent linking two or more substituents” may include a biphenyl group. In other words, a biphenyl group may be an aryl group, or interpreted as a substituent linking two phenyl groups.

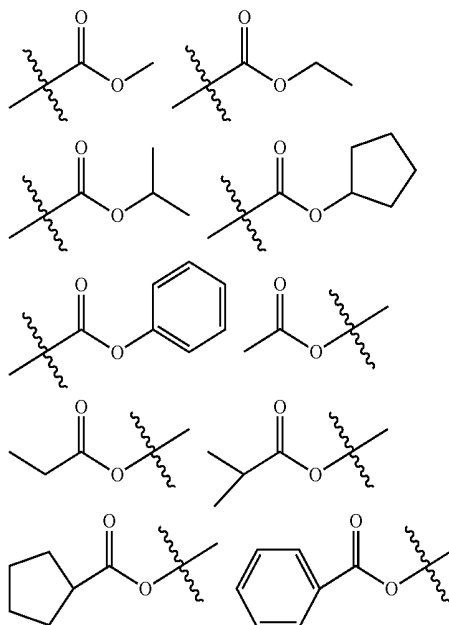
[0029] In the present specification, the expression “substituted or unsubstituted” may mean being preferably substituted with one or more substituents selected from the group consisting of deuterium; a halogen group; a nitrile group; an alkyl group; a trimethylsilyl group; an aryl group; and a heterocyclic group, or being unsubstituted.

[0030] In the present specification, an “adjacent” group may mean a substituent substituting an atom directly linked to an atom substituted by the corresponding substituent, a substituent sterically most closely positioned to the corresponding substituent, or another substituent substituting an atom substituted by the corresponding substituent. For example, two substituents substituting ortho positions in a benzene ring, and two substituents substituting the same carbon in an aliphatic ring may be interpreted as groups “adjacent” to each other.

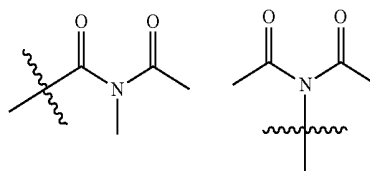
[0031] In the present specification, the number of carbon atoms of the carbonyl group is not particularly limited, but is preferably from 1 to 40. Specifically, compounds having structures as below may be included, however, the carbonyl group is not limited thereto.

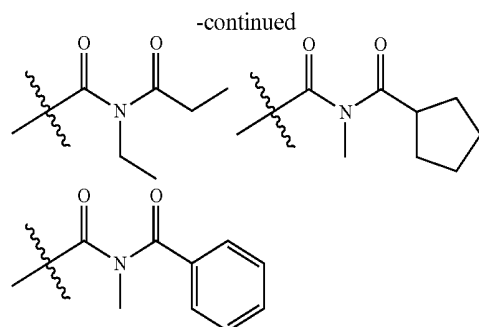


[0032] In the present specification, in the ester group, the oxygen of the ester group may be substituted with a linear, branched or cyclic alkyl group having 1 to 25 carbon atoms, or an aryl group having 6 to 25 carbon atoms. Specifically, compounds having the following structural formulae may be included, however, the ester group is not limited thereto.



[0033] In the present specification, the number of carbon atoms of the imide group is not particularly limited, but is preferably from 1 to 25. Specifically, compounds having structures as below may be included, however, the imide group is not limited thereto.





[0034] In the present specification, the silyl group may be represented by the chemical formula of —SiRR'R'' , and R, R' and R'' may each be hydrogen; a substituted or unsubstituted alkyl group; or a substituted or unsubstituted aryl group. Specific examples of the silyl group may include a trimethylsilyl group, a triethylsilyl group, a t-butyl dimethylsilyl group, a vinyl dimethylsilyl group, a propyl dimethylsilyl group, a triphenylsilyl group, a diphenylsilyl group, a phenylsilyl group and the like, but are not limited thereto.

[0035] In the present specification, the boron group may be represented by the chemical formula of —BRR' , and R and R' may each be hydrogen; a substituted or unsubstituted alkyl group; or a substituted or unsubstituted aryl group. Specific examples of the boron group may include a trimethylboron group, a triethylboron group, a t-butyl dimethylboron group, a triphenylboron group, a phenylboron group and the like, but are not limited thereto.

[0036] In the present specification, examples of the halogen group may include fluorine, chlorine, bromine or iodine.

[0037] In the present specification, the alkyl group may be linear or branched, and the number of carbon atoms is not particularly limited, but is preferably from 1 to 40. According to one embodiment, the number of carbon atoms of the alkyl group is from 1 to 20. According to another embodiment, the number of carbon atoms of the alkyl group is from 1 to 10. According to still another embodiment, the number of carbon atoms of the alkyl group is from 1 to 6. Specific examples of the alkyl group may include methyl, ethyl, propyl, n-propyl, isopropyl, butyl, n-butyl, isobutyl, tert-butyl, sec-butyl, 1-methylbutyl, 1-ethylbutyl, pentyl, n-pentyl, isopentyl, neopentyl, tert-pentyl, hexyl, n-hexyl, 1-methylpentyl, 2-methylpentyl, 4-methyl-2-pentyl, 3,3-dimethylbutyl, 2-ethylbutyl, heptyl, n-heptyl, 1-methylhexyl, cyclopentylmethyl, cyclohexylmethyl, octyl, n-octyl, tert-octyl, 1-methylheptyl, 2-ethylhexyl, 2-propylpentyl, n-nonyl, 2,2-dimethylheptyl, 1-ethylpropyl, 1,1-dimethylpropyl, isohexyl, 4-methylhexyl, 5-methylhexyl and the like, but are not limited thereto.

[0038] In the present specification, the alkenyl group may be linear or branched, and although not particularly limited thereto, the number of carbon atoms is preferably from 2 to 40. According to one embodiment, the number of carbon atoms of the alkenyl group is from 2 to 20. According to another embodiment, the number of carbon atoms of the alkenyl group is from 2 to 10. According to still another embodiment, the number of carbon atoms of the alkenyl group is from 2 to 6. Specific examples thereof may include vinyl, 1-propenyl, isopropenyl, 1-butenyl, 2-butenyl, 3-butenyl, 1-pentenyl, 2-pentenyl, 3-pentenyl, 3-methyl-1-butenyl, 1,3-butadienyl, allyl, 1-phenylvinyl-1-yl, 2-phenylvinyl-1-yl, 2,2-diphenylvinyl-1-yl, 2-phenyl-2-(naphthyl-1-yl)vinyl-

1-yl, 2,2-bis(diphenyl-1-yl)vinyl-1-yl, a stilbenyl group, a styrenyl group and the like, but are not limited thereto.

[0039] In the present specification, the cycloalkyl group is not particularly limited, but preferably has 3 to 60 carbon atoms, and according to one embodiment, the number of carbon atoms of the cycloalkyl group is from 3 to 30. According to another embodiment, the number of carbon atoms of the cycloalkyl group is from 3 to 20. According to still another embodiment, the number of carbon atoms of the cycloalkyl group is from 3 to 6. Specific examples thereof may include cyclopropyl, cyclobutyl, cyclopentyl, 3-methylcyclopentyl, 2,3-dimethylcyclopentyl, cyclohexyl, 3-methylcyclohexyl, 4-methylcyclohexyl, 2,3-dimethylcyclohexyl, 3,4,5-trimethylcyclohexyl, 4-tert-butylcyclohexyl, cycloheptyl, cyclooctyl and the like, but are not limited thereto.

[0040] In the present specification, the alkoxy group is not particularly limited, but preferably has 1 to 40 carbon atoms. According to one embodiment, the number of carbon atoms of the alkoxy group is from 1 to 10. According to another embodiment, the number of carbon atoms of the alkoxy group is from 1 to 6. Specific examples of the alkoxy group may include a methoxy group, an ethoxy group, a propoxy group, an isobutyloxy group, a sec-butyloxy group, a pentyloxy group, an iso-amtyloxy group, a hexyloxy group and the like, but are not limited thereto.

[0041] In the present specification, the number of carbon atoms of the amine group is not particularly limited, but is preferably from 1 to 30. Specific examples of the amine group may include a methylamine group, a dimethylamine group, an ethylamine group, a diethylamine group, a phenylamine group, a naphthylamine group, a biphenylamine group, an anthracenylamine group, a 9-methylanthracenylamine group, a diphenylamine group, a phenyl naphthylamine group, a ditolylamine group, a phenyltolylamine group, a triphenylamine group and the like, but are not limited thereto.

[0042] In the present specification, examples of the arylamine group include a substituted or unsubstituted monoarylamine group, a substituted or unsubstituted diarylamine group, or a substituted or unsubstituted triarylamine group. The aryl group in the arylamine group may be a monocyclic aryl group or a multicyclic aryl group. The arylamine group including two or more aryl groups may include monocyclic aryl groups, multicyclic aryl groups, or both monocyclic aryl groups and multicyclic aryl groups.

[0043] Specific examples of the arylamine group may include a phenylamine group, a naphthylamine group, a biphenylamine group, an anthracenylamine group, a 3-methylphenylamine group, a 4-methylnaphthylamine group, a 2-methylbiphenylamine group, a 9-methylanthracenylamine group, a diphenylamine group, a phenyl naphthylamine group, a ditolylamine group, a phenyltolylamine group, carbazole, a triphenylamine group and the like, but are not limited thereto.

[0044] In the present specification, examples of the heteroarylamine group include a substituted or unsubstituted monoheteroarylamine group, a substituted or unsubstituted diheteroarylamine group, or a substituted or unsubstituted triheteroarylamine group. The heteroaryl group in the heteroarylamine group may be a monocyclic heterocyclic group or a multicyclic heterocyclic group. The heteroarylamine group including two or more heterocyclic groups may include monocyclic heterocyclic groups, multicyclic hetero-

cyclic groups, or both monocyclic heterocyclic groups and multicyclic heterocyclic groups.

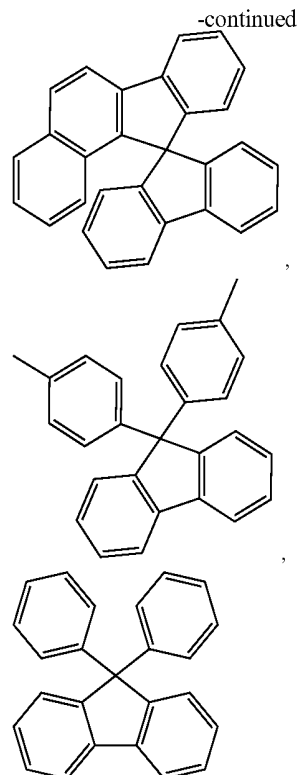
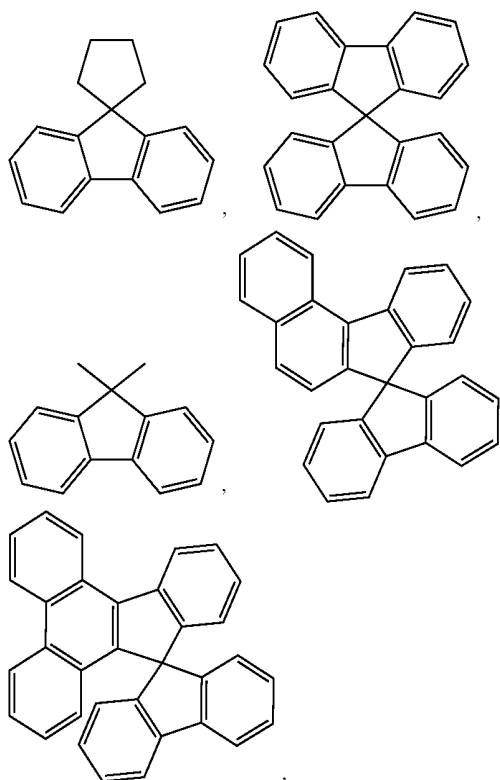
[0045] In the present specification, the arylheteroarylamine group means an amine group substituted with an aryl group and a heterocyclic group.

[0046] In the present specification, examples of the arylphosphine group include a substituted or unsubstituted monoarylphosphine group, a substituted or unsubstituted diarylphosphine group, or a substituted or unsubstituted triarylphosphine group. The aryl group in the arylphosphine group may be a monocyclic aryl group or a multicyclic aryl group. The arylphosphine group including two or more aryl groups may include monocyclic aryl groups, multicyclic aryl groups, or both monocyclic aryl groups and multicyclic aryl groups.

[0047] In the present specification, the aryl group is not particularly limited, but preferably has 6 to 60 carbon atoms, and may be a monocyclic aryl group or a multicyclic aryl group. According to one embodiment, the number of carbon atoms of the aryl group is from 6 to 30. According to one embodiment, the number of carbon atoms of the aryl group is from 6 to 20. Examples of the monocyclic aryl group may include a phenyl group, a biphenyl group, a terphenyl group and the like, but are not limited thereto. Examples of the multicyclic aryl group may include a naphthyl group, an anthracenyl group, a phenanthryl group, a pyrenyl group, a perylenyl group, a chrysenyl group, a fluorenyl group, a triphenylene group and the like, but are not limited thereto.

[0048] In the present specification, the fluorenyl group may be substituted, and two of the substituents may bond to each other to form a spiro structure.

[0049] When the fluorenyl group is substituted,



and the like may be included. However, the structure is not limited thereto.

[0050] In the present specification, the heterocyclic group is a heterocyclic group including one or more of N, O, S, Si and Se as a heteroatom, and although not particularly limited thereto, the number of carbon atoms is preferably from 2 to 60. Examples of the heterocyclic group may include a thiophene group, a furan group, a pyrrole group, an imidazole group, a triazole group, an oxazole group, an oxadiazole group, a triazole group, a pyridyl group, a bipyridyl group, a pyrimidyl group, a triazine group, a triazole group, an acridyl group, a pyridazine group, a pyrazinyl group, a quinolinyl group, a quinazoline group, a quinoxalinyl group, a phthalazinyl group, a pyridopyrimidinyl group, a pyridopyrazinyl group, a pyrazinopyrazinyl group, an isoquinoline group, an indole group, a carbazole group, a benzoxazole group, a benzimidazole group, a benzothiazole group, a benzocarbazole group, a benzothiophene group, a dibenzothiophene group, a benzofuranyl group, a phenanthroline group, a thiazolyl group, an isoxazolyl group, a thiadiazolyl group, a benzothiazolyl group, a phenoxazinyl group, a phenothiazinyl group, a dibenzofuranyl group and the like, but are not limited thereto.

[0051] In the present specification, the descriptions on the heterocyclic group provided above may be used on the heteroaryl group except that the heteroaryl group is an aromatic group.

[0052] In the present specification, the descriptions on the aryl group provided above may be used on the aryl group in the aryloxy group, the arylthioxy group, the arylsulfoxy group, the arylphosphine group, the aralkyl group, the aralkylamine group, the aralkenyl group, the alkylaryl group, the arylamine group and the arylheteroarylamine group.

[0053] In the present specification, the descriptions on the alkyl group provided above may be used on the alkyl group in the alkylthioxy group, the alkylsulfoxy group, the aralkyl group, the aralkylamine group, the alkylaryl group and the alkylamine group.

[0054] In the present specification, the descriptions on the heterocyclic group provided above may be used on the heteroaryl group in the heteroaryl group, the heteroarylamine group and the arylheteroarylamine group.

[0055] In the present specification, the descriptions on the alkenyl group provided above may be used on the alkenyl group in the aralkenyl group.

[0056] In the present specification, the descriptions on the aryl group provided above may be used on the arylene group except that the arylene group is divalent.

[0057] In the present specification, the descriptions on the heterocyclic group provided above may be used on the heteroarylene group except that the heteroarylene group is divalent.

[0058] In the present specification, bonding to an adjacent group to form a ring means bonding to an adjacent group to form a substituted or unsubstituted aliphatic hydrocarbon ring; a substituted or unsubstituted aromatic hydrocarbon ring; a substituted or unsubstituted aliphatic heteroring; a substituted or unsubstituted aromatic heteroring; or a fused ring thereof.

[0059] In the present specification, the aliphatic hydrocarbon ring means a ring that is not aromatic and formed only with carbon and hydrogen atoms.

[0060] In the present specification, examples of the aromatic hydrocarbon ring may include a phenyl group, a naphthyl group, an anthracenyl group and the like, but are not limited thereto.

[0061] In the present specification, the aliphatic heteroring means an aliphatic ring including one or more of heteroatoms.

[0062] In the present specification, the aromatic heteroring means an aromatic ring including one or more of heteroatoms.

[0063] In the present specification, the aliphatic hydrocarbon ring, the aromatic hydrocarbon ring, the aliphatic heteroring and the aromatic heteroring may be monocyclic or multicyclic.

[0064] According to one embodiment of the present specification, in Chemical Formula 1, a is from 1 to 10, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group, m is an integer of 1 to 10, and A is $-NAr_1Ar_2$; a substituted or unsubstituted N-containing heterocyclic group; $-P(=O)R_5R_6$; a substituted or unsubstituted anthracene group; or an aryl group substituted with a halogen group or a nitrile group. Herein, Ar1, Ar2, R5 and R6 are the same as or different from each other, and each independently hydrogen; deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a substituted or unsubstituted silyl group; a substituted or unsubstituted boron group; a substituted or unsubstituted alkyl group; a substituted or unsubstituted cycloalkyl group; a substituted or unsubstituted alkoxy group; a substituted or unsubstituted aryloxy group; a substituted or unsubstituted alkylthioxy group; a substituted or unsubstituted arylthioxy group; a substituted or unsubstituted alkylsulfoxy group; a substi-

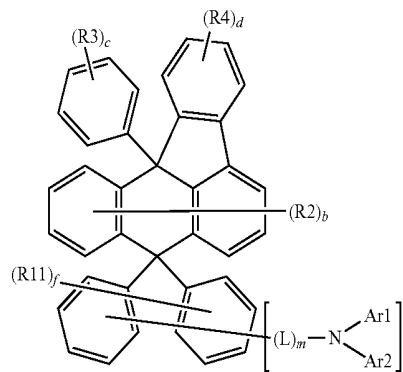
tuted or unsubstituted arylsulfoxy group; a substituted or unsubstituted alkenyl group; a substituted or unsubstituted aralkyl group; a substituted or unsubstituted aralkenyl group; a substituted or unsubstituted alkylaryl group; a substituted or unsubstituted alkylamine group; a substituted or unsubstituted aralkylamine group; a substituted or unsubstituted heteroarylamine group; a substituted or unsubstituted arylamine group; a substituted or unsubstituted arylheteroarylamine group; a substituted or unsubstituted arylphosphine group; a substituted or unsubstituted phosphine oxide group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group, or may bond to an adjacent group to form a substituted or unsubstituted ring.

[0065] According to one embodiment of the present specification, in Chemical Formula 1, a is from 1 to 10, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group, m is an integer of 1 to 10, and A is $-NAr_1Ar_2$.

[0066] According to one embodiment of the present specification, in Chemical Formula 1, a is 1 or 2, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group, m is an integer of 1 to 2, and A is $-NAr_1Ar_2$.

[0067] According to one embodiment of the present specification, Chemical Formula 1 may be represented by the following Chemical Formula 2.

[Chemical Formula 2]



[0068] In Chemical Formula 2,

[0069] definitions of R2 to R4, b, c and d are the same as in Chemical Formula 1,

[0070] R11 has the same the definition as R1 to R4,

[0071] L is a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group,

[0072] Ar1 and Ar2 are the same as or different from each other, and each independently hydrogen; deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a substituted or unsubstituted silyl group; a substituted or unsubstituted boron group; a substituted or unsubstituted alkyl group; a substituted or unsubstituted cycloalkyl group; a substituted or unsubstituted alkoxy group; a substituted or unsubstituted aryloxy group; a substituted or unsubstituted alkylthioxy

group; a substituted or unsubstituted arylthioxy group; a substituted or unsubstituted alkylsulfoxy group; a substituted or unsubstituted arylsulfoxy group; a substituted or unsubstituted alkenyl group; a substituted or unsubstituted aralkyl group; a substituted or unsubstituted aralkenyl group; a substituted or unsubstituted alkylaryl group; a substituted or unsubstituted alkylamine group; a substituted or unsubstituted aralkylamine group; a substituted or unsubstituted heteroarylamine group; a substituted or unsubstituted arylamine group; a substituted or unsubstituted arylheteroarylamine group; a substituted or unsubstituted arylphosphine group; a substituted or unsubstituted phosphine oxide group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group, or may bond to an adjacent group to form a substituted or unsubstituted ring.

[0073] p is an integer of 1 to 10,

[0074] f is an integer of 0 to 10,

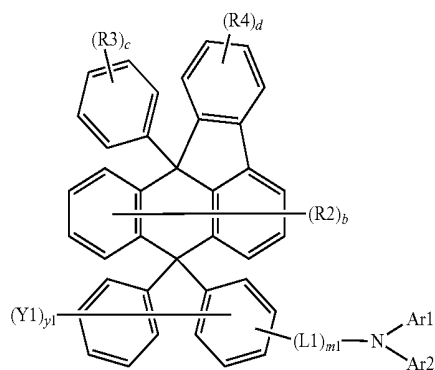
$$1 \leq p+f \leq 10,$$

[0075] m is an integer of 1 to 10, and

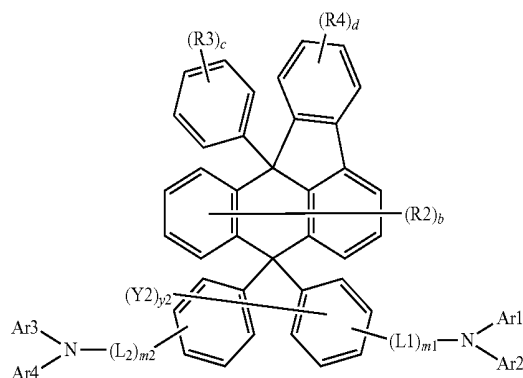
[0076] when p, f and m are each 2 or greater, structures in the parentheses are the same as or different from each other.

[0077] According to one embodiment of the present specification, Chemical Formula 1 may be represented by the following Chemical Formula 3 or 4.

[Chemical Formula 3]



[Chemical Formula 4]



[0078] In Chemical Formulae 3 and 4,

[0079] definitions of R2 to R4, b, c and d are the same as in Chemical Formula 1,

[0080] L1 and L2 are the same as or different from each other, and each independently a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group,

[0081] Ar1 to Ar4, and Y1 and Y2 are the same as or different from each other, and each independently hydrogen; deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a substituted or unsubstituted silyl group; a substituted or unsubstituted boron group; a substituted or unsubstituted alkyl group; a substituted or unsubstituted cycloalkyl group; a substituted or unsubstituted alkoxy group; a substituted or unsubstituted aryloxy group; a substituted or unsubstituted alkylthioxy group; a substituted or unsubstituted arylthioxy group; a substituted or unsubstituted alkylsulfoxy group; a substituted or unsubstituted arylsulfoxy group; a substituted or unsubstituted alkenyl group; a substituted or unsubstituted aralkyl group; a substituted or unsubstituted aralkenyl group; a substituted or unsubstituted alkylaryl group; a substituted or unsubstituted alkylamine group; a substituted or unsubstituted aralkylamine group; a substituted or unsubstituted heteroarylamine group; a substituted or unsubstituted arylamine group; a substituted or unsubstituted arylheteroarylamine group; a substituted or unsubstituted arylphosphine group; a substituted or unsubstituted phosphine oxide group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group, or may bond to an adjacent group to form a substituted or unsubstituted ring,

[0082] y1 is an integer of 0 to 9,

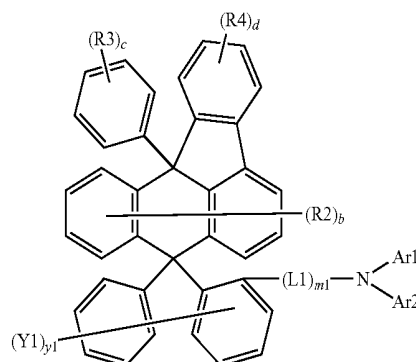
[0083] y2 is an integer of 0 to 8,

[0084] m1 and m2 are the same as or different from each other, and each independently an integer of 1 to 10, and

[0085] when y1, y2, m1 and m2 are each 2 or greater, structures in the parentheses are the same as or different from each other.

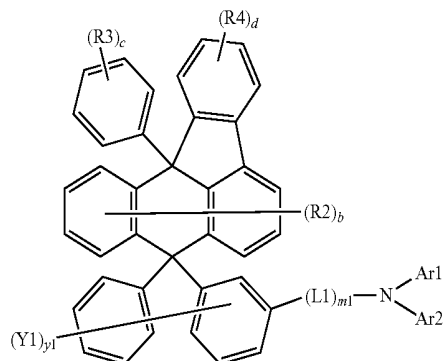
[0086] According to one embodiment of the present specification, Chemical Formula 1 may be represented by any one of the following Chemical Formulae 5 to 8.

[Chemical Formula 5]

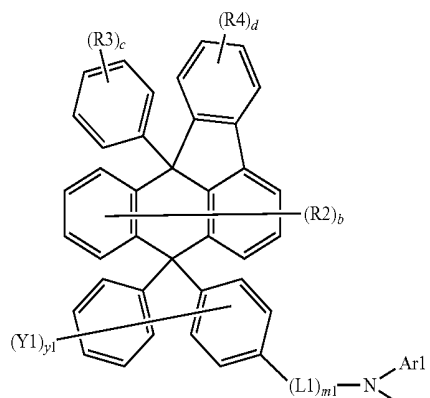


-continued

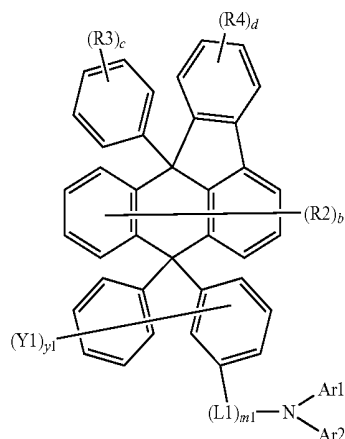
[Chemical Formula 6]



[Chemical Formula 7]



[Chemical Formula 8]



[0087] In Chemical Formulae 5 to 8,

[0088] definitions of R2 to R4, b, c and d are the same as in

[0089] Chemical Formula 1,

[0090] L1 is a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group,

[0091] Ar1, Ar2 and Y1 are the same as or different from each other, and each independently hydrogen; deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a substituted or unsubstituted silyl group; a substituted or unsubstituted boron group; a substituted or unsubstituted alkyl group; a

substituted or unsubstituted cycloalkyl group; a substituted or unsubstituted alkoxy group; a substituted or unsubstituted aryloxy group; a substituted or unsubstituted alkylthioxy group; a substituted or unsubstituted arylthioxy group; a substituted or unsubstituted alkylsulfoxy group; a substituted or unsubstituted arylsulfoxy group; a substituted or unsubstituted alkenyl group; a substituted or unsubstituted aralkyl group; a substituted or unsubstituted aralkenyl group; a substituted or unsubstituted alkylaryl group; a substituted or unsubstituted alkylamine group; a substituted or unsubstituted aralkylamine group; a substituted or unsubstituted heteroaryllamine group; a substituted or unsubstituted arylamine group; a substituted or unsubstituted arylheteroaryllamine group; a substituted or unsubstituted arylphosphine group; a substituted or unsubstituted phosphine oxide group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group, or may bond to an adjacent group to form a substituted or unsubstituted ring,

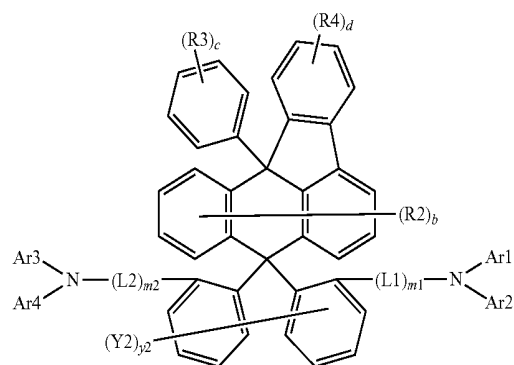
[0092] y1 is an integer of 0 to 9,

[0093] m1 and m2 are the same as or different from each other, and each independently an integer of 1 to 10, and

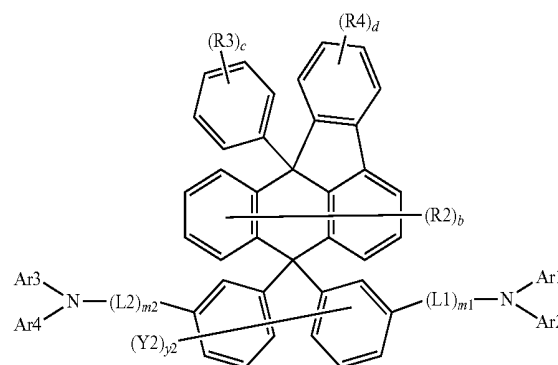
[0094] when y1 and m1 are each 2 or greater, structures in the parentheses are the same as or different from each other.

[0095] According to one embodiment of the present specification, Chemical Formula 1 may be represented by any one of the following Chemical Formulae 9 to 12.

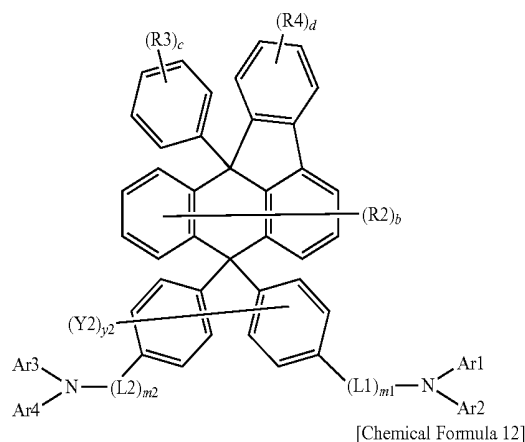
[Chemical Formula 9]



[Chemical Formula 10]



[Chemical Formula 11]



phine oxide group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group, or may bond to an adjacent group to form a substituted or unsubstituted ring.

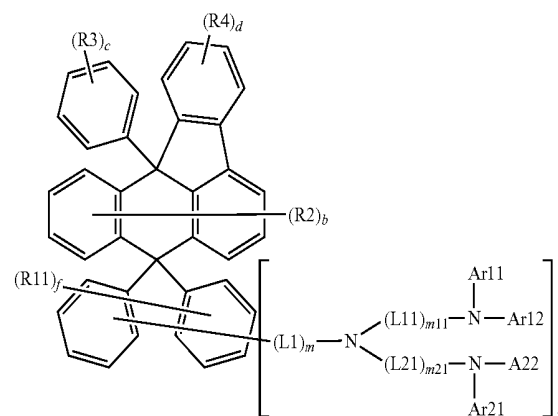
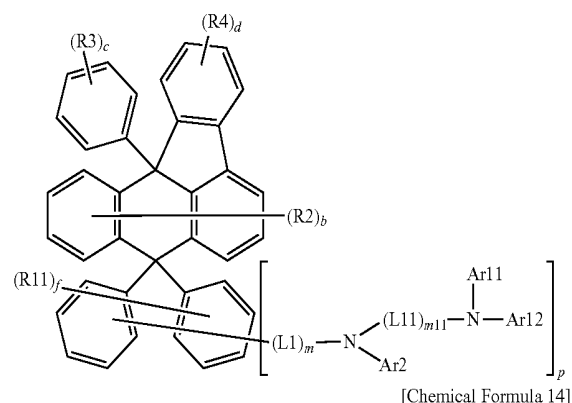
[0100] y2 is an integer of 0 to 8,

[0101] m1 and m2 are the same as or different from each other, and each independently an integer of 1 to 10, and

[0102] when y2, m1 and m2 are each 2 or greater, structures in the parentheses are the same as or different from each other.

[0103] According to one embodiment of the present specification, Chemical Formula 1 may be represented by the following Chemical Formula 13 or 14.

[Chemical Formula 13]



[0104] In Chemical Formulae 13 and 14,

[0105] definitions of R2 to R4, b, c and d are the same as in Chemical Formula 1,

[0106] R11 has the same definition as R2 to R4.

[10107] L, L11 and L21 are the same as or different from each other, and each independently a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group,

[0108] Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently hydrogen; deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a substituted or unsubstituted silyl group; a substituted or unsubstituted boron group; a substituted or unsubstituted alkyl group; a substituted or unsubstituted cycloalkyl group; a substituted or unsubstituted alkoxy group; a substituted or

unsubstituted aryloxy group; a substituted or unsubstituted alkylthioxy group; a substituted or unsubstituted arylthioxy group; a substituted or unsubstituted alkylsulfoxy group; a substituted or unsubstituted arylsulfoxy group; a substituted or unsubstituted alkenyl group; a substituted or unsubstituted aralkyl group; a substituted or unsubstituted aralkenyl group; a substituted or unsubstituted alkylaryl group; a substituted or unsubstituted alkylamine group; a substituted or unsubstituted aralkylamine group; a substituted or unsubstituted heteroarylamine group; a substituted or unsubstituted arylamine group; a substituted or unsubstituted aryl-heteroarylamine group; a substituted or unsubstituted arylphosphine group; a substituted or unsubstituted phosphine oxide group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group, or may bond to an adjacent group to form a substituted or unsubstituted ring,

[0109] p is an integer of 1 to 10,

[0110] f is an integer of 0 to 10,

$$1 \leq p+f \leq 10,$$

[0111] m, m11 and m21 are the same as or different from each other, and each independently an integer of 1 to 10, and

[0112] when p, f, m, m11 and m21 are each 2 or greater, structures in the parentheses are the same as or different from each other.

[0113] According to one embodiment of the present disclosure, L, L1, L2, L11 and L12 are the same as or different from each other, and each independently a direct bond; or a substituted or unsubstituted monocyclic to pentacyclic arylene group.

[0114] According to one embodiment of the present disclosure, L, L1, L2, L11 and L12 are the same as or different from each other, and each independently a direct bond; or a substituted or unsubstituted monocyclic to tetracyclic arylene group.

[0115] According to one embodiment of the present disclosure, L, L1, L2, L11 and L12 are the same as or different from each other, and each independently a direct bond; or a substituted or unsubstituted arylene group.

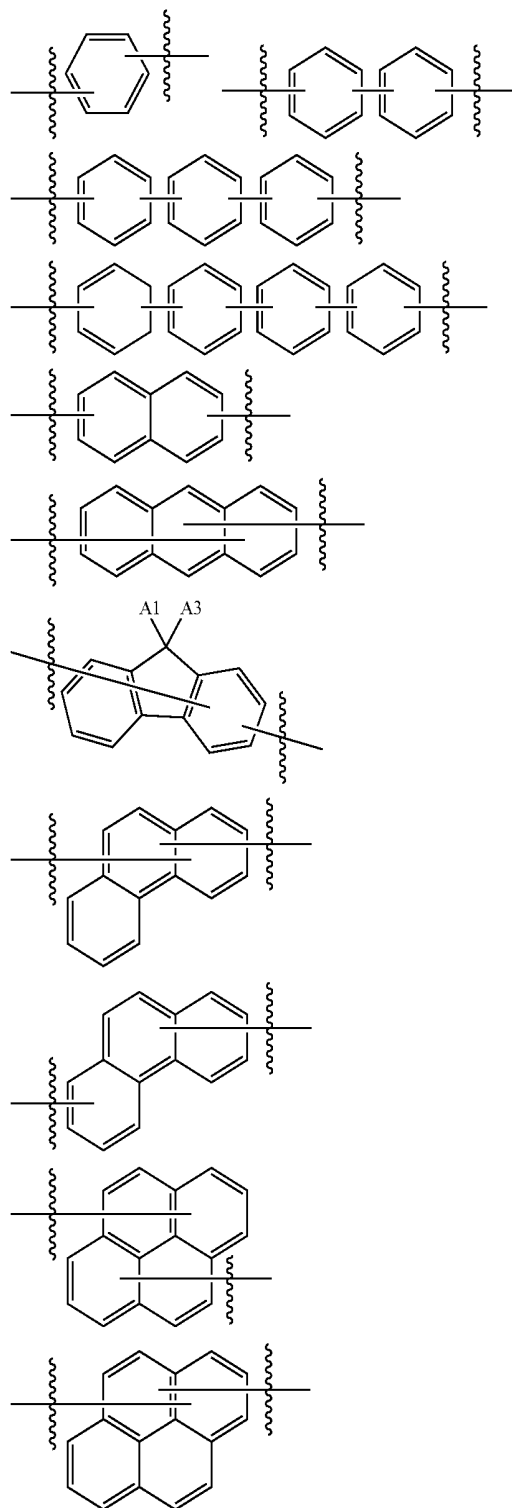
[0116] According to one embodiment of the present disclosure, L, L1, L2, L11 and L12 are the same as or different from each other, and each independently a direct bond; a substituted or unsubstituted phenylene group; a substituted or unsubstituted divalent biphenyl group; a substituted or unsubstituted divalent terphenyl group; a substituted or unsubstituted divalent quaterphenyl group; a substituted or unsubstituted divalent naphthyl group; a substituted or unsubstituted divalent anthracenyl group; a substituted or unsubstituted divalent fluorenyl group; a substituted or unsubstituted divalent phenanthryl group; a substituted or unsubstituted divalent pyrenyl group; or a substituted or unsubstituted divalent chrysenyl group.

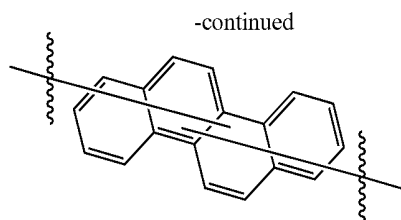
[0117] According to one embodiment of the present disclosure, L, L1, L2, L11 and L12 are the same as or different from each other, and each independently a direct bond; a phenylene group; a divalent biphenyl group; a divalent terphenyl group; a divalent quaterphenyl group; a divalent naphthyl group; a divalent anthracenyl group; a divalent fluorenyl group; a divalent phenanthryl group; a divalent pyrenyl group; or a divalent chrysenyl group.

[0118] According to one embodiment of the present disclosure, L, L1, L2, L11 and L12 are the same as or different

from each other, and each independently a substituted or unsubstituted heteroarylene group.

[0119] According to one embodiment of the present disclosure, L, L1, L2, L11 and L12 are the same as or different from each other, and each independently a direct bond; or may be any one selected from among the following structures.



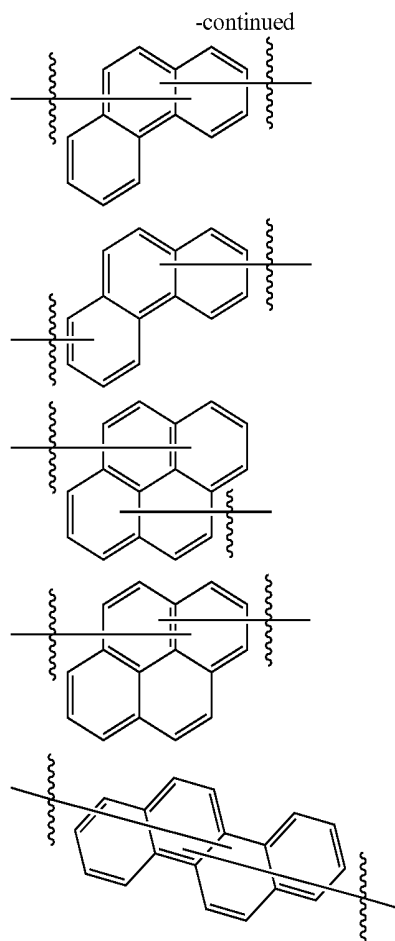
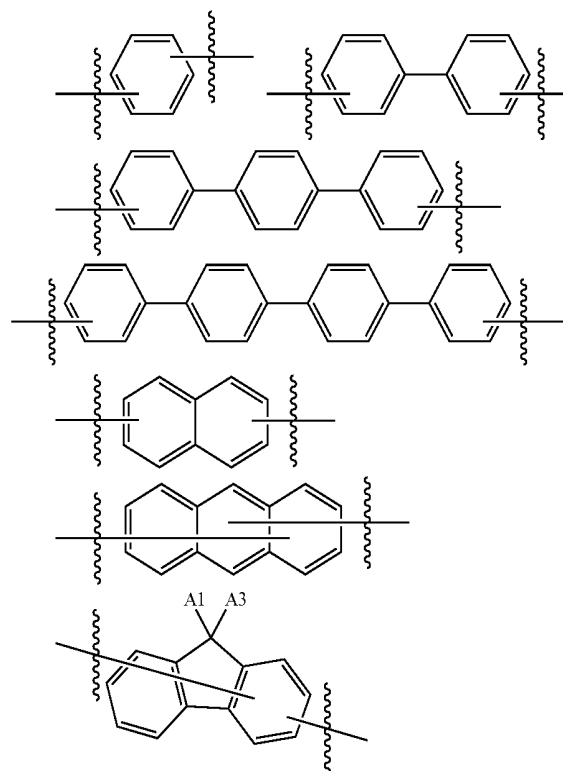


[0120] In the structural formulae,

[0121] A1 and A2 are the same as or different from each other, and each independently hydrogen; a substituted or unsubstituted alkyl group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group, or may bond to each other to form a substituted or unsubstituted ring, and

[0122] the structures may be unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a phosphine oxide group; an alkoxy group; an aryloxy group; an alkylthioxy group; an arylthioxy group; an alkylsulfoxy group; an arylsulfoxy group; a silyl group; a boron group; an alkyl group; a cycloalkyl group; an alkenyl group; an aryl group; an aralkyl group; an aralkenyl group; an alkylaryl group; an alkylamine group; an aralkylamine group; a heteroarylamine group; an arylamine group; an arylphosphine group; and a heterocyclic group.

[0123] According to one embodiment of the present disclosure, L, L1, L2, L11 and L12 are the same as or different from each other, and each independently a direct bond or may be any one selected from among the following structures.

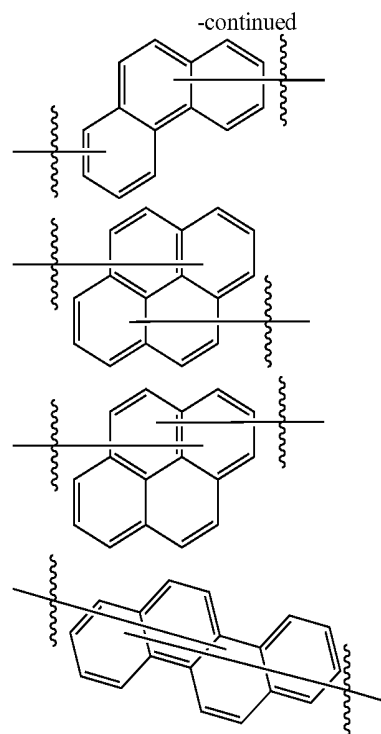
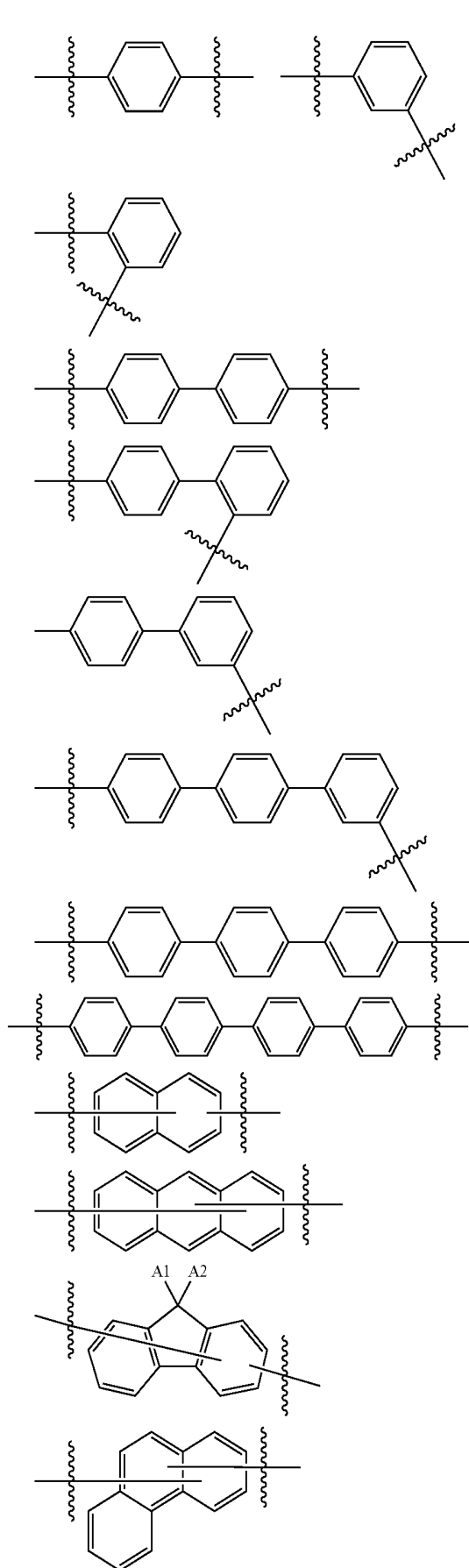


[0124] In the structural formulae,

[0125] A1 and A2 are the same as or different from each other, and each independently hydrogen; a substituted or unsubstituted alkyl group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group, or may bond to each other to form a substituted or unsubstituted ring, and

[0126] the structures may be unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a phosphine oxide group; an alkoxy group; an aryloxy group; an alkylthioxy group; an arylthioxy group; an alkylsulfoxy group; an arylsulfoxy group; a silyl group; a boron group; an alkyl group; a cycloalkyl group; an alkenyl group; an aryl group; an aralkyl group; an aralkenyl group; an alkylaryl group; an alkylamine group; an aralkylamine group; a heteroarylamine group; an arylamine group; an arylphosphine group; and a heterocyclic group.

[0127] According to one embodiment of the present disclosure, L, L1, L2, L11 and L12 are the same as or different from each other, and each independently a direct bond or may be any one selected from among the following structures.



[0128] In the structural formulae,

[0129] A1 and A2 are the same as or different from each other, and each independently hydrogen; a substituted or unsubstituted alkyl group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group, or may bond to each other to form a substituted or unsubstituted ring, and

[0130] the structures may be unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a phosphine oxide group; an alkoxy group; an aryloxy group; an alkylthioxy group; an arylthioxy group; an alkylsulfoxy group; an arylsulfoxy group; a silyl group; a boron group; an alkyl group; a cycloalkyl group; an alkenyl group; an aryl group; an aralkyl group; an aralkenyl group; an alkylamine group; an aralkylamine group; a heteroarylamine group; an arylamine group; an arylphosphine group; and a heterocyclic group.

[0131] According to one embodiment of the present disclosure, L, L1, L2, L11 and L12 are the same as or different from each other, and each independently a direct bond; a phenylene group; a biphenylene group; or a fluorenylene group.

[0132] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group.

[0133] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group including one or more of N, O and S.

tuted phosphine oxide group, a substituted or unsubstituted aryl group, and a substituted or unsubstituted heterocyclic group.

[0140] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a substituted or unsubstituted phenyl group; a substituted or unsubstituted biphenyl group; a substituted or unsubstituted terphenyl group; a substituted or unsubstituted quaterphenyl group; a substituted or unsubstituted naphthyl group; a substituted or unsubstituted anthracenyl group; a substituted or unsubstituted chrysenyl group; a substituted or unsubstituted pyrenyl group; a substituted or unsubstituted fluorenyl group; a substituted or unsubstituted triphenylene group; or a substituted or unsubstituted phenanthryl group.

[0141] According to one embodiment of the present disc

[0141] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a phenyl group unsubstituted or substituted with a substituent selected from the group consisting of deuterium, a halogen group, a nitrile group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted silyl group, a substituted or unsubstituted phosphine oxide group, a substituted or unsubstituted aryl group, and a substituted or unsubstituted heterocyclic group; a biphenyl group unsubstituted or substituted with a substituent selected from the group consisting of deuterium, a halogen group, a nitrile group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted silyl group, a substituted or unsubstituted phosphine oxide group, a substituted or unsubstituted aryl group, and a substituted or unsubstituted heterocyclic group; a naphthyl group unsubstituted or substituted with a substituent selected from the group consisting of deuterium, a halogen group, a nitrile group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted silyl group, a substituted or unsubstituted phosphine oxide group, a substituted or unsubstituted aryl group, and a substituted or unsubstituted heterocyclic group; an anthracenyl group unsubstituted or substituted with a substituent selected from the group consisting of deuterium, a halogen group, a nitrile group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted silyl group, a substituted or unsubstituted phosphine oxide group, a substituted or unsubstituted aryl group, and a substituted or unsubstituted heterocyclic group; a chrysenyl group unsubstituted or substituted with a substituent selected from the group consisting of deuterium, a halogen group, a nitrile group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted silyl group, a substituted or unsubstituted phosphine oxide group, a substituted or unsubstituted aryl group, and a substituted or unsubstituted heterocyclic group; a pyrenyl group unsubstituted or substituted with a substituent selected from the group consisting of deuterium, a halogen group, a nitrile group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted silyl group, a substituted or unsubstituted phosphine oxide group, a substituted or unsubstituted aryl group, and a substituted or unsubstituted heterocyclic group; a terphenyl group unsubstituted or substituted with a substituent selected from the group consisting of deuterium, a halogen group, a nitrile group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted silyl group, a substituted or unsubstituted phosphine oxide group, a substituted or unsubstituted aryl group, and a substituted or unsubstituted heterocyclic group; a quaterphenyl group

unsubstituted or substituted with a substituent selected from the group consisting of deuterium, a halogen group, a nitrile group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted silyl group, a substituted or unsubstituted phosphine oxide group, a substituted or unsubstituted aryl group, and a substituted or unsubstituted heterocyclic group; a phenanthryl group unsubstituted or substituted with a substituent selected from the group consisting of deuterium, a halogen group, a nitrile group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted silyl group, a substituted or unsubstituted phosphine oxide group, a substituted or unsubstituted aryl group, and a substituted or unsubstituted heterocyclic group; a triphenylene group unsubstituted or substituted with a substituent selected from the group consisting of deuterium, a halogen group, a nitrile group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted silyl group, a substituted or unsubstituted phosphine oxide group, a substituted or unsubstituted aryl group, and a substituted or unsubstituted heterocyclic group; or a fluorenyl group unsubstituted or substituted with a substituent selected from the group consisting of deuterium, a halogen group, a nitrile group, a substituted or unsubstituted alkyl group, a substituted or unsubstituted silyl group, a substituted or unsubstituted phosphine oxide group, a substituted or unsubstituted aryl group, and a substituted or unsubstituted heterocyclic group.

[0142] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a substituted or unsubstituted heterocyclic group.

[0143] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a substituted or unsubstituted heterocyclic group including one or more of N, O and S.

[0144] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a substituted or unsubstituted monocyclic to hexacyclic heterocyclic group.

[0145] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a substituted or unsubstituted monocyclic to pentacyclic heterocyclic group.

[0146] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a substituted or unsubstituted monocyclic to tetracyclic heterocyclic group.

[0147] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a substituted or unsubstituted bicyclic to hexacyclic heterocyclic group.

[0148] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a substituted or unsubstituted tricyclic to hexacyclic heterocyclic group.

[0149] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a substituted or unsubstituted thiophene group; a substituted

or unsubstituted furan group; a substituted or unsubstituted pyrrole group; a substituted or unsubstituted imidazole group; a substituted or unsubstituted triazole group; a substituted or unsubstituted oxazole group; a substituted or unsubstituted oxadiazole group; a substituted or unsubstituted triazole group; a substituted or unsubstituted pyridyl group; a substituted or unsubstituted bipyridyl group; a substituted or unsubstituted pyrimidyl group; a substituted or unsubstituted triazine group; a substituted or unsubstituted triazole group; a substituted or unsubstituted acridyl group; a substituted or unsubstituted pyridazine group; a substituted or unsubstituted pyrazinyl group; a substituted or unsubstituted quinolinyl group; a substituted or unsubstituted quinazoline group; a substituted or unsubstituted quinoxalyl group; a substituted or unsubstituted phthalazinyl group; a substituted or unsubstituted pyridopyrimidinyl group; a substituted or unsubstituted pyridopyrazinyl group; a substituted or unsubstituted pyrazinopyrazinyl group; a substituted or unsubstituted isoquinoline group; a substituted or unsubstituted indole group; a substituted or unsubstituted carbazole group; a substituted or unsubstituted benzoxazole group; a substituted or unsubstituted benzimidazole group; a substituted or unsubstituted benzothiazole group; a substituted or unsubstituted benzocarbazole group; a substituted or unsubstituted benzothiophene group; a substituted or unsubstituted dibenzothiophene group; a substituted or unsubstituted benzofuranyl group; a substituted or unsubstituted phenanthroline group; a substituted or unsubstituted isoxazolyl group; a substituted or unsubstituted thiadiazolyl group; a substituted or unsubstituted phenothiazinyl group; or a substituted or unsubstituted dibenzofuranyl group.

[0150] According to one embodiment of the present disclosure, Ar1n to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a thiophene group; a furan group; a pyrrole group; an imidazole group; a triazole group; an oxazole group; an oxadiazole group; a triazole group; a pyridyl group; a bipyridyl group; a pyrimidyl group; a triazine group; a triazole group; an acridyl group; a pyridazine group; a pyrazinyl group; a quinolinyl group; a quinazoline group; a quinoxalyl group; a phthalazinyl group; a pyridopyrimidinyl group; a pyridopyrazinyl group; a pyrazinopyrazinyl group; an isoquinoline group; an indole group; a carbazole group; a benzoxazole group; a benzimidazole group; a benzothiazole group; a benzocarbazole group; a benzothiophene group; a dibenzothiophene group; a benzofuranyl group; a phenanthroline group; a thiazolyl group; an isoxazolyl group; a thiadiazolyl group; a phenothiazinyl group; or a dibenzofuranyl group.

[0151] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a substituted or unsubstituted pyridyl group; a substituted or unsubstituted pyrimidyl group; a substituted or unsubstituted triazine group; a substituted or unsubstituted carbazole group; a substituted or unsubstituted indolocarbazole group; a substituted or unsubstituted benzocarbazole group; a substituted or unsubstituted thiophene group; a substituted or unsubstituted furanyl group; a substituted or unsubstituted dibenzothiophene group; a substituted or unsubstituted dibenzofuranyl group; a substituted or unsubstituted quinoline group; a substituted or unsubstituted quinoxalyl group; a substituted or unsubstituted quinazoline group; a

substituted or unsubstituted phosphine oxide group; a substituted or unsubstituted silyl group; a dicyclic substituted or unsubstituted heterocyclic group including one or more of N, S and O; a tricyclic substituted or unsubstituted heterocyclic group including two or more of N, O and S; a tetracyclic substituted or unsubstituted heterocyclic group including one or more of S and O; or a pentacyclic or hexacyclic substituted or unsubstituted heterocyclic group including one or more Ns.

[0152] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a pyridyl group; a pyrimidyl group; a triazine group; a carbazole group; an indolocarbazole group; a benzocarbazole group; a thiophene group; a furanyl group; a dibenzothiophene group; a dibenzofuranyl group; a quinoline group; a quinoxaliny group; a quinazoline group; a phosphine oxide group; a silyl group; a dicyclic heterocyclic group including one or more of N, S and O; a tricyclic heterocyclic group including two or more of N, O and S; a tetracyclic heterocyclic group including one or more of S and O; or a pentacyclic or hexacyclic heterocyclic group including one or more Ns.

[0153] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently an aryl group unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, a halogen group, a nitrile group, an alkyl group, a trimethylsilyl group, an aryl group and a heterocyclic group; or a heterocyclic group unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, a halogen group, a nitrile group, an alkyl group, a trimethylsilyl group, an aryl group and a heterocyclic group.

[0154] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a phenyl group unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, a halogen group, a nitrile group, an alkyl group, and a silyl group substituted with an alkyl group; a naphthyl group; a biphenyl group; a terphenyl group; a tetraphenyl group; a fluorenyl group unsubstituted or substituted with an alkyl group or an aryl group; a phenanthryl group; a triphenylene group; a dibenzofuranyl group; a dibenzothiophene group; a carbazole group unsubstituted or substituted with an aryl group; or a benzocarbazole group unsubstituted or substituted with an aryl group.

[0155] According to one embodiment of the present specification, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a substituted or unsubstituted phenyl group; a substituted or unsubstituted biphenyl group; a substituted or unsubstituted terphenyl group; a substituted or unsubstituted quaterphenyl group; a substituted or unsubstituted 1-naphthyl group; a substituted or unsubstituted 2-naphthyl group; a substituted or unsubstituted 2-fluorenyl group; a substituted or unsubstituted 3-fluorenyl group; a substituted or unsubstituted 4-fluorenyl group; a substituted or unsubstituted 2-phenanthryl group; a substituted or unsubstituted 3-phenanthryl group; a substituted or unsubstituted triphenylene group; or a substituted or unsubstituted 9-phenanthryl group.

[0156] According to one embodiment of the present specification, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a substituted or unsubstituted 2-dibenzothiophene group; a substituted or unsubstituted 2-dibenzofuranyl group; a substituted or unsubstituted 4-dibenzofuranyl group; a substituted or unsubstituted N-carbazole group; a substituted or unsubstituted 1-carbazole group; a substituted or unsubstituted 2-carbazole group; a substituted or unsubstituted 3-carbazole group; a substituted or unsubstituted a-benzocarbazole group; or a substituted or unsubstituted c-benzocarbazole group.

[0157] According to one embodiment of the present specification, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a phenyl group; a biphenyl group; a terphenyl group; a quaterphenyl group; a 1-naphthyl group; a 2-naphthyl group; a 2-fluorenyl group; a 3-fluorenyl group; a 4-fluorenyl group; a 2-phenanthryl group; a triphenylene group; a 3-phenanthryl group; or a 9-phenanthryl group.

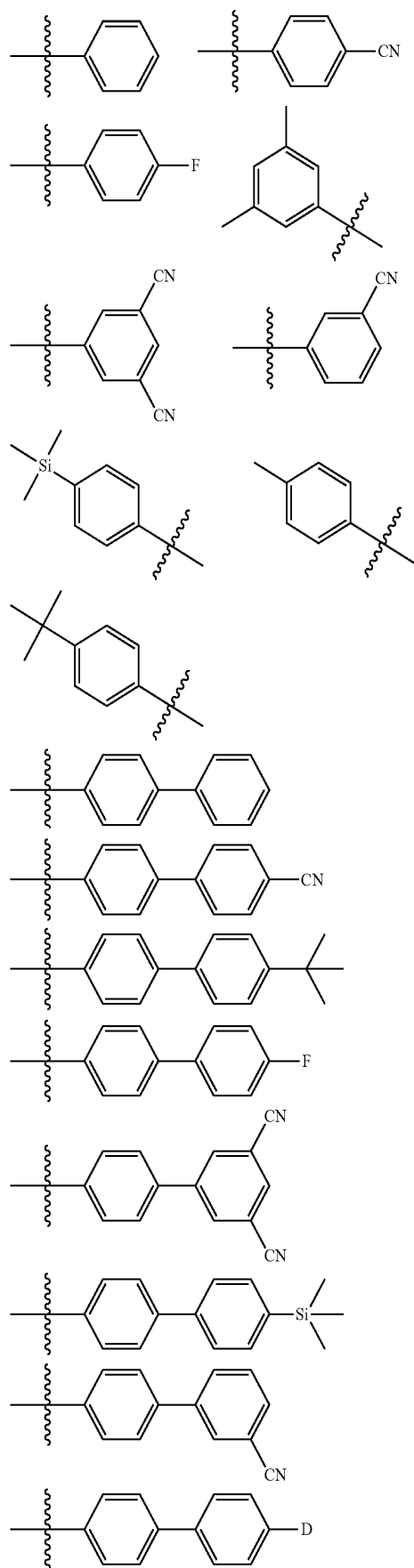
[0158] According to one embodiment of the present specification, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a 2-dibenzothiophene group; a 2-dibenzofuranyl group; a 4-dibenzofuranyl group; an N-carbazole group; a 1-carbazole group; a 2-carbazole group; a 3-carbazole group; an a-benzocarbazole group; or a c-benzocarbazole group.

[0159] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group.

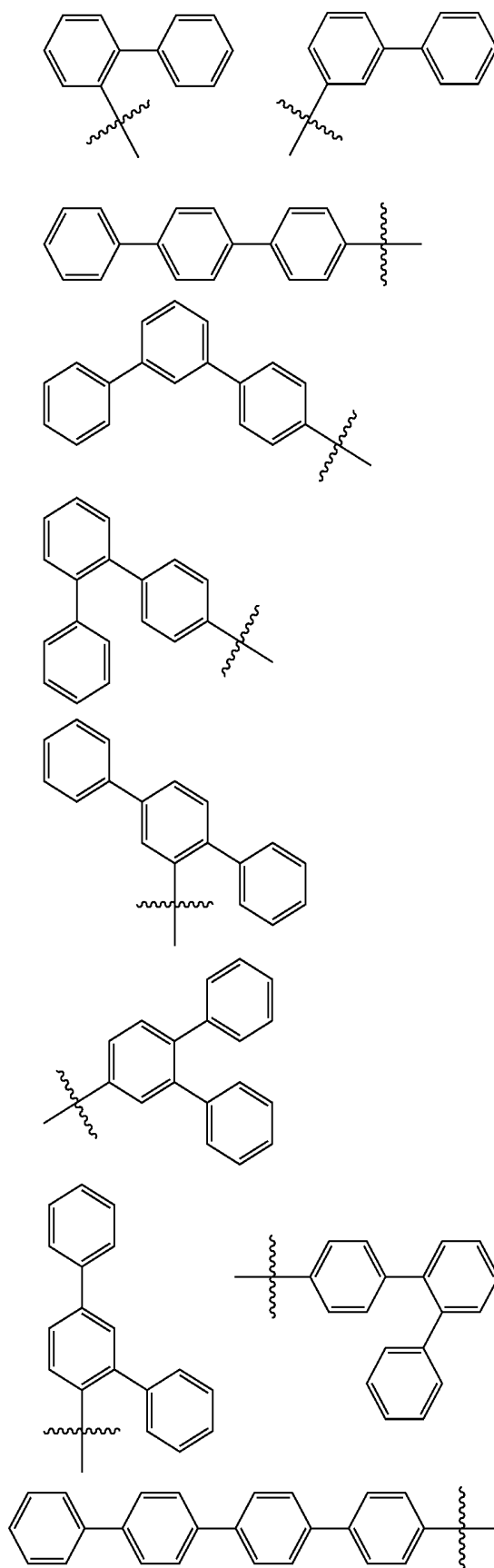
[0160] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently an aryl group unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, a halogen group, a nitrile group, an alkyl group, a trimethylsilyl group, an aryl group and a heterocyclic group; or a heterocyclic group unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, a halogen group, a nitrile group, an alkyl group, a trimethylsilyl group, an aryl group and a heterocyclic group.

[0161] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently a phenyl group unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium, a halogen group, a nitrile group, an alkyl group, and a silyl group substituted with an alkyl group; a naphthyl group; a biphenyl group; a terphenyl group; a tetraphenyl group; a fluorenyl group unsubstituted or substituted with an alkyl group or an aryl group; a phenanthryl group; a triphenylene group; a dibenzofuranyl group; a dibenzothiophene group; a carbazole group unsubstituted or substituted with an aryl group; or a benzocarbazole group unsubstituted or substituted with an aryl group.

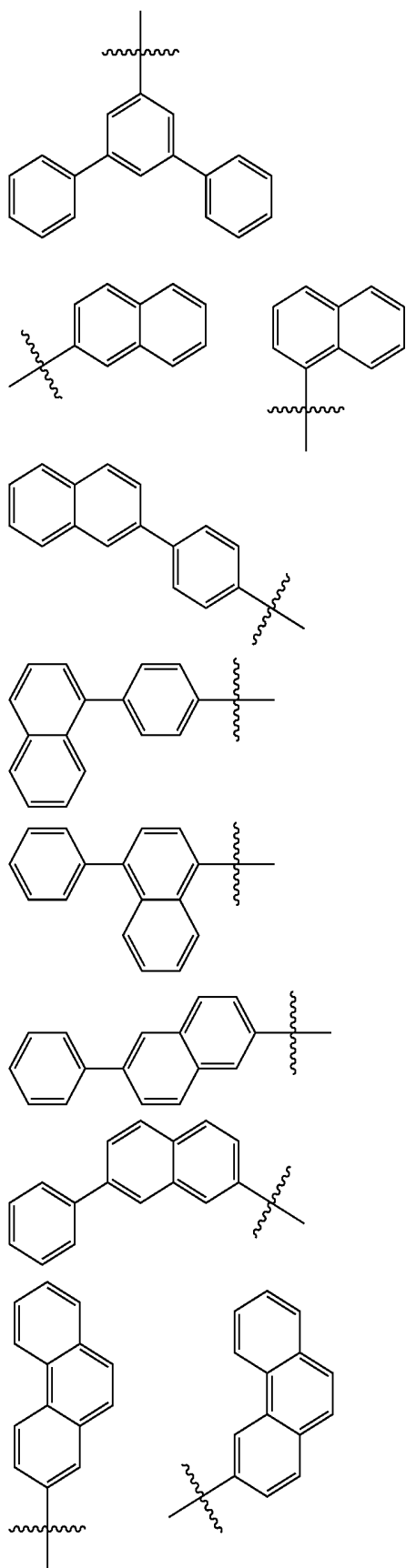
[0162] According to one embodiment of the present disclosure, Ar1 to Ar4, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently may be any one selected from among the following structures.



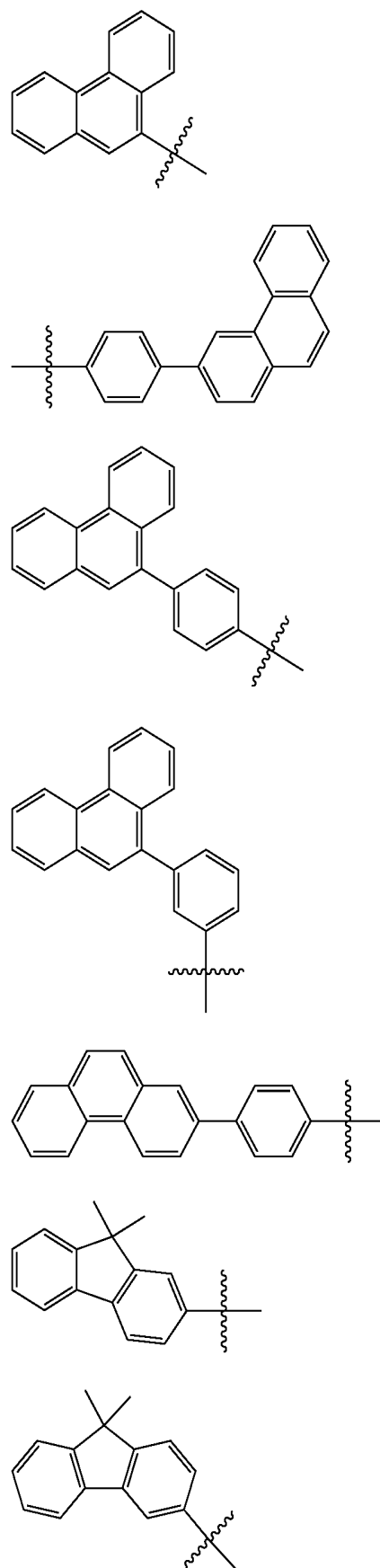
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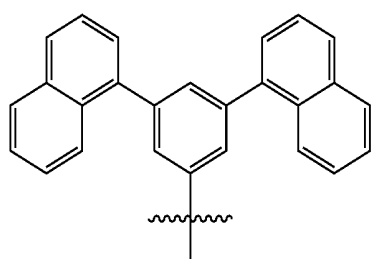
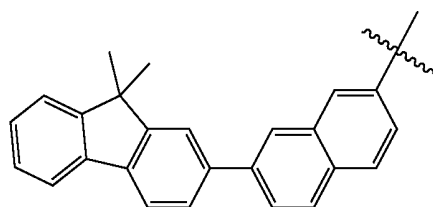
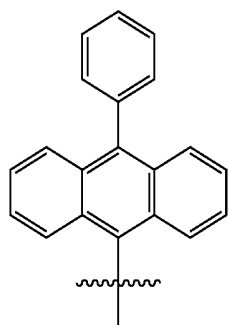
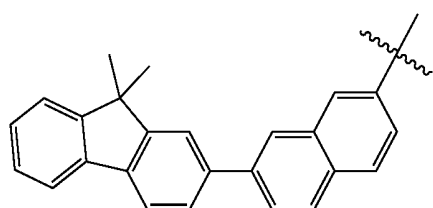
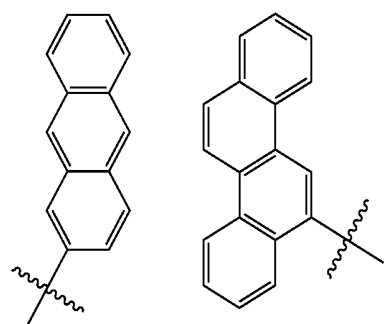
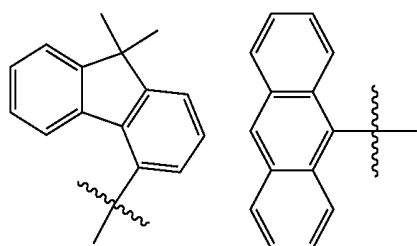
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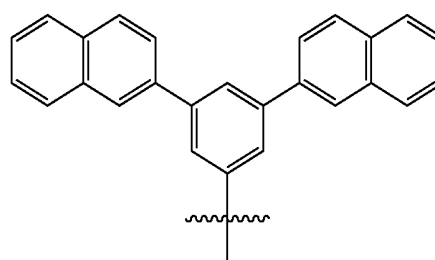
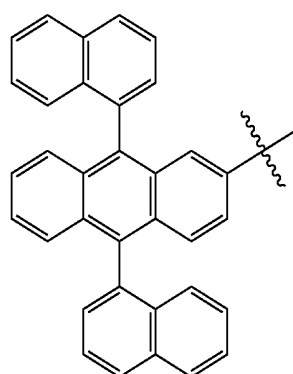
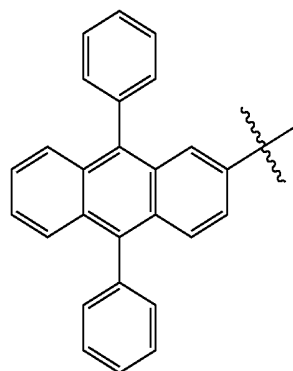
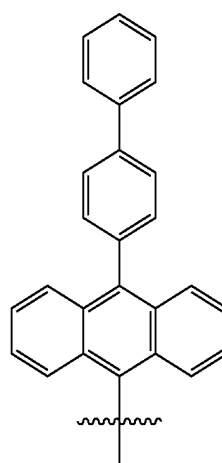
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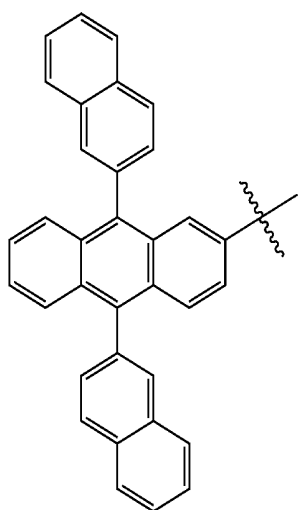
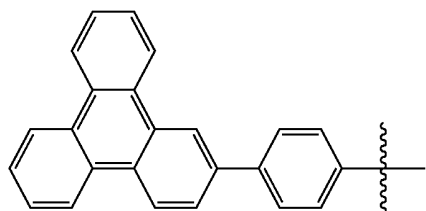
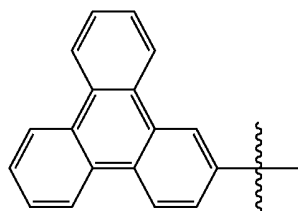
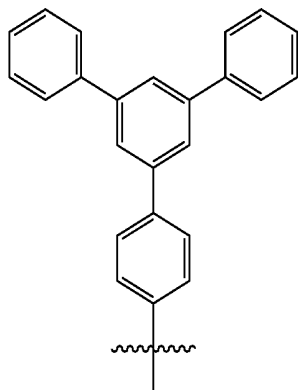
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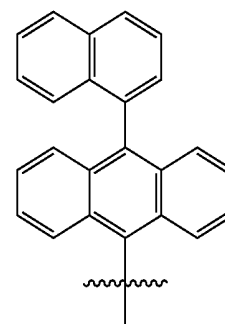
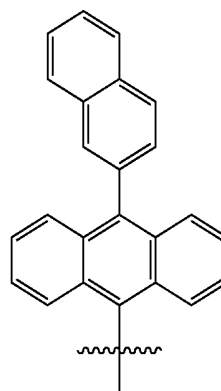
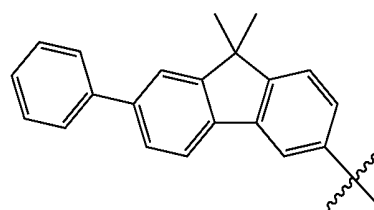
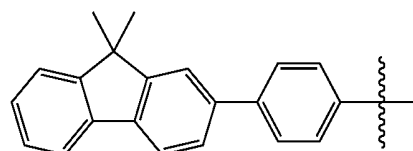
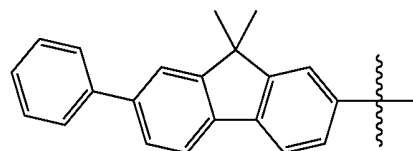
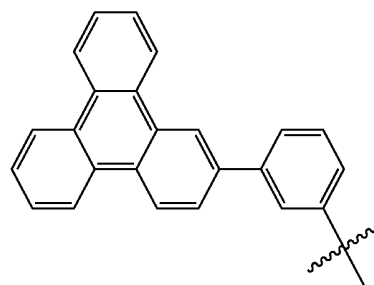
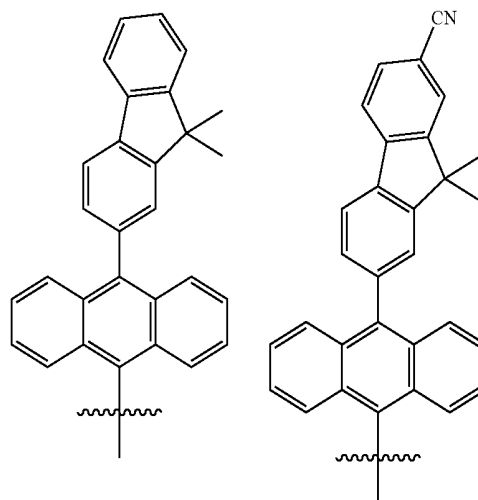
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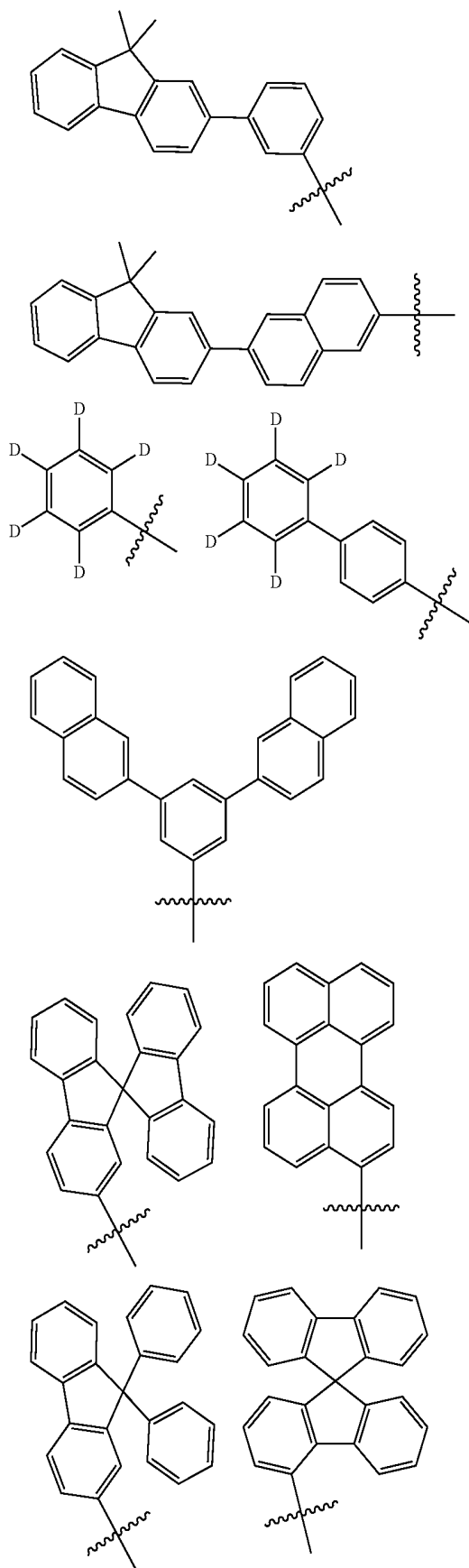
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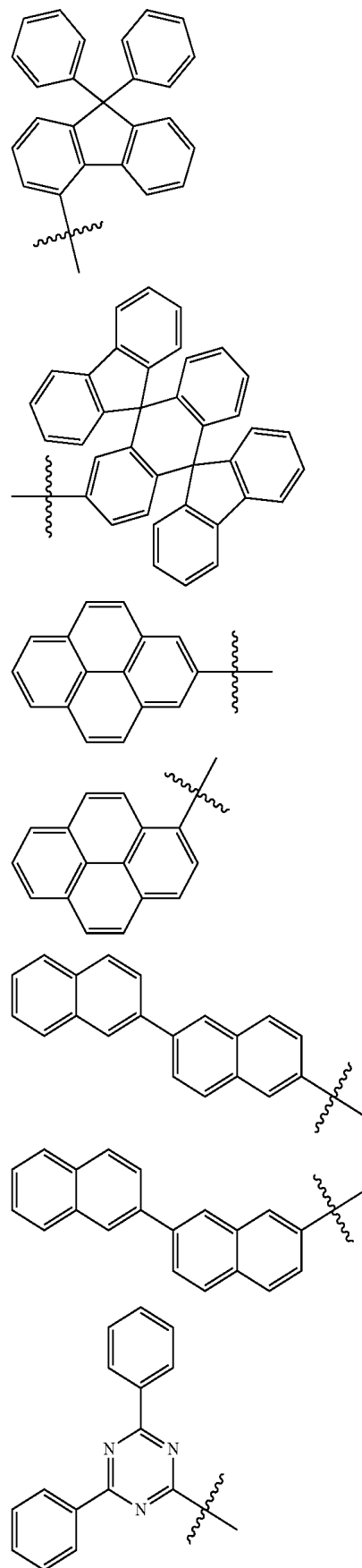
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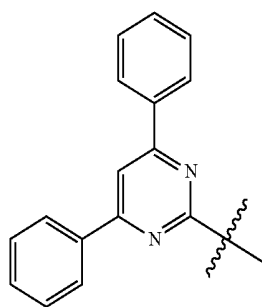
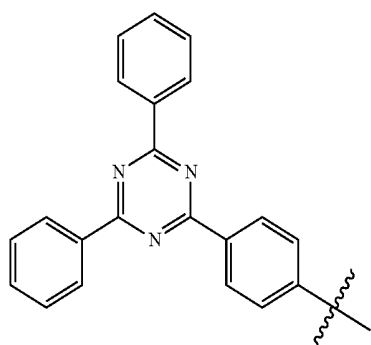
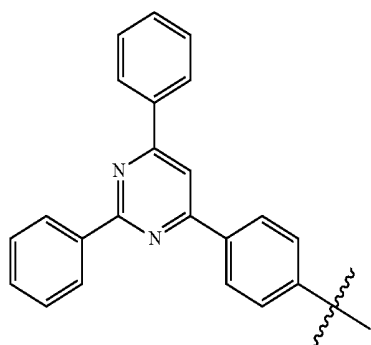
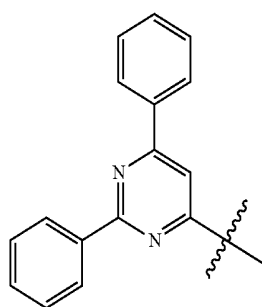
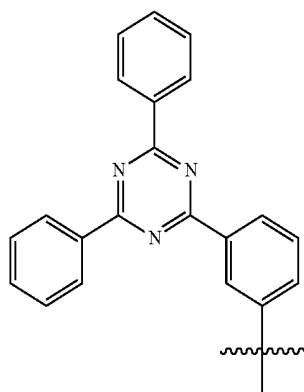
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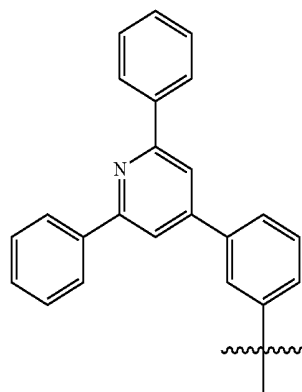
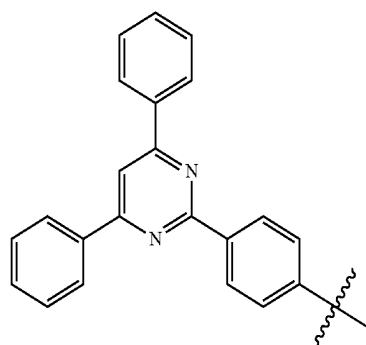
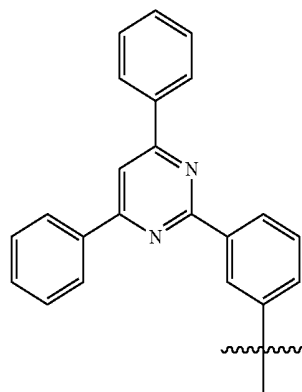
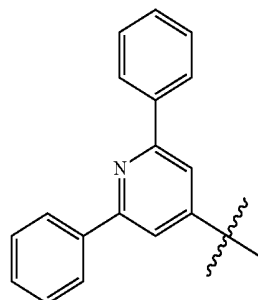
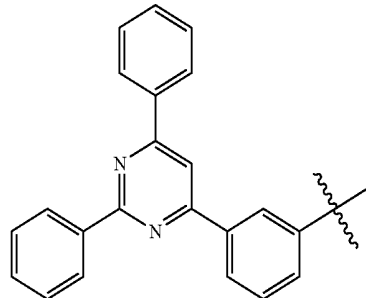
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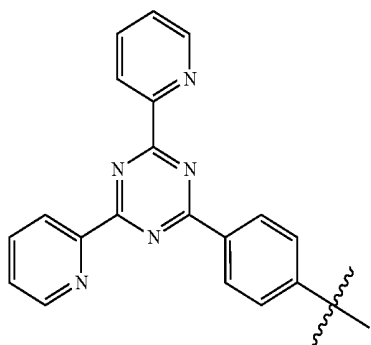
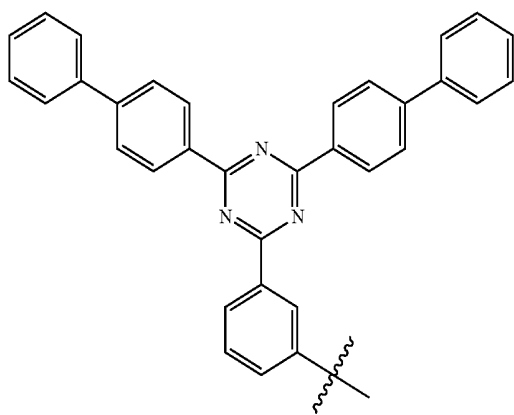
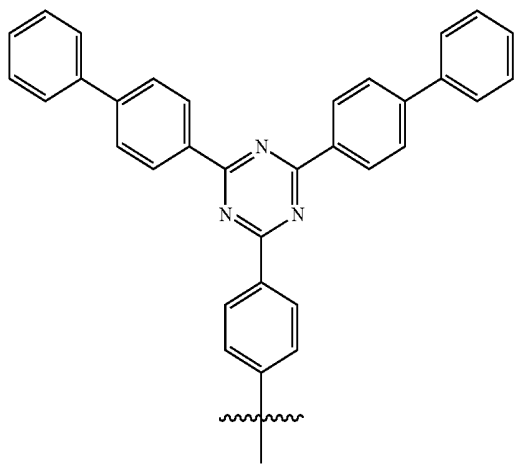
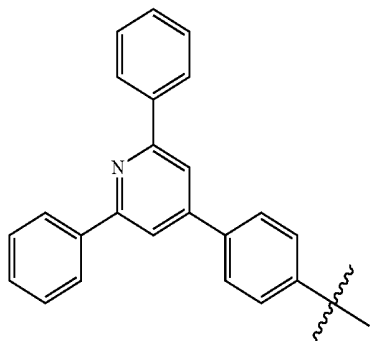
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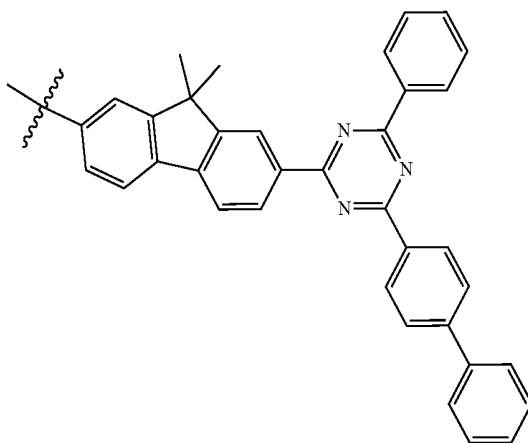
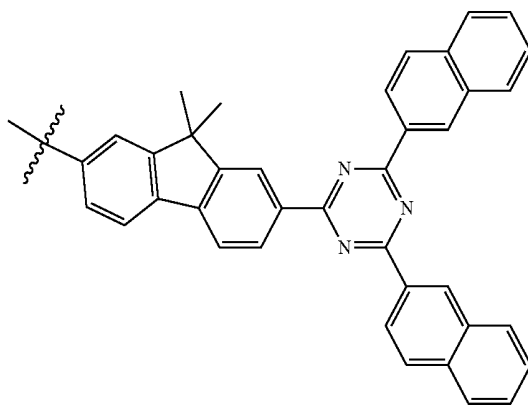
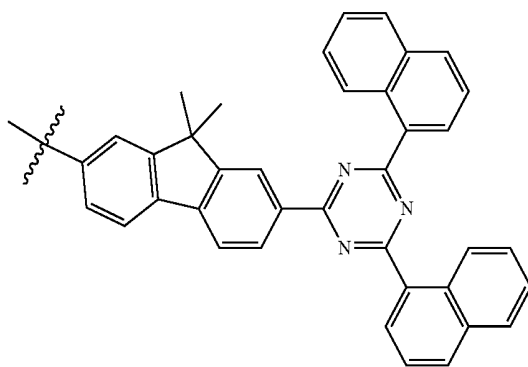
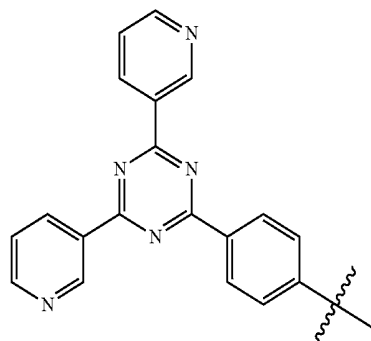
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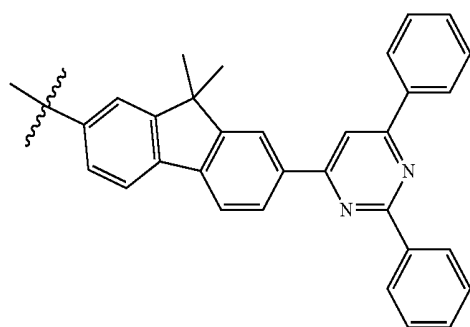
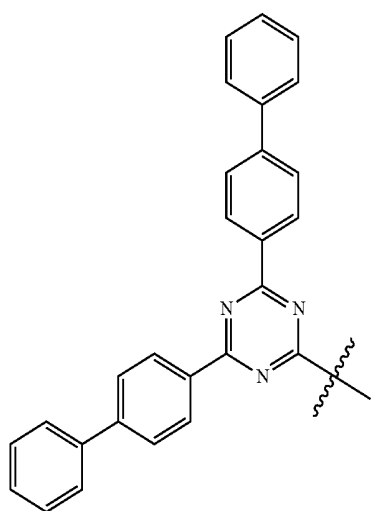
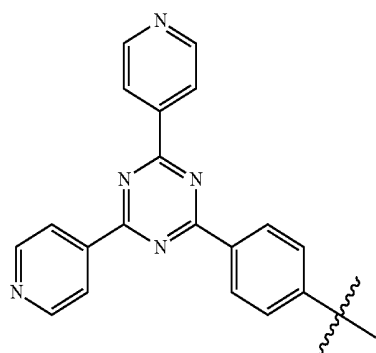
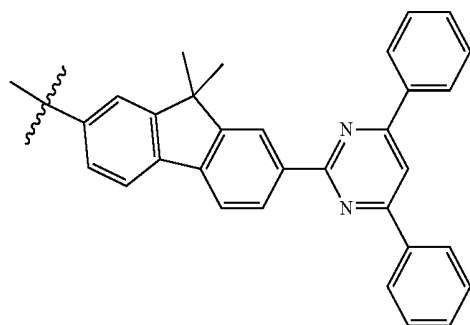
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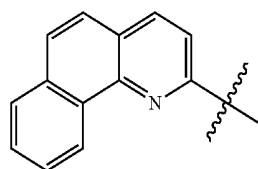
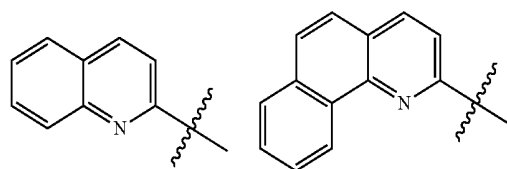
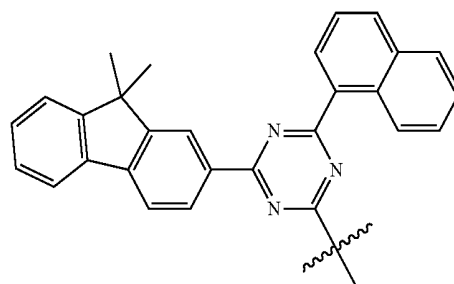
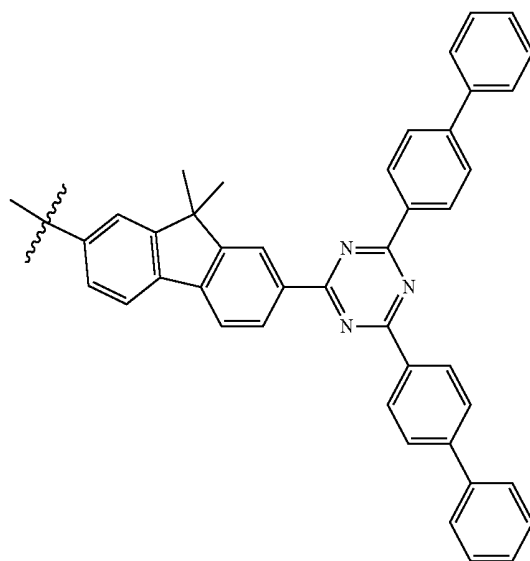
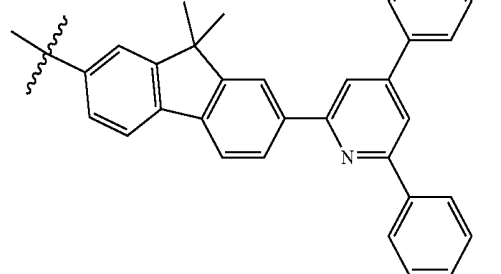
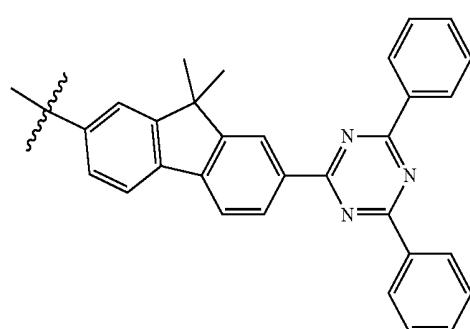
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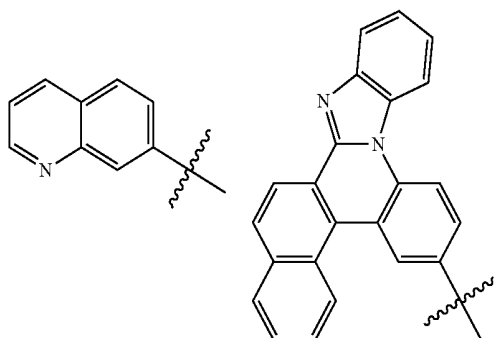
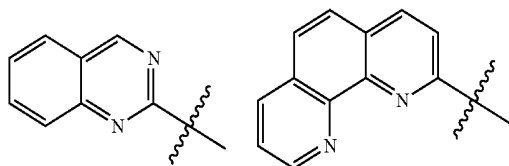
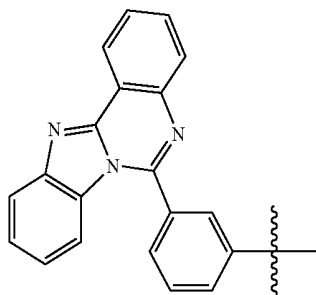
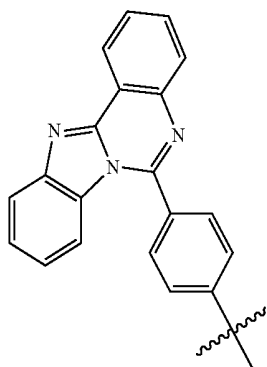
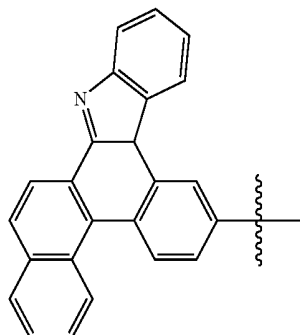
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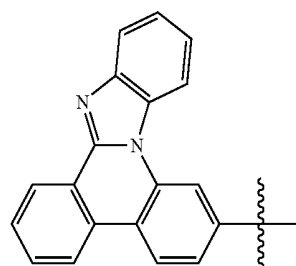
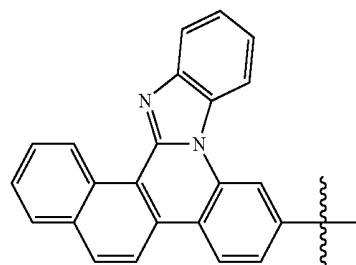
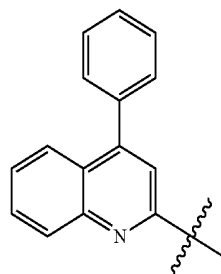
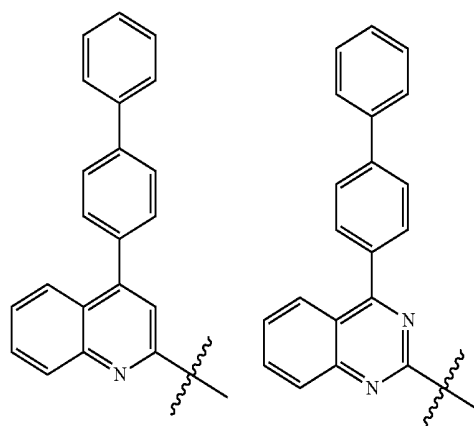
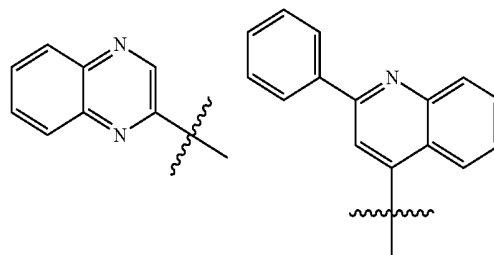
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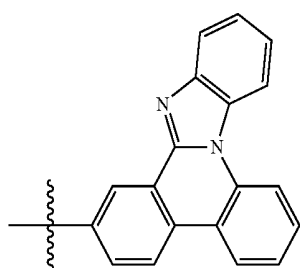
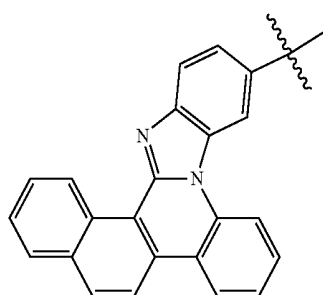
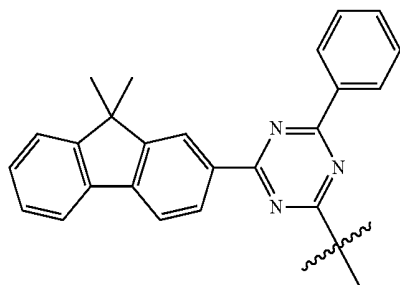
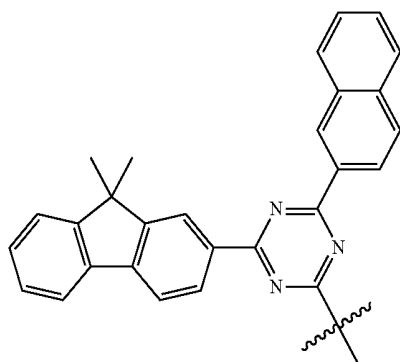
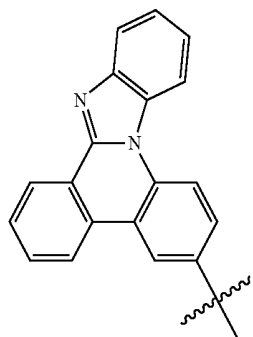
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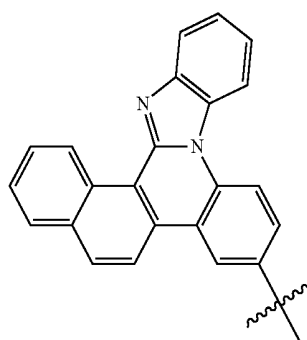
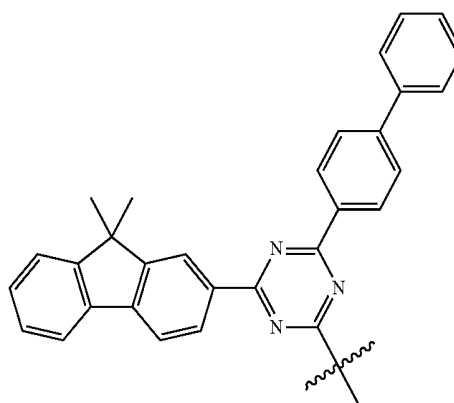
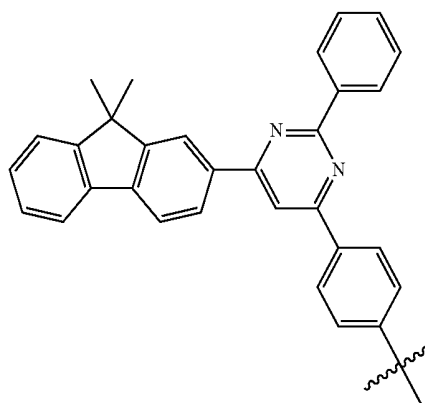
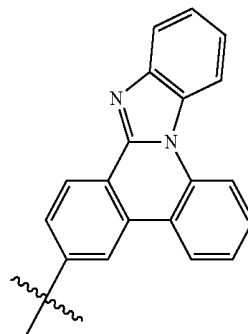
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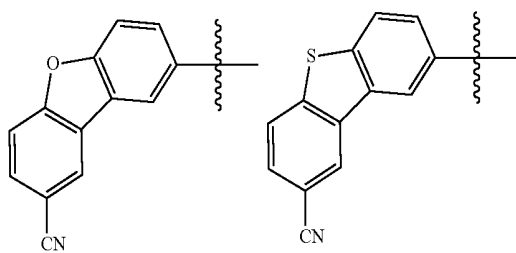
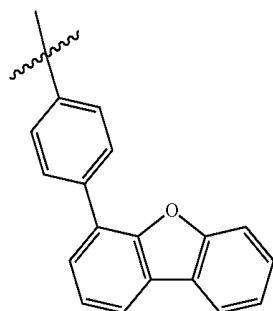
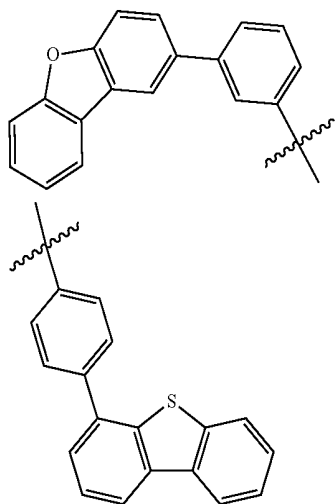
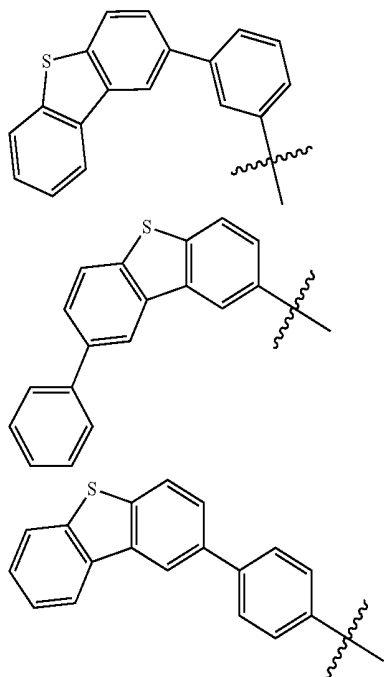
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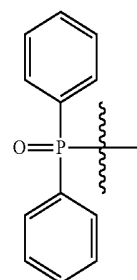
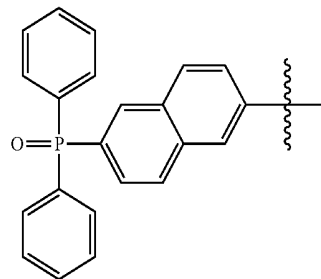
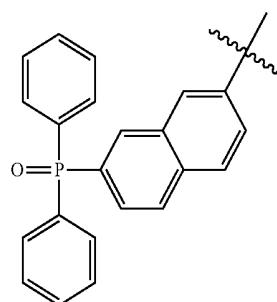
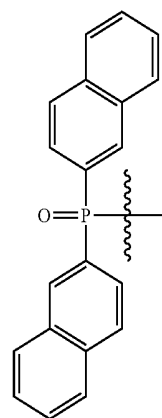
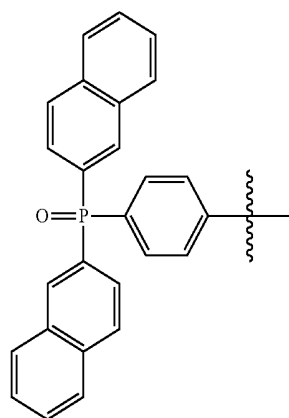
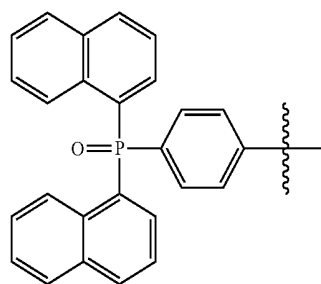
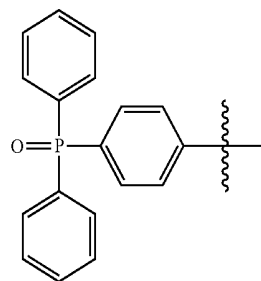
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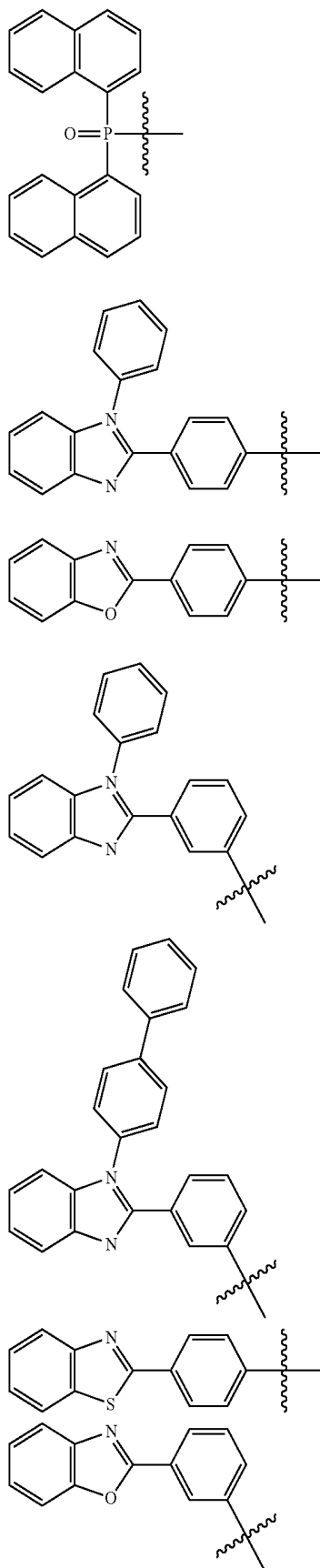
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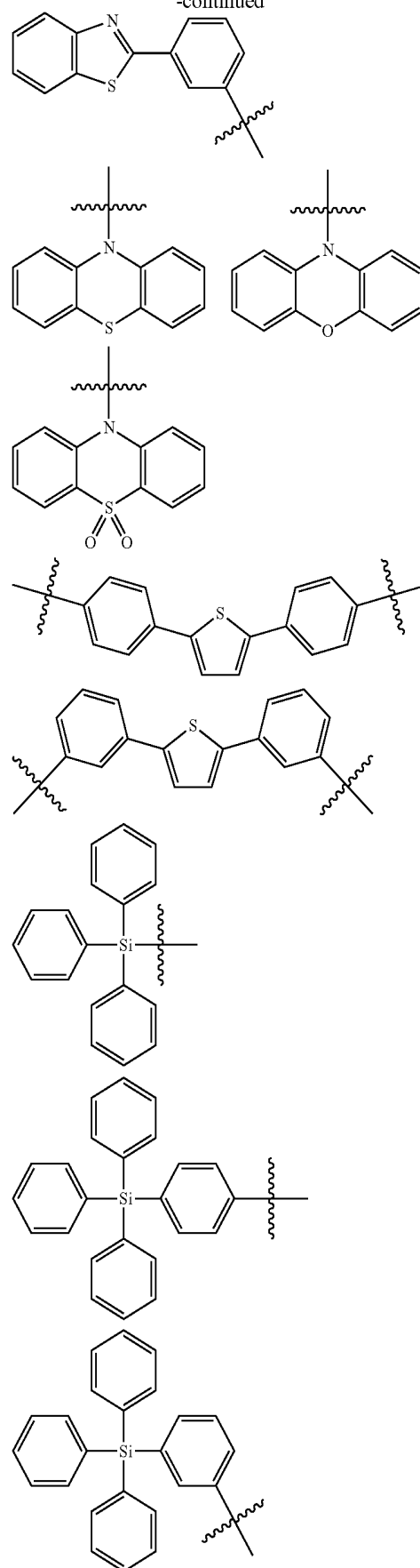
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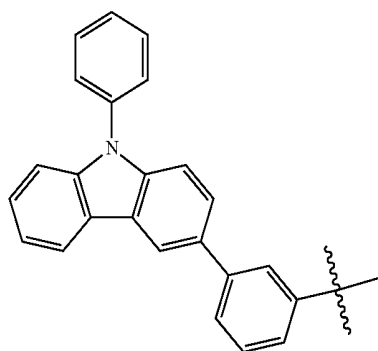
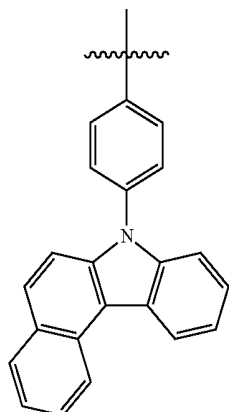
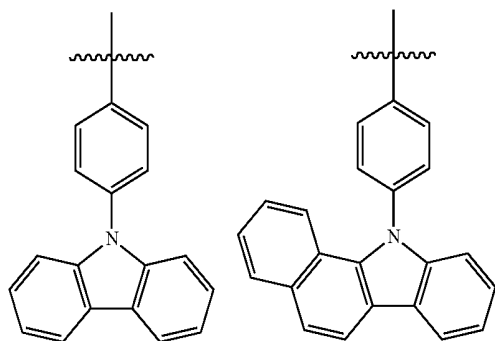
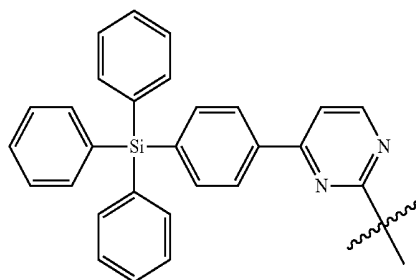
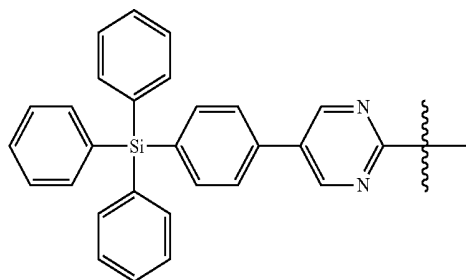
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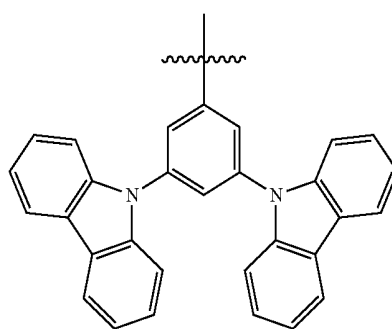
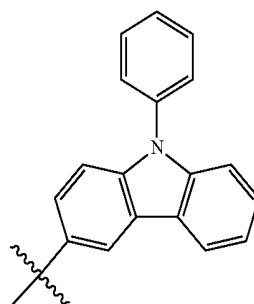
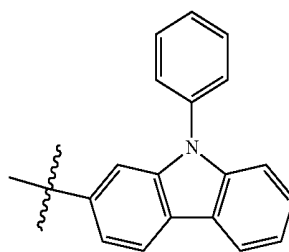
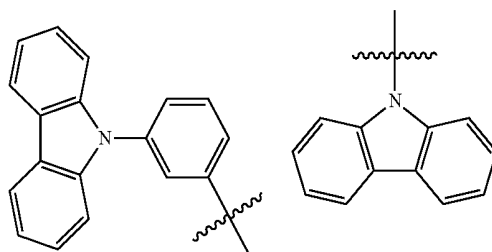
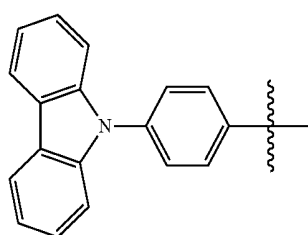
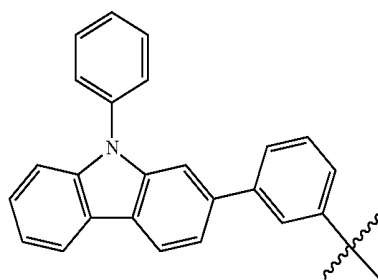
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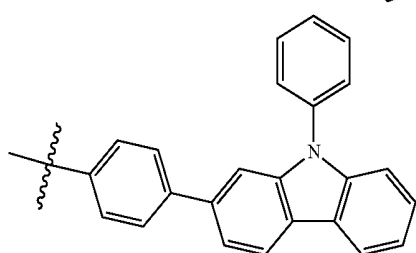
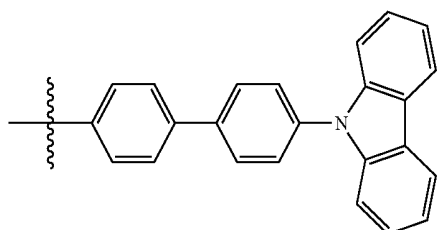
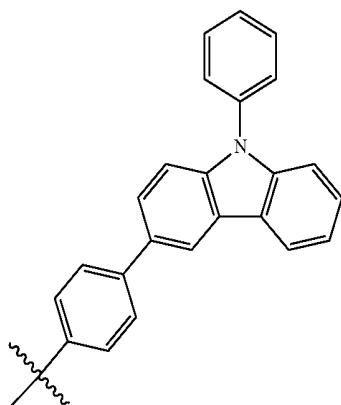
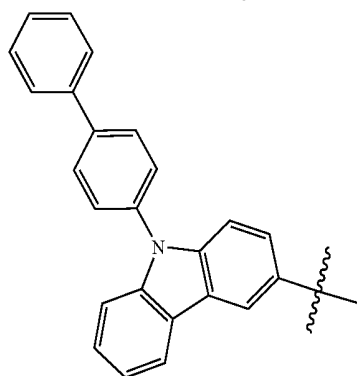
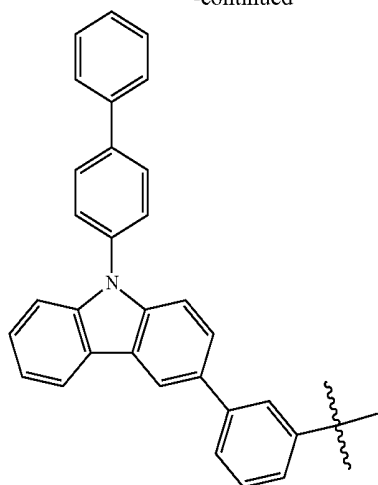
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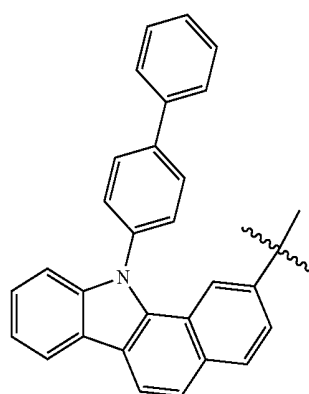
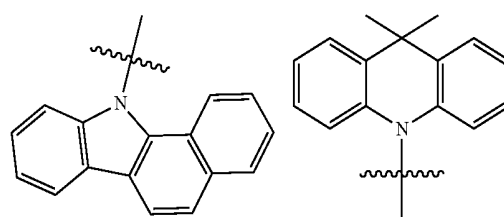
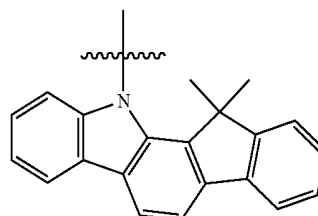
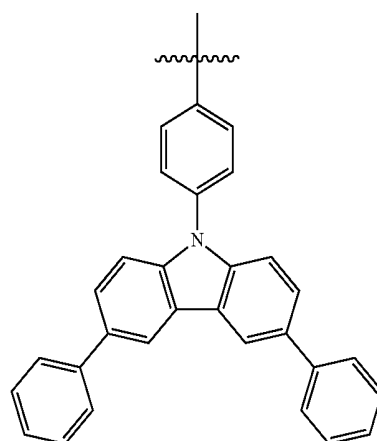
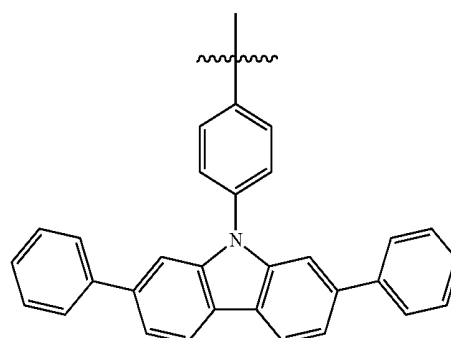
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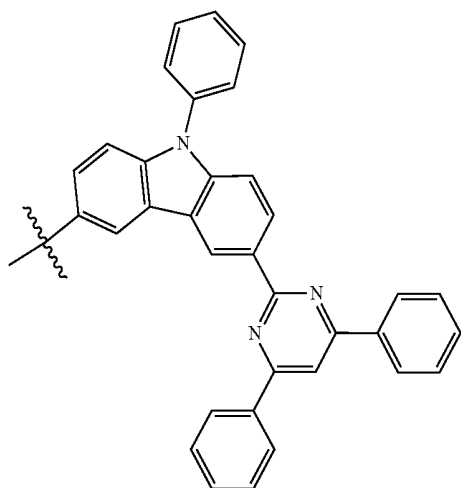
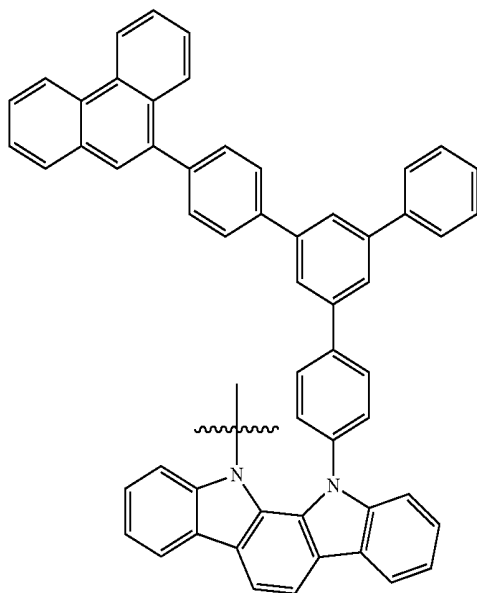
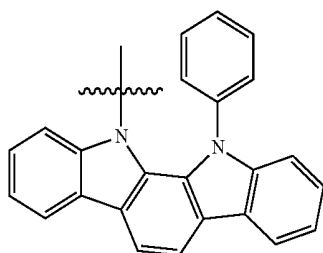
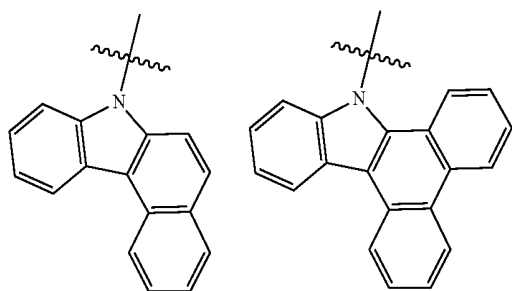
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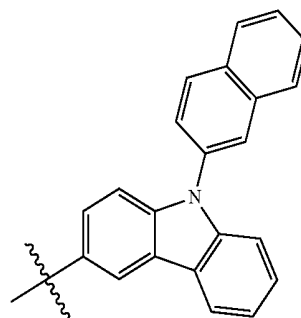
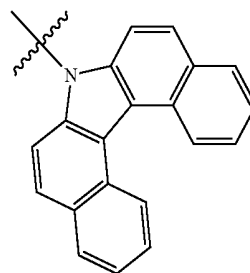
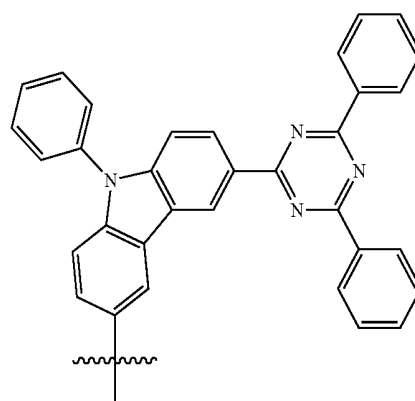
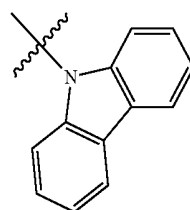
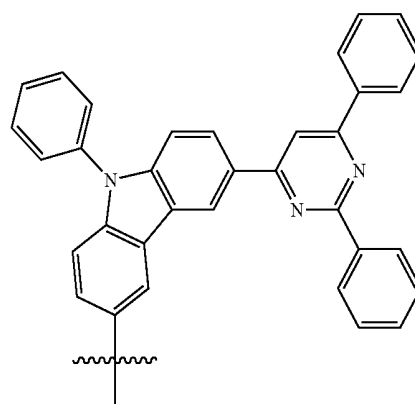
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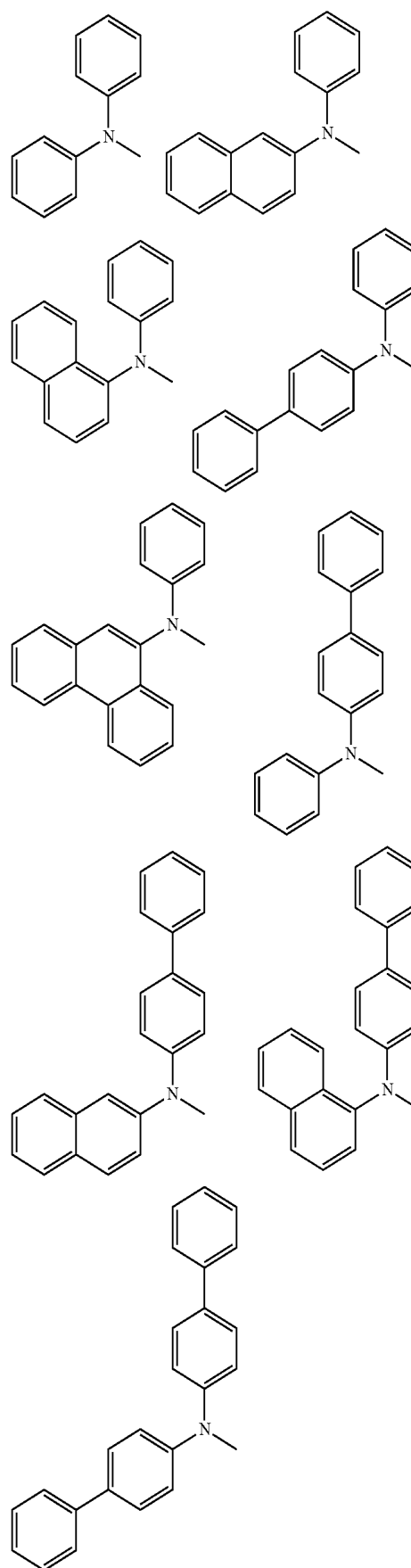
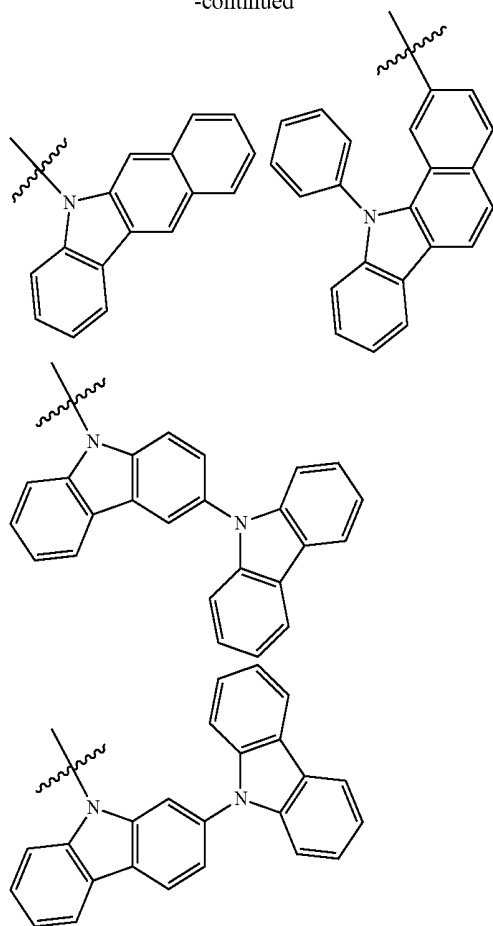
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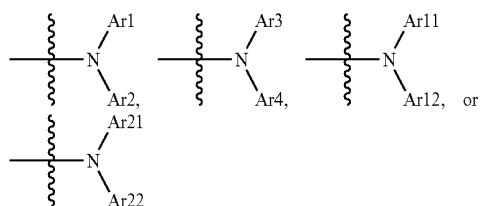


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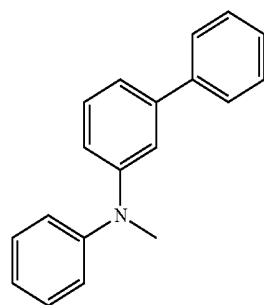
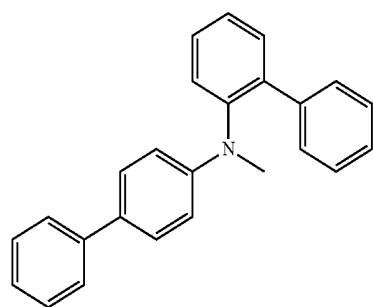
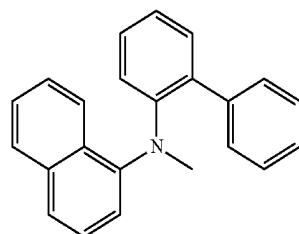
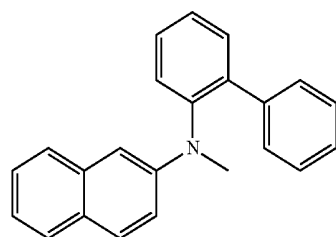
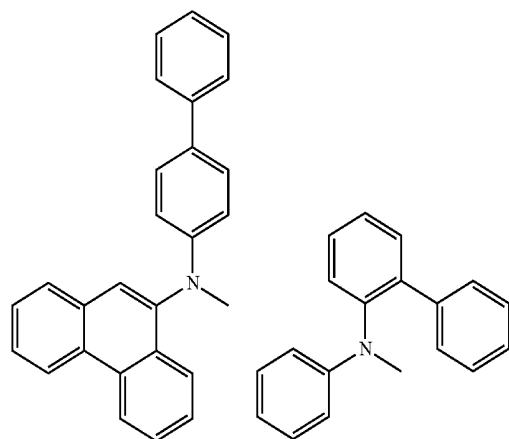
[0163] The structures may be unsubstituted or substituted with one or more substituents selected from the group consisting of deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a phosphine oxide group; an alkoxy group; an aryloxy group; an alkylthioxy group; an arylthioxy group; an alkylsulfoxy group; an arylsulfoxy group; a silyl group; a boron group; an alkyl group; a cycloalkyl group; an alkenyl group; an aryl group; an aralkyl group; an aralkenyl group; an alkylaryl group; an alkylamine group; an aralkylamine group; a heteroarylamine group; an arylamine group; an arylphosphine group; and a heterocyclic group.

[0164] According to one embodiment of the present specification,

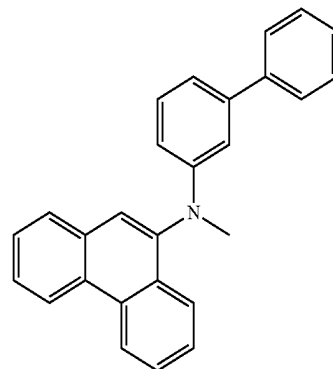
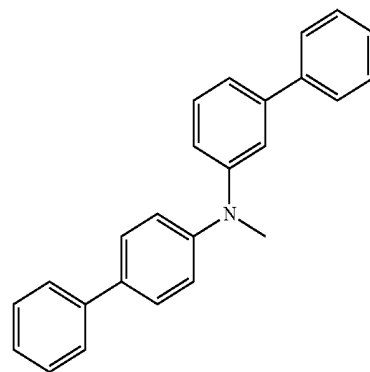
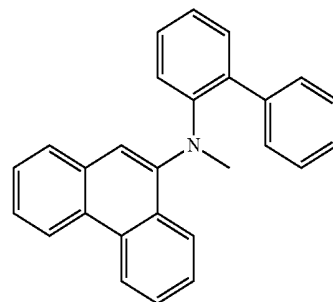
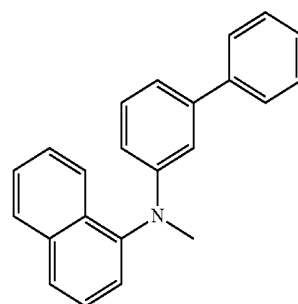
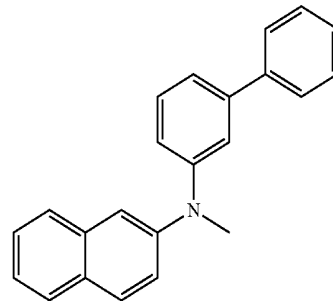


may be any one selected from among the following structures.

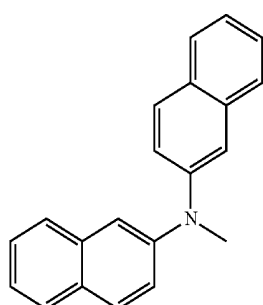
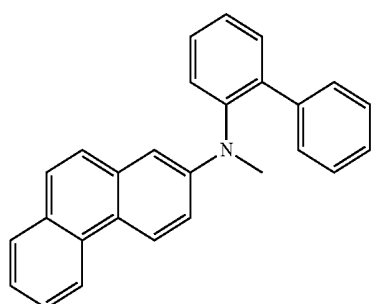
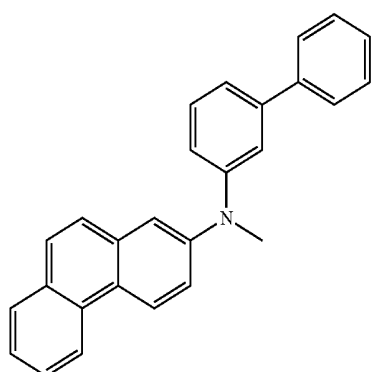
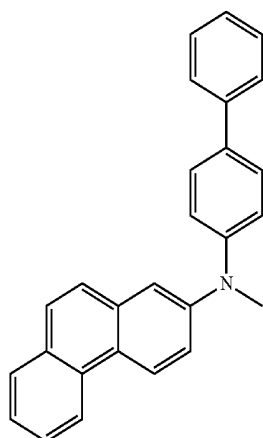
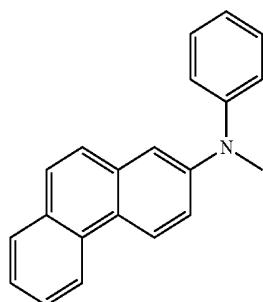
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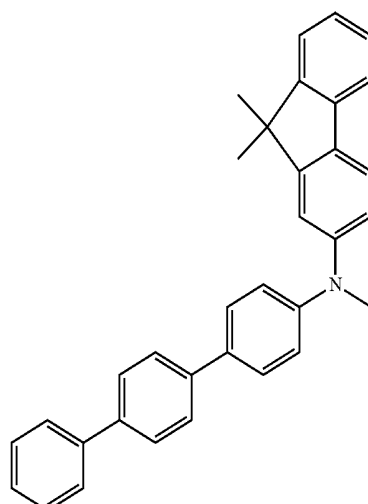
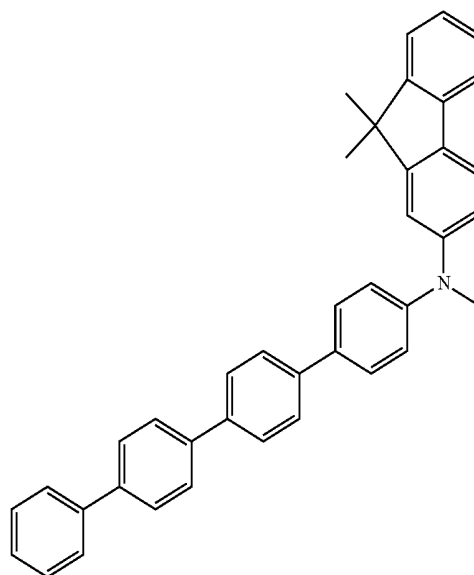
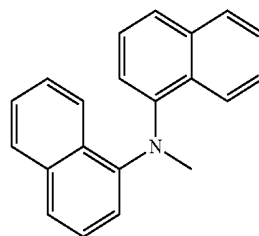
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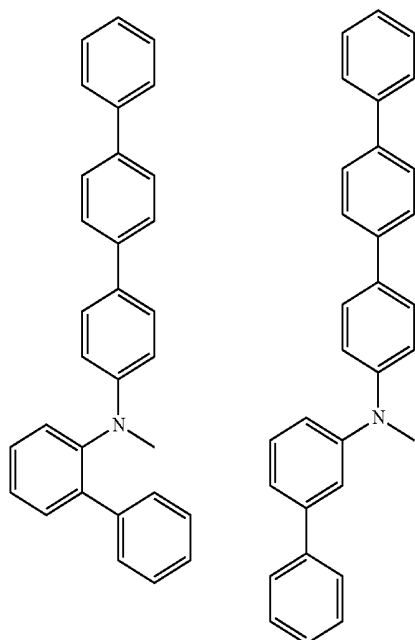
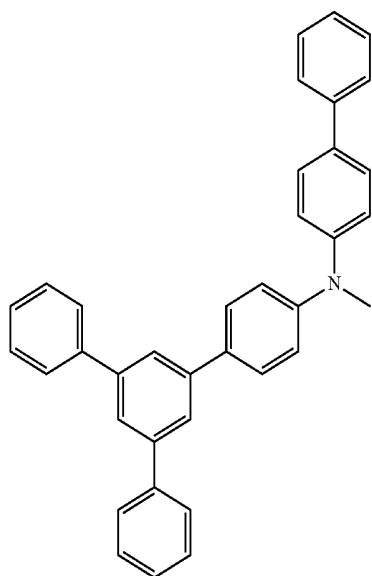
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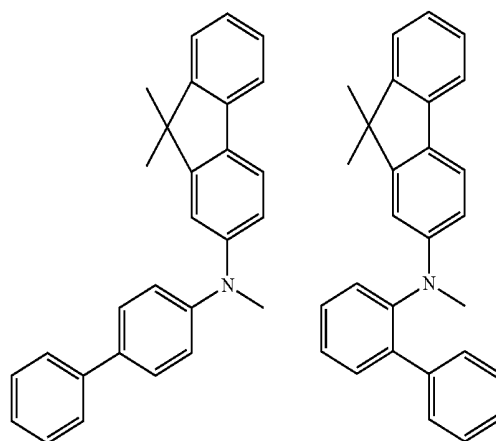
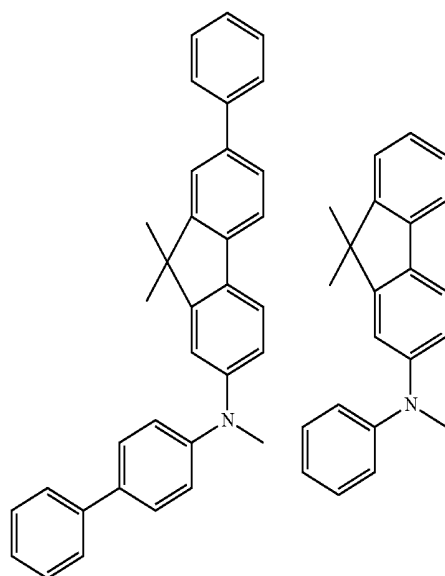
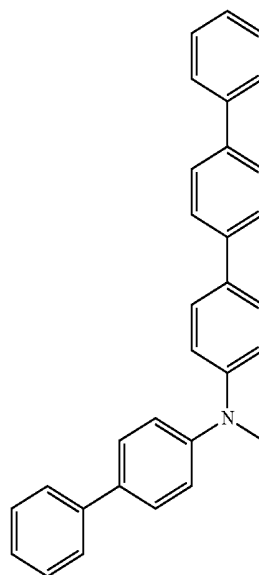
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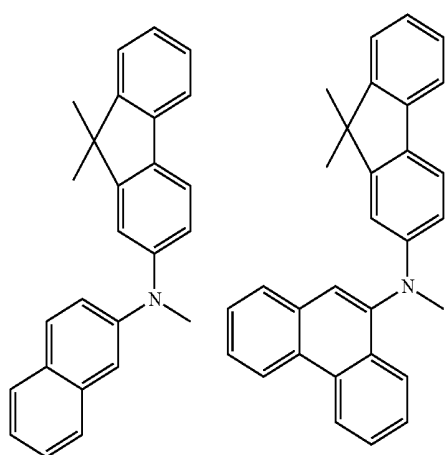
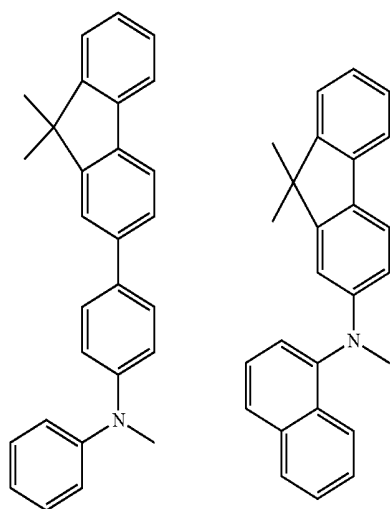
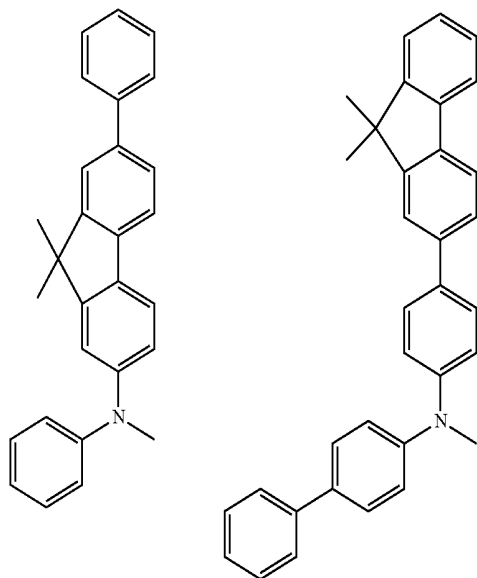
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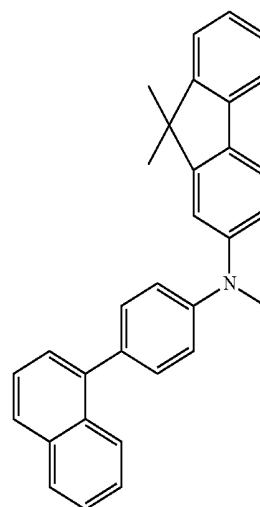
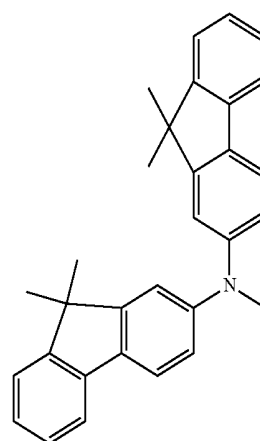
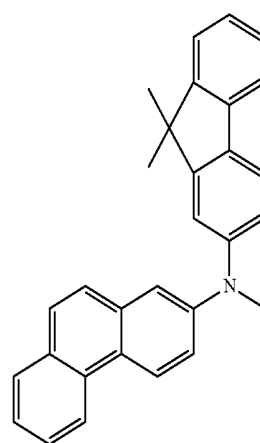
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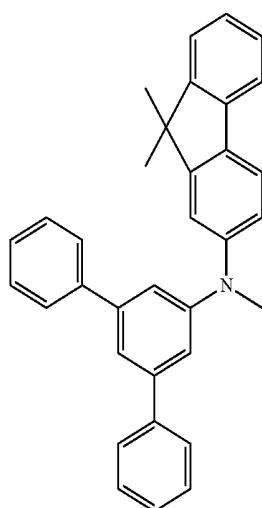
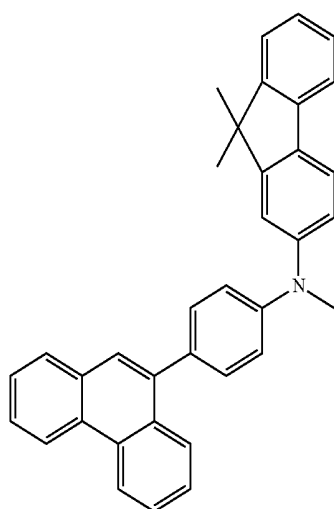
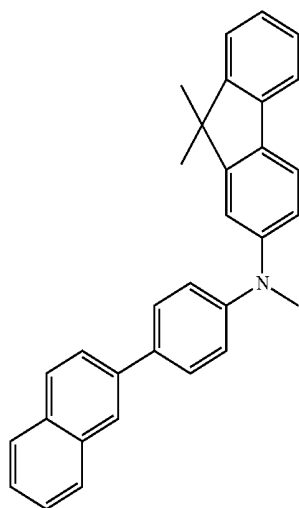
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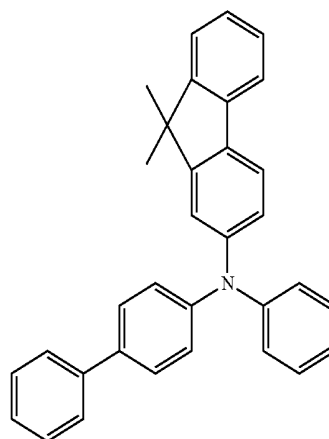
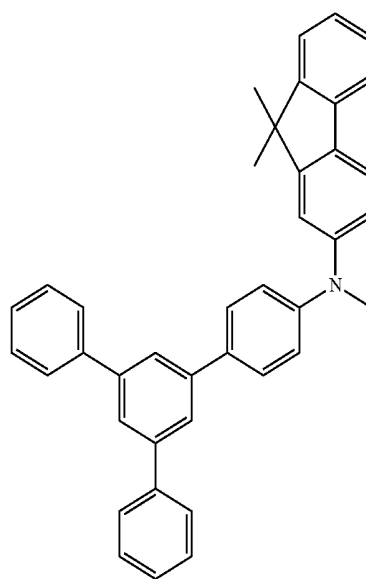
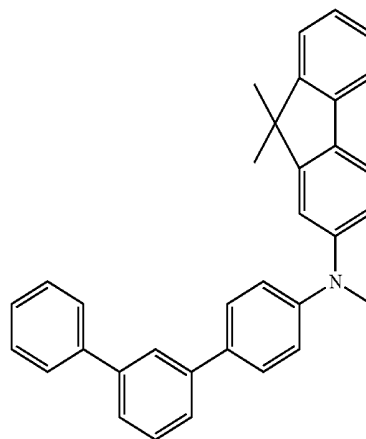
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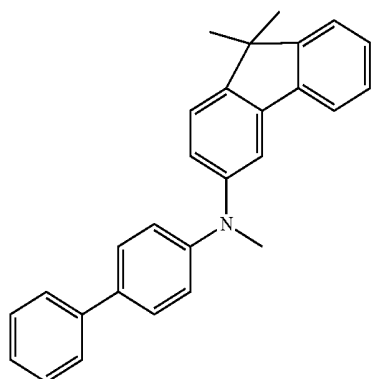
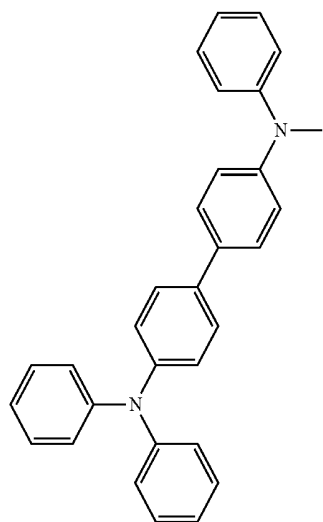
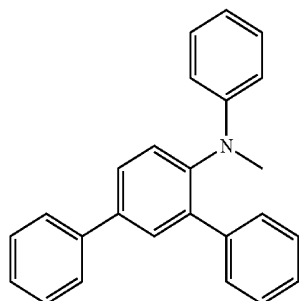
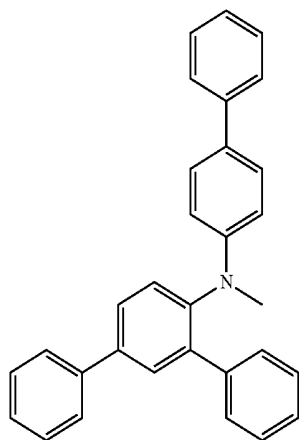
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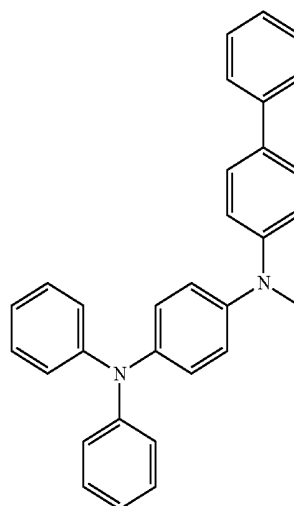
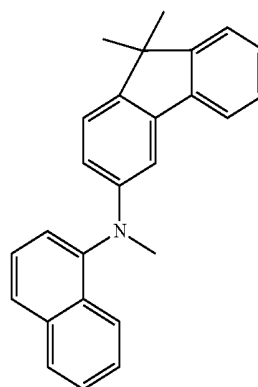
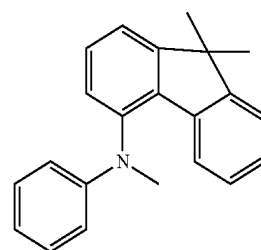
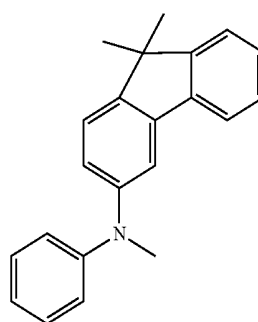
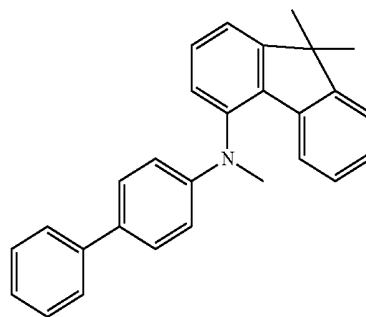
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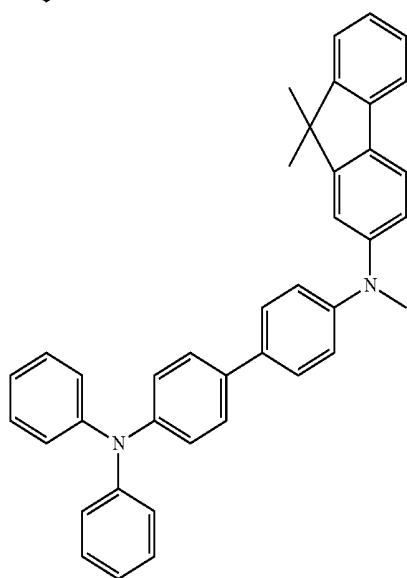
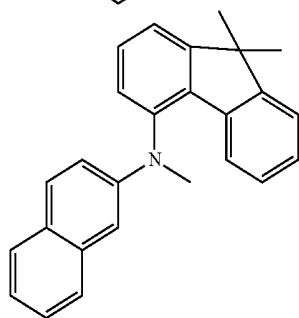
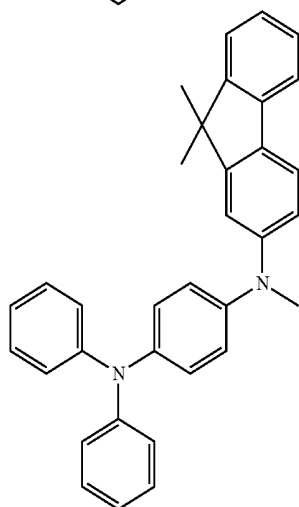
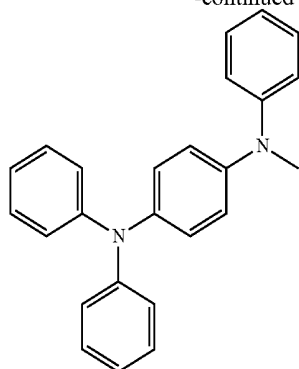
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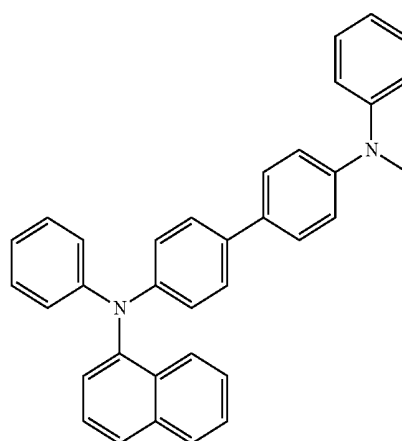
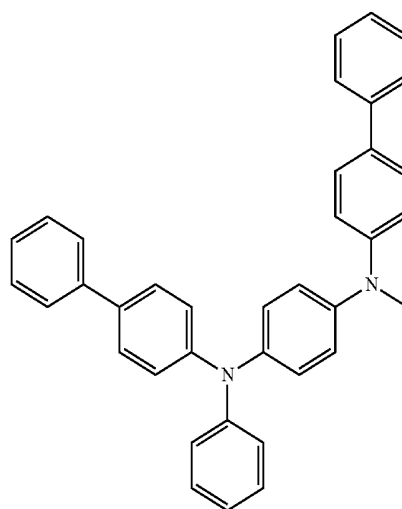
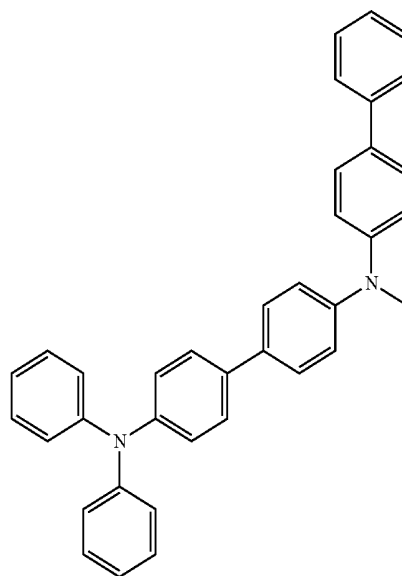
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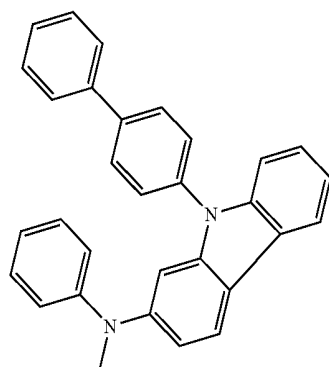
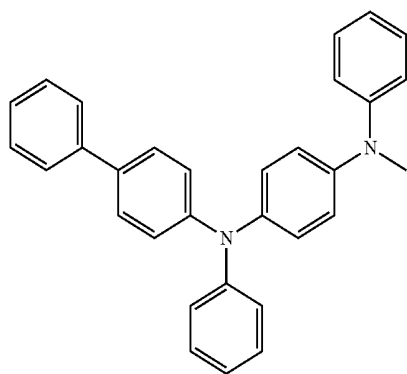
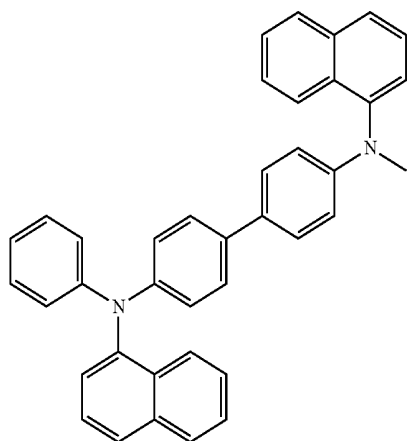
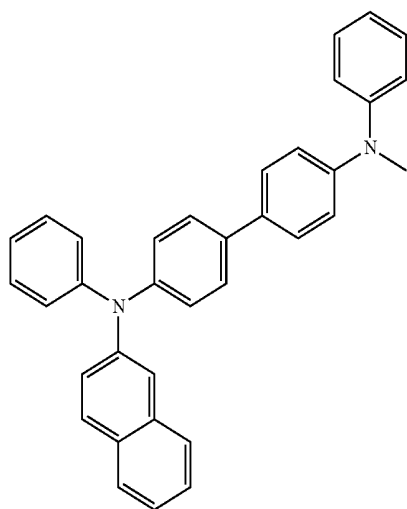
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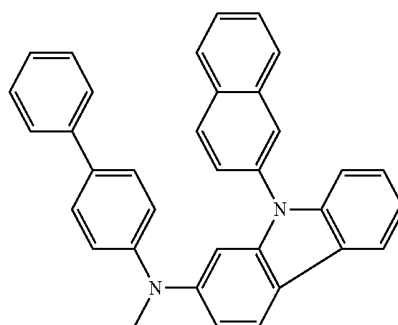
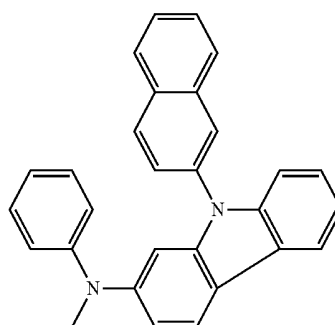
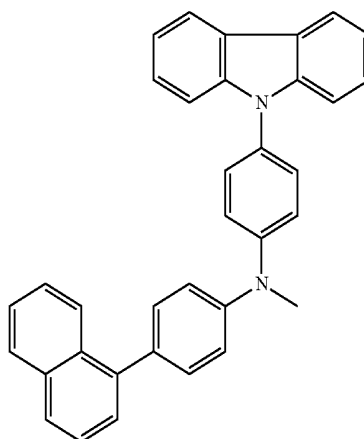
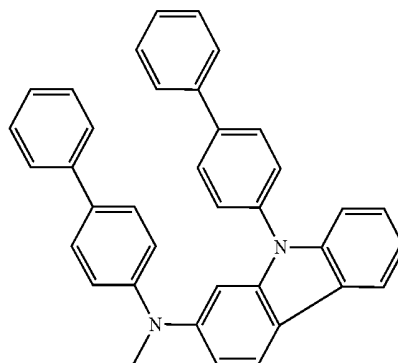
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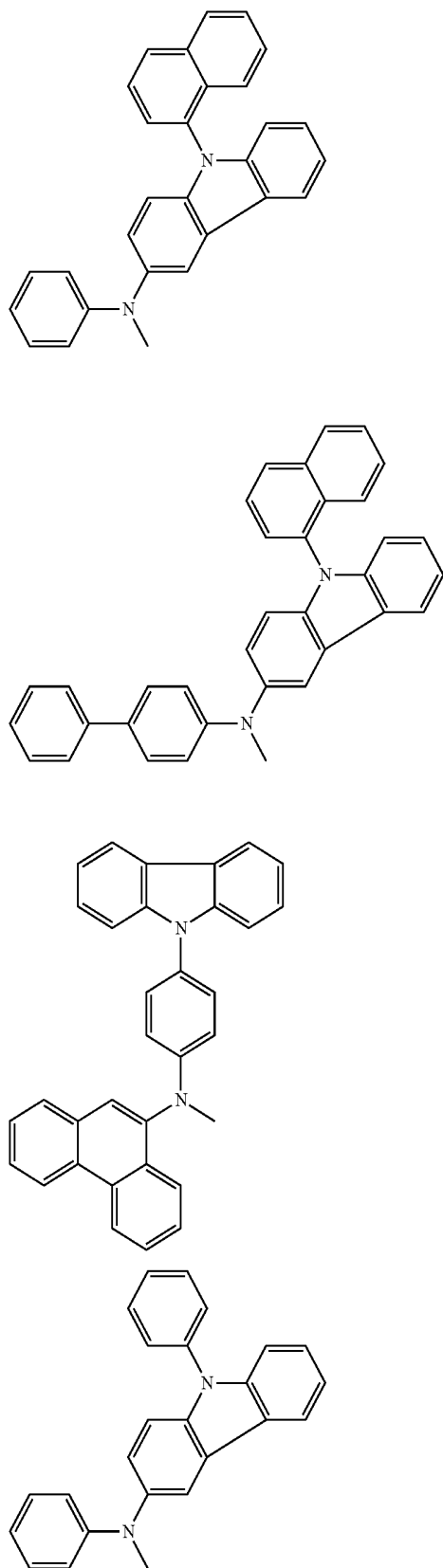
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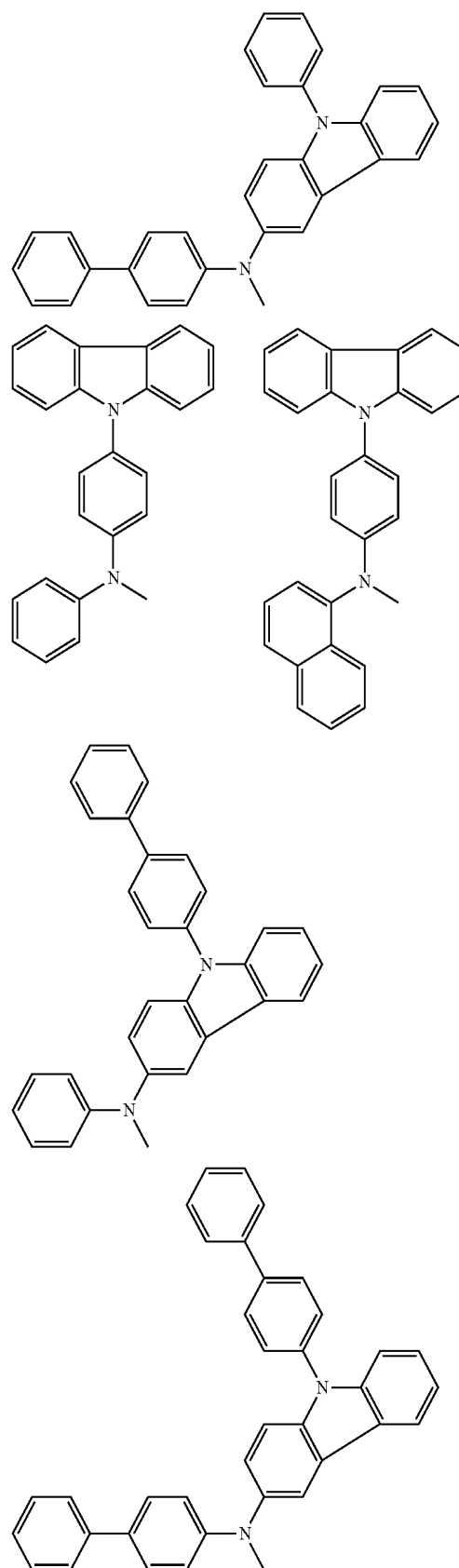
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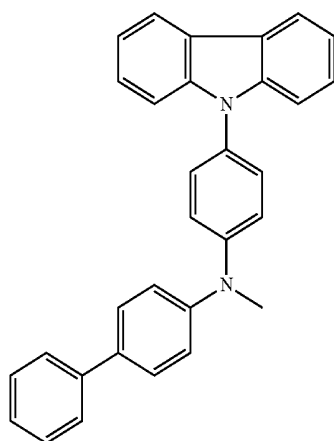
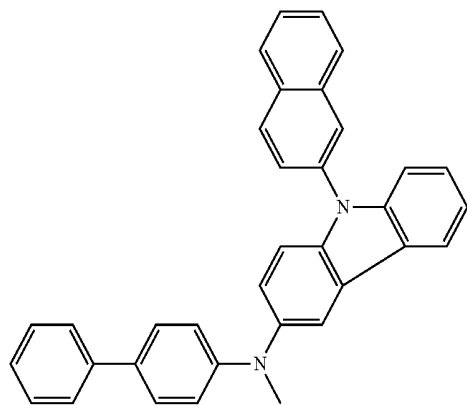
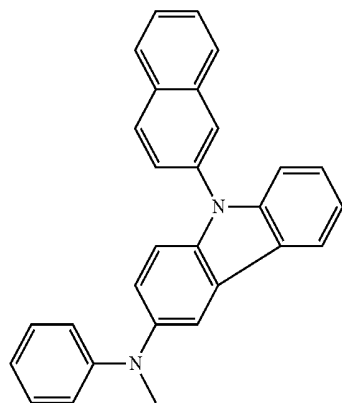
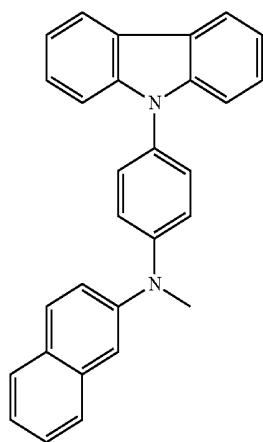
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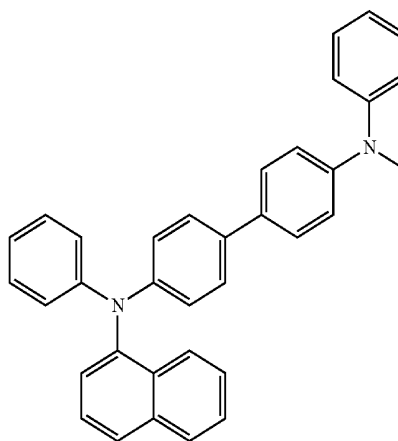
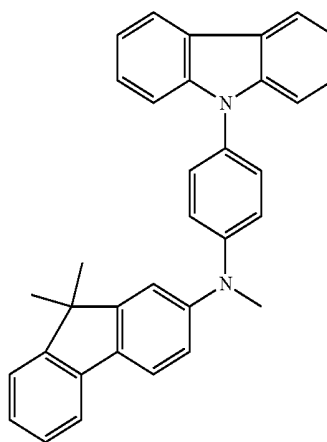
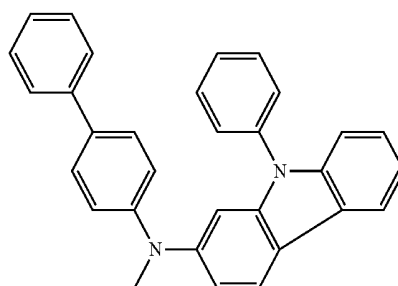
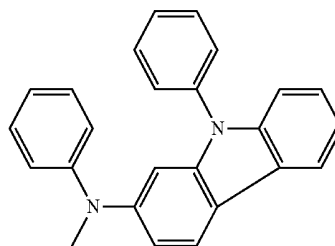
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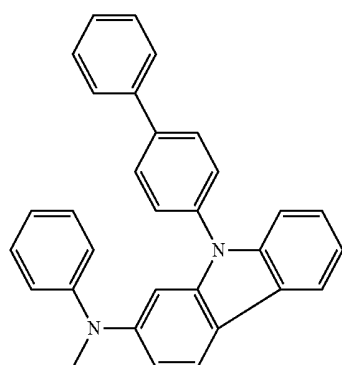
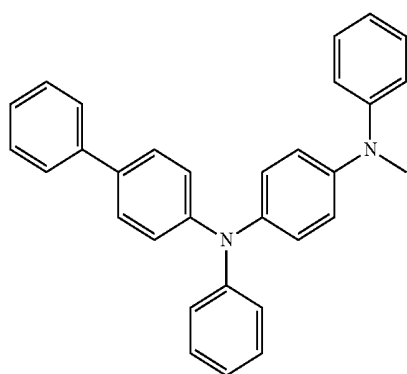
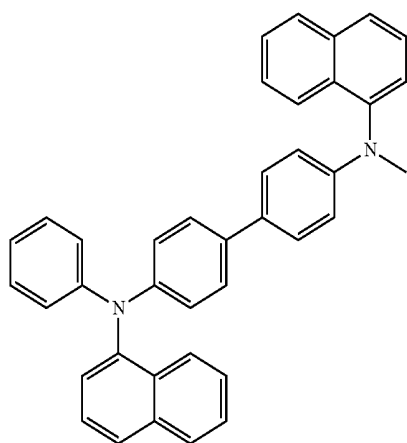
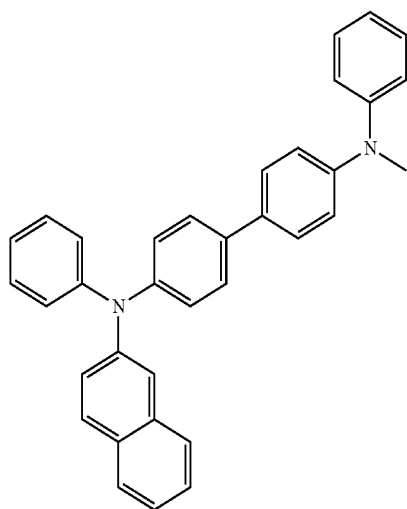
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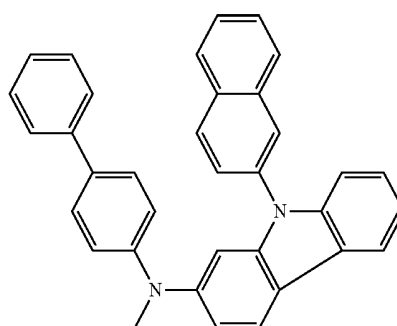
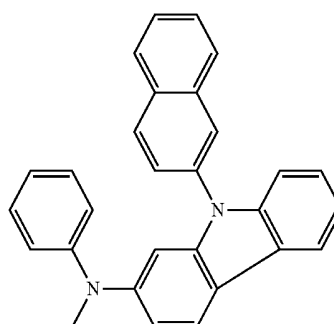
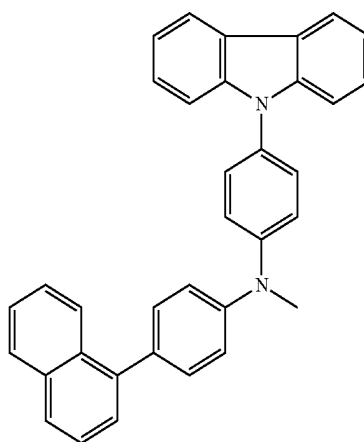
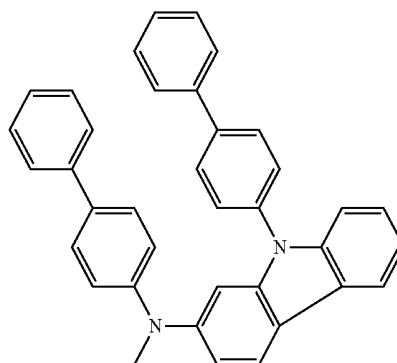
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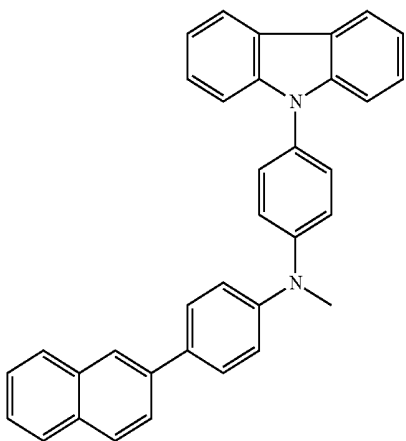
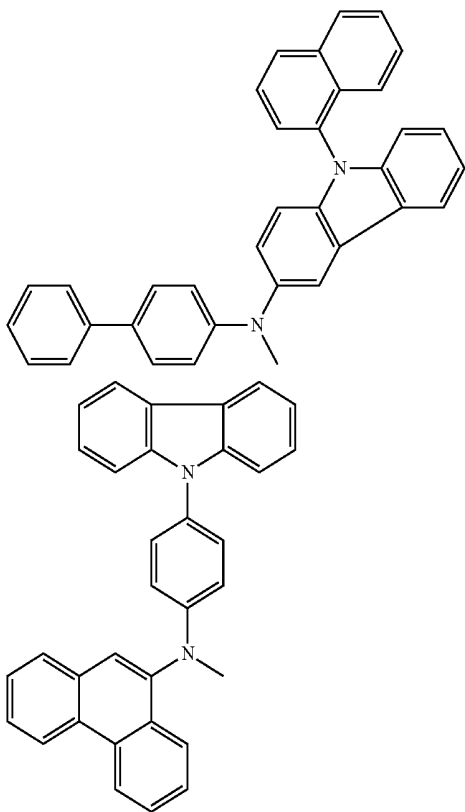
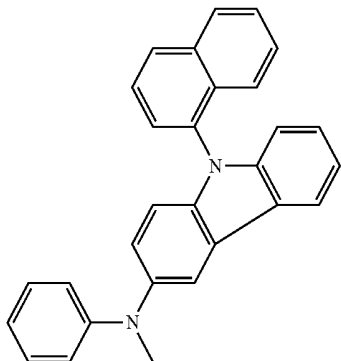
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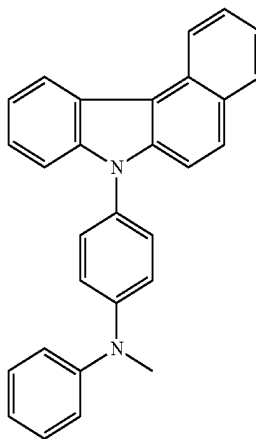
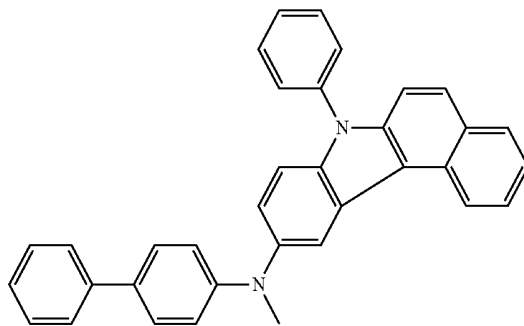
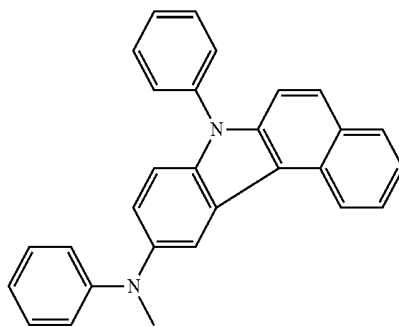
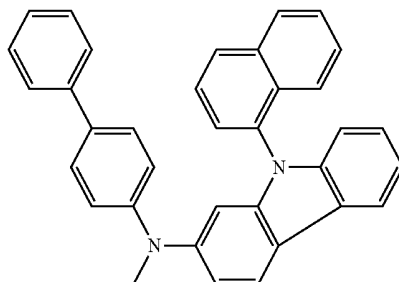
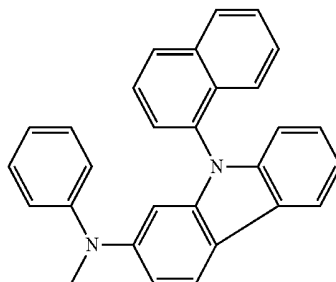
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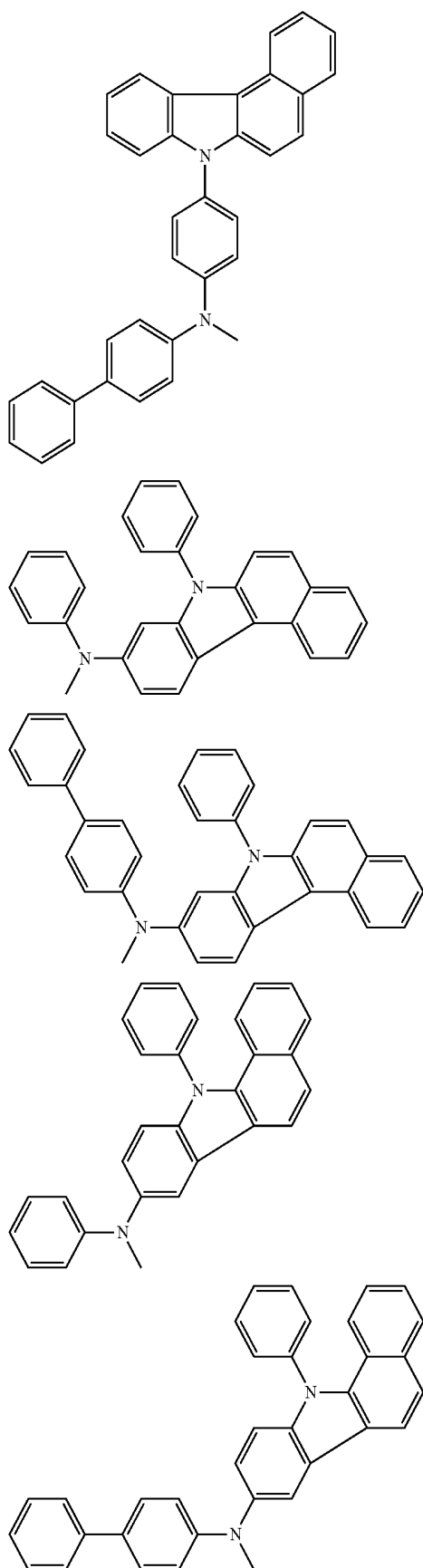
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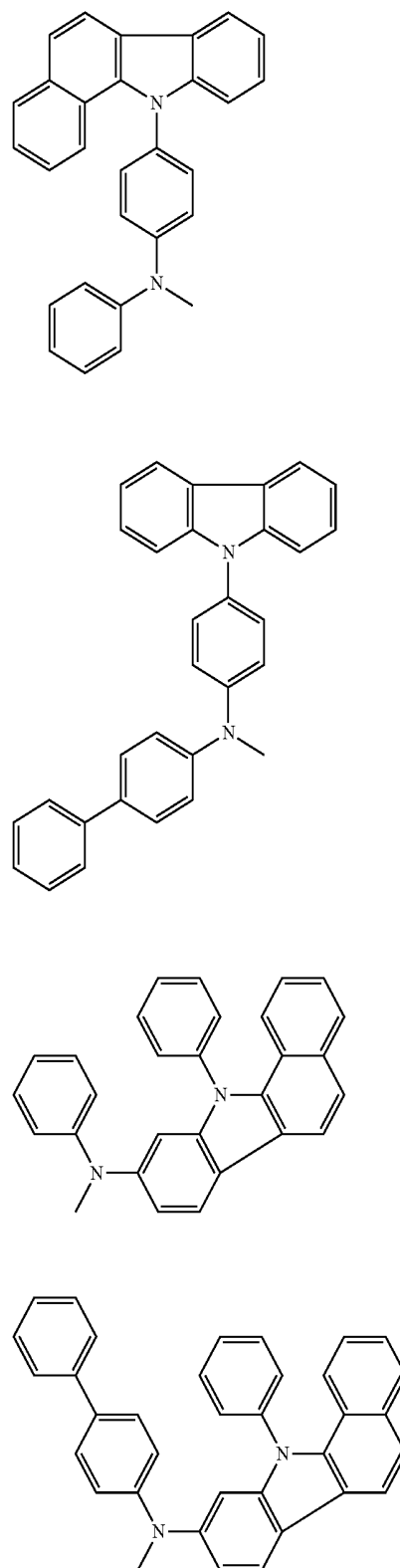
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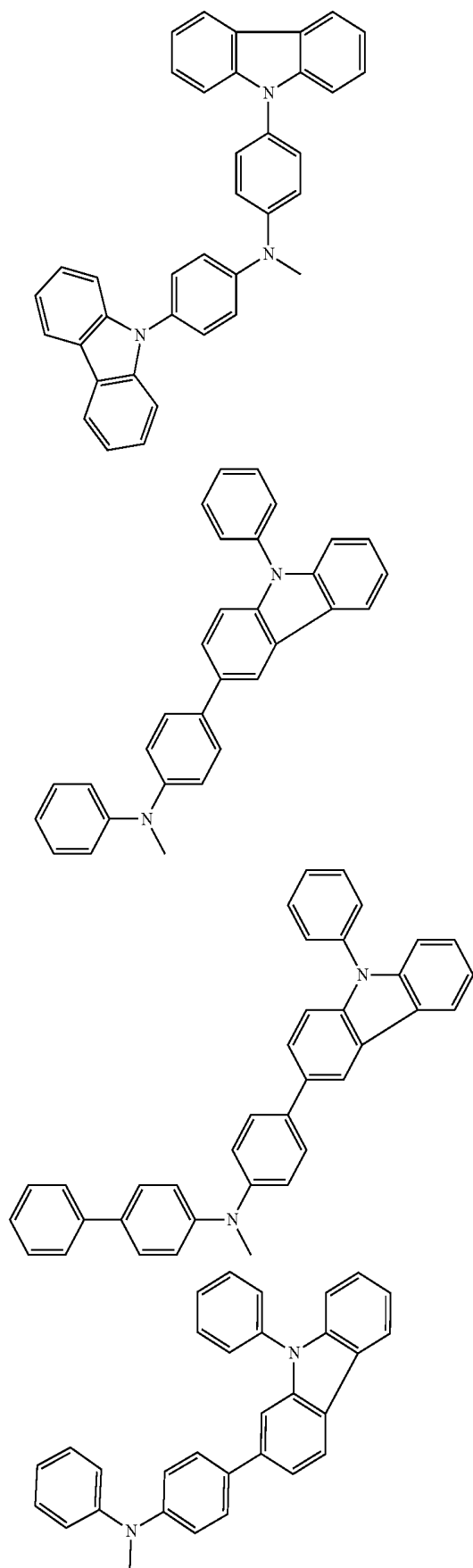
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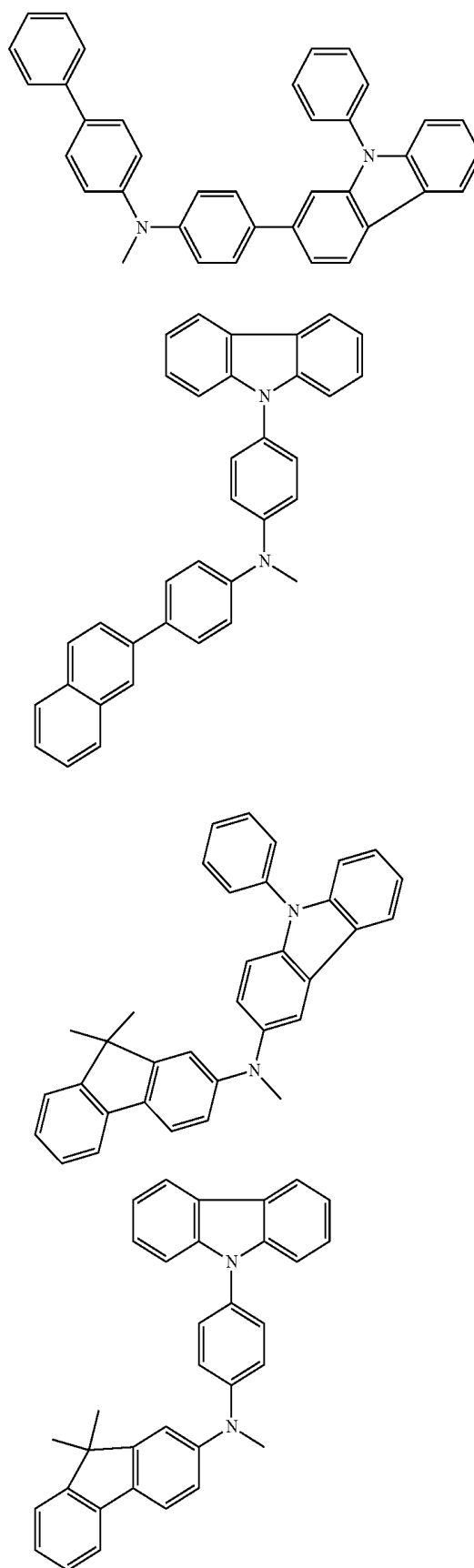
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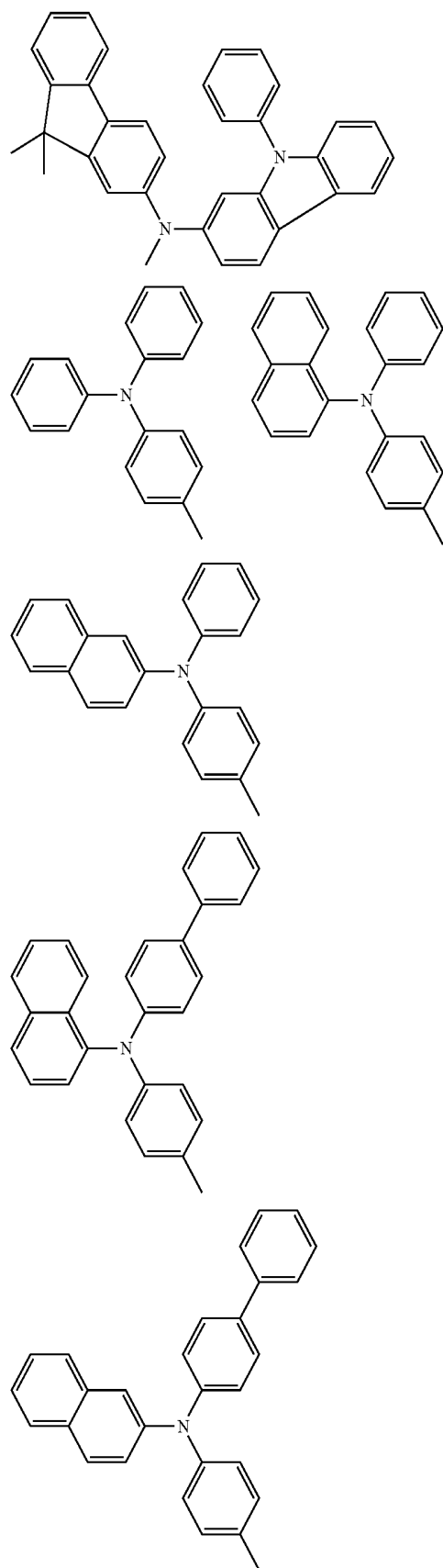
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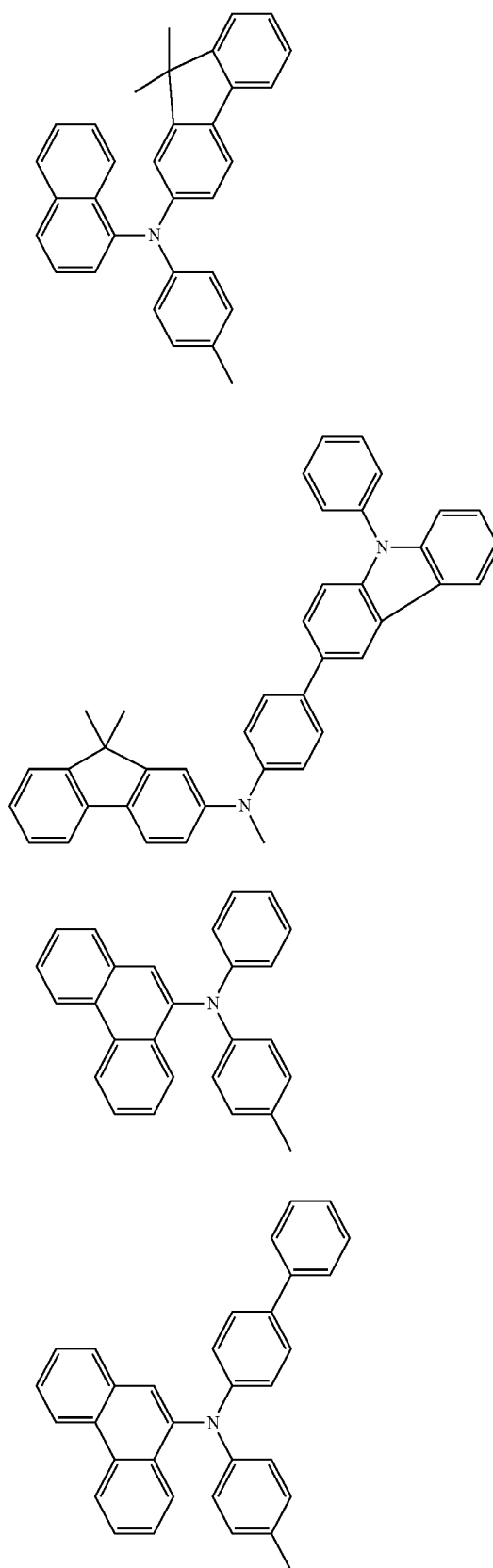
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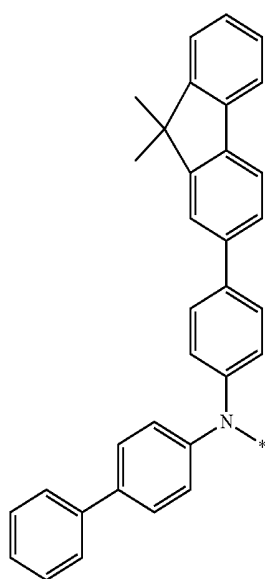
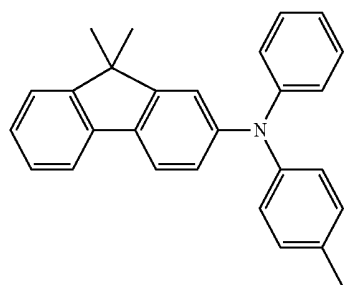
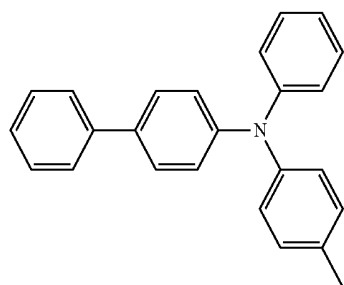
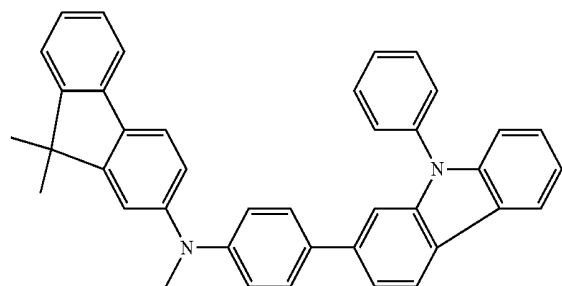
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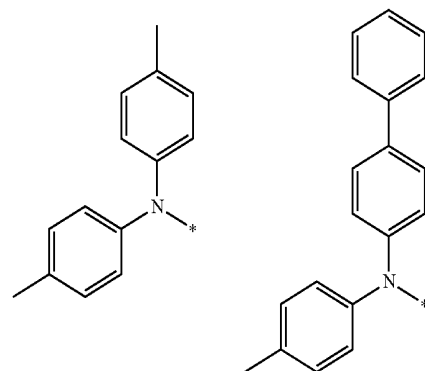
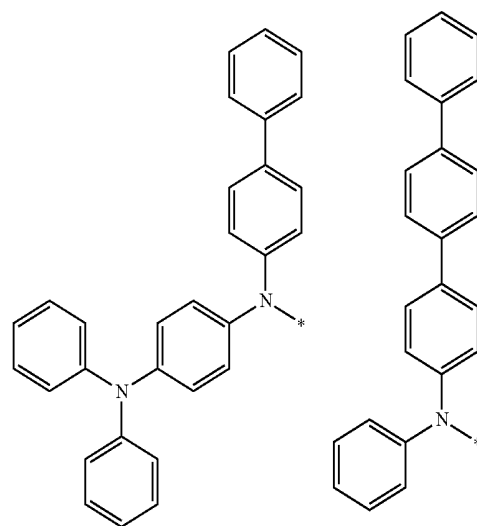
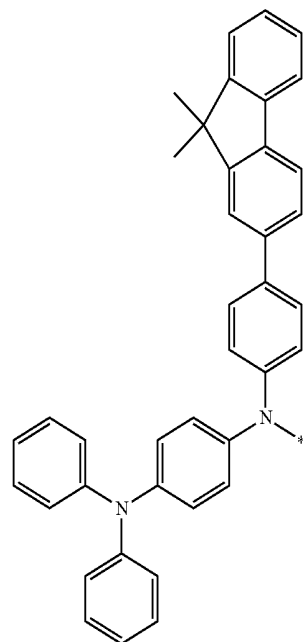
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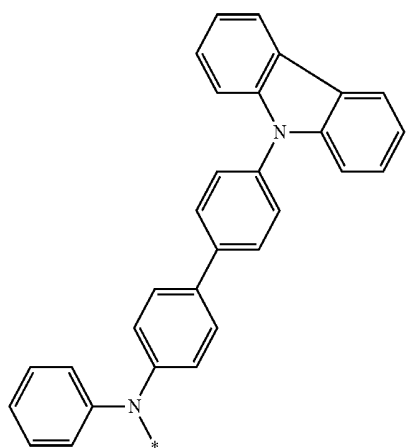
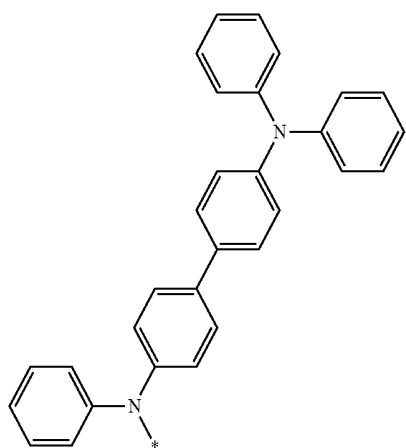
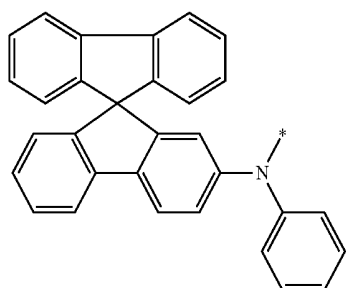
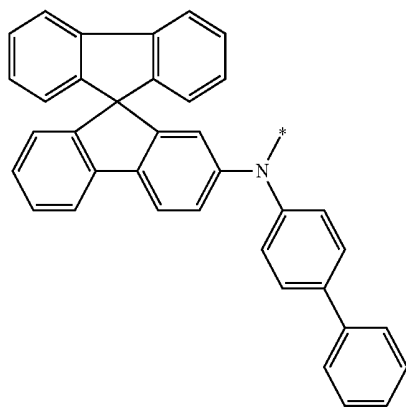
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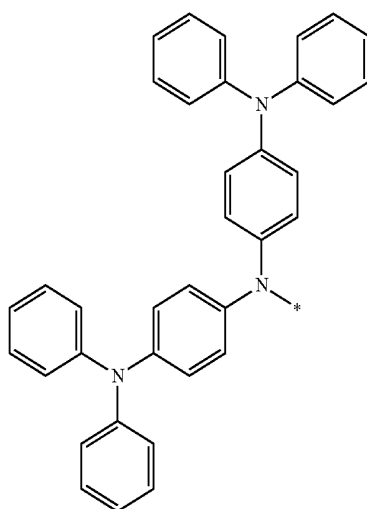
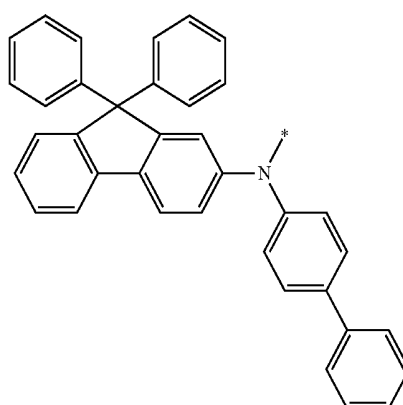
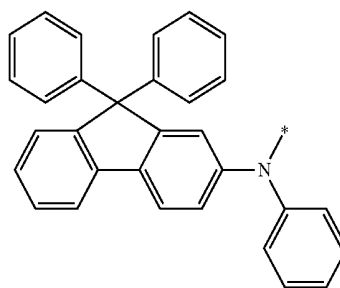
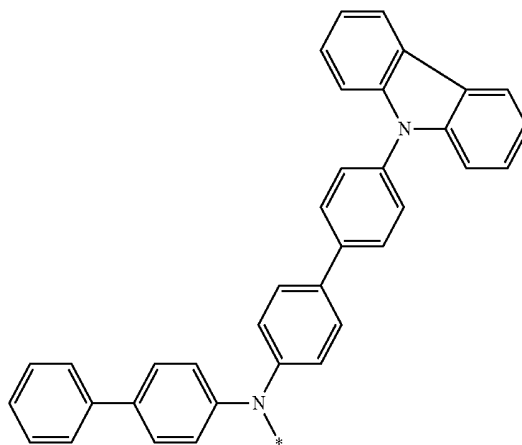
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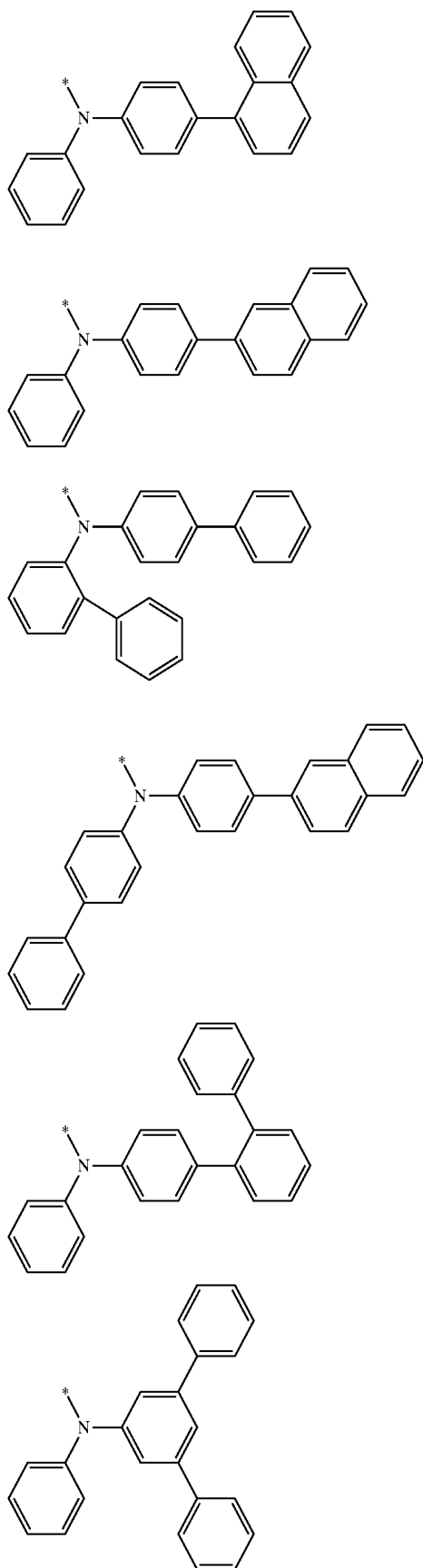
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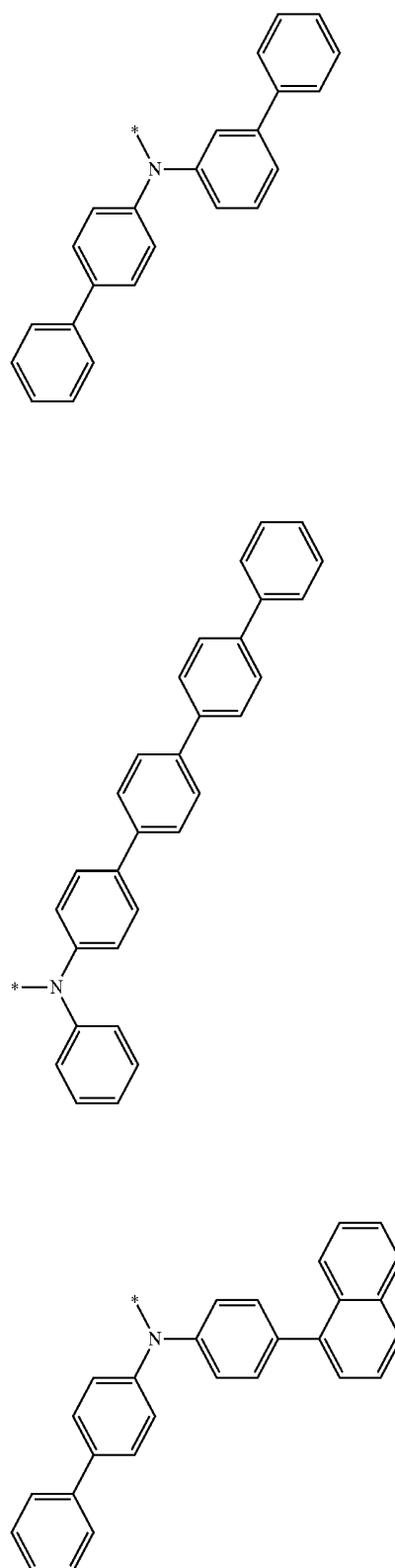
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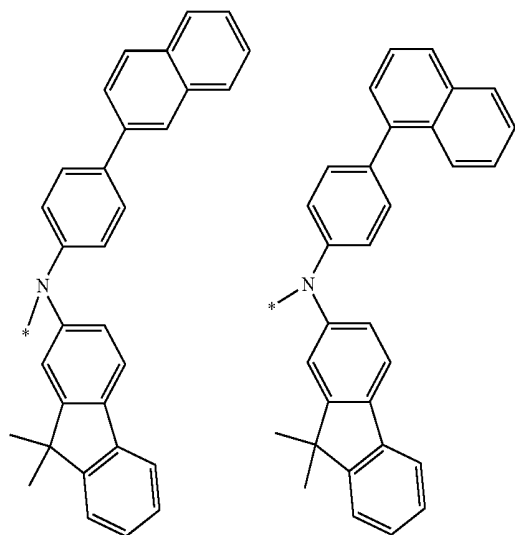
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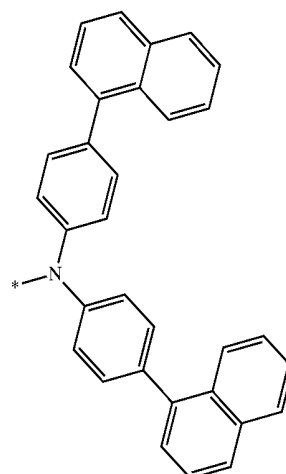
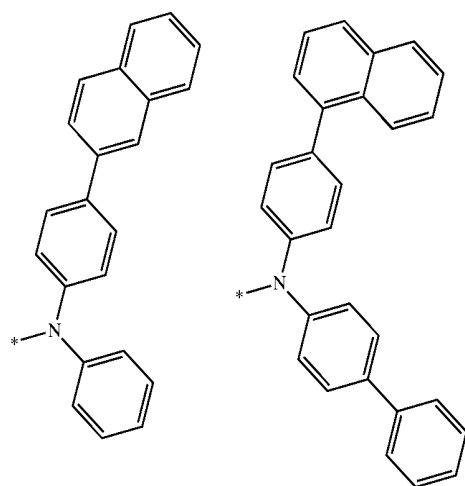
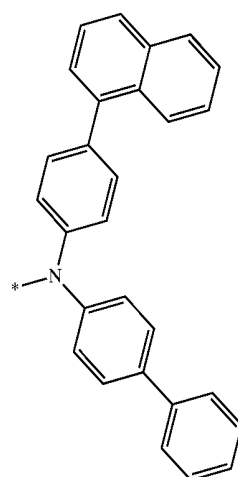
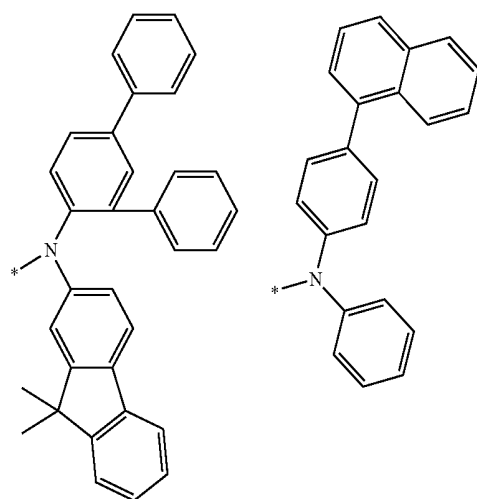
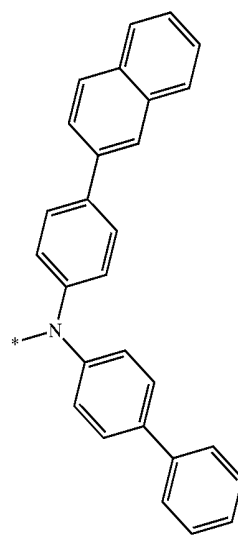
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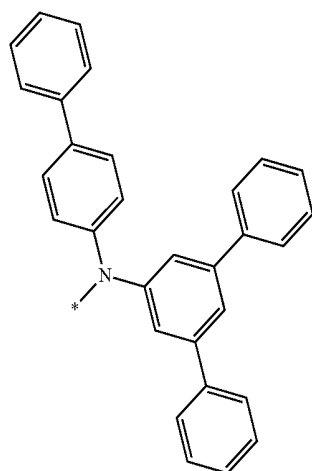
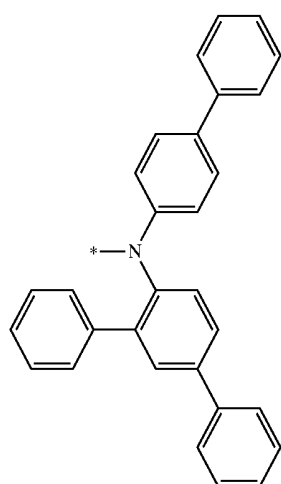
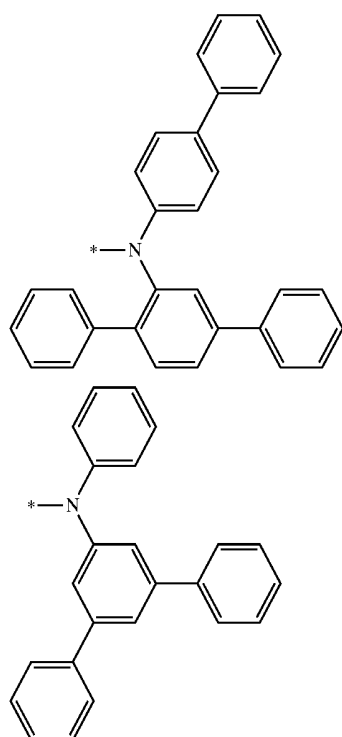
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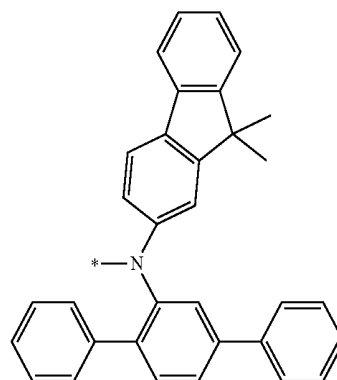
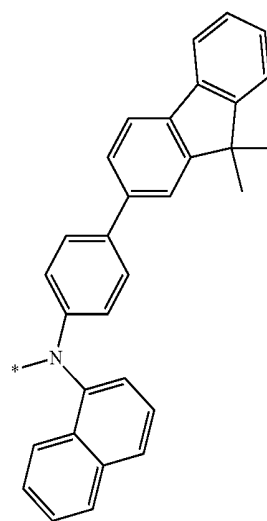
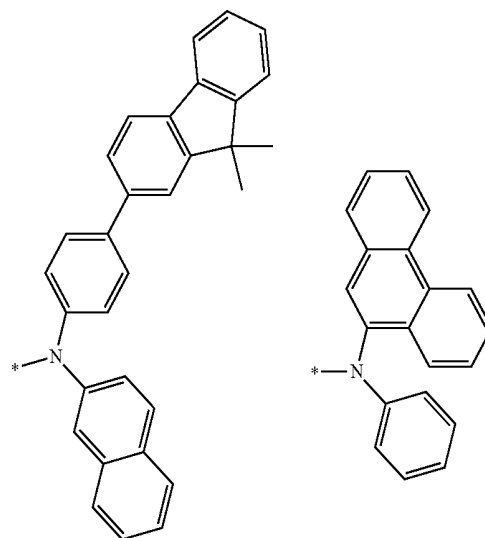
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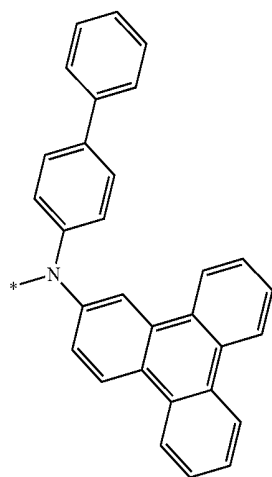
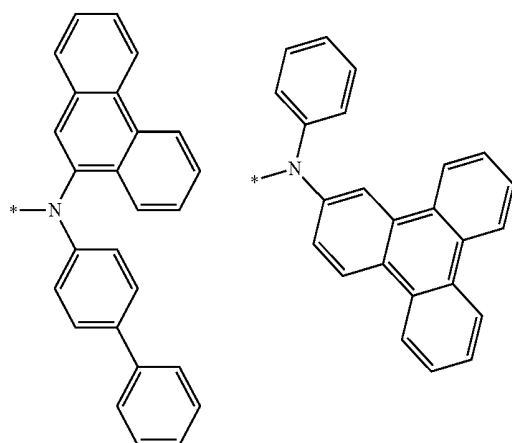
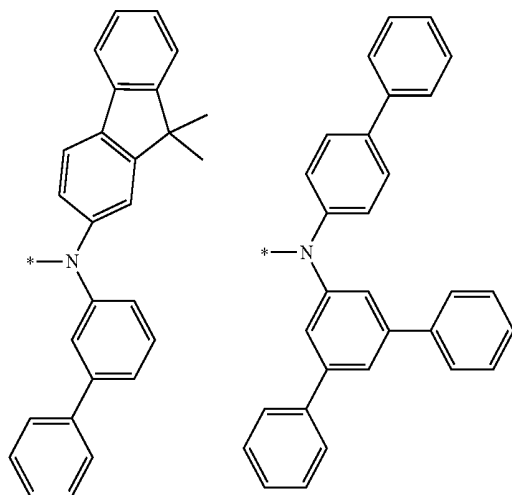
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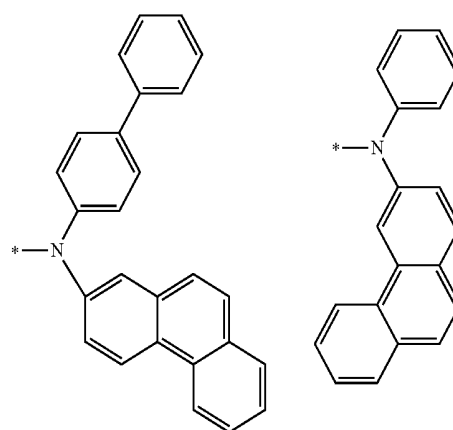
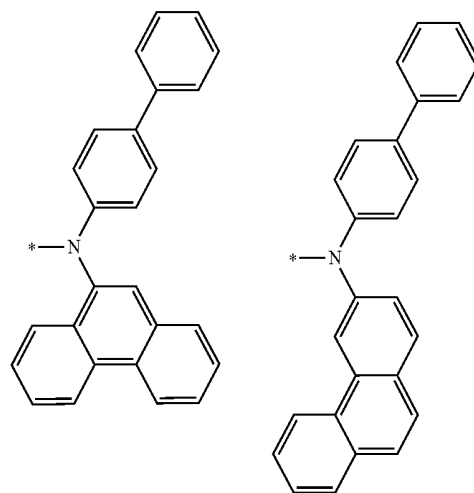
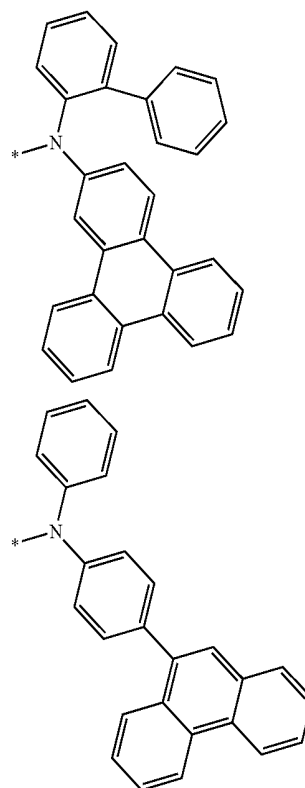
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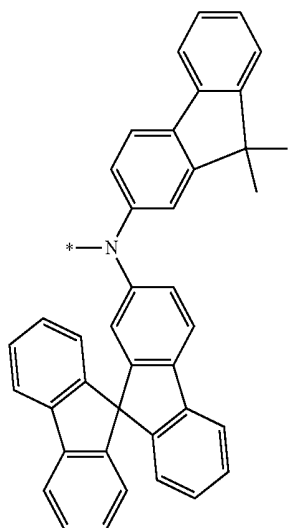
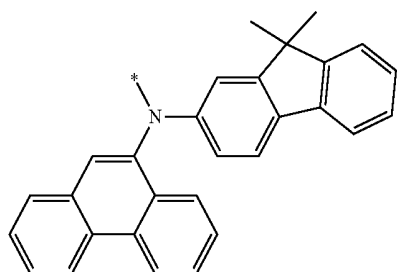
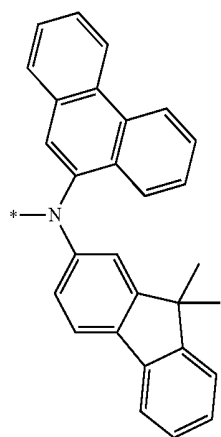
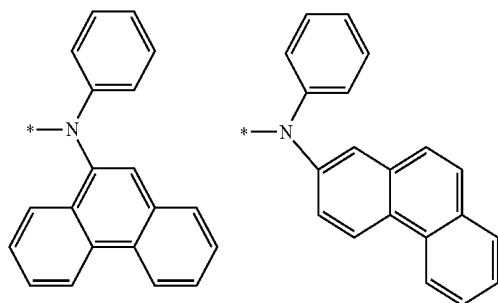
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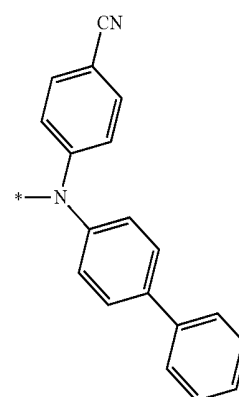
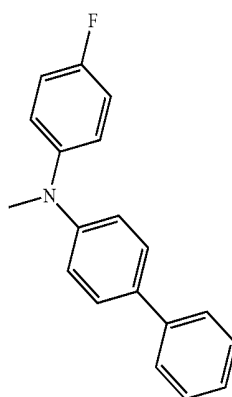
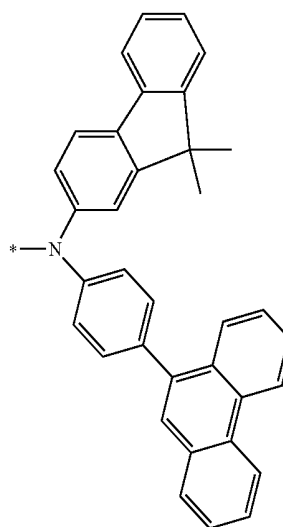
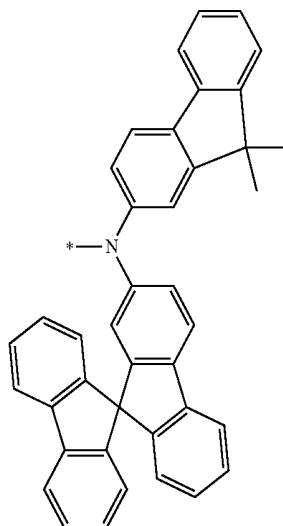
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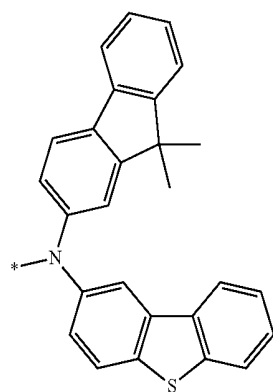
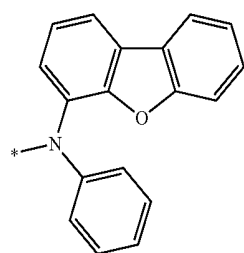
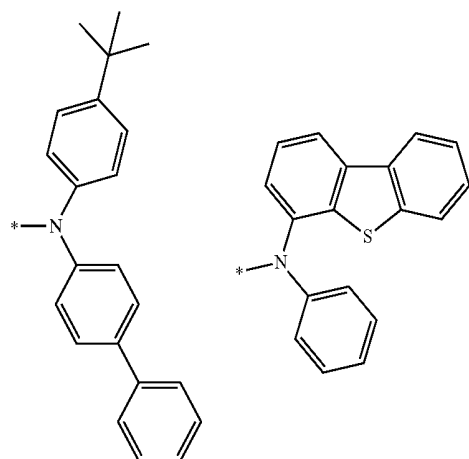
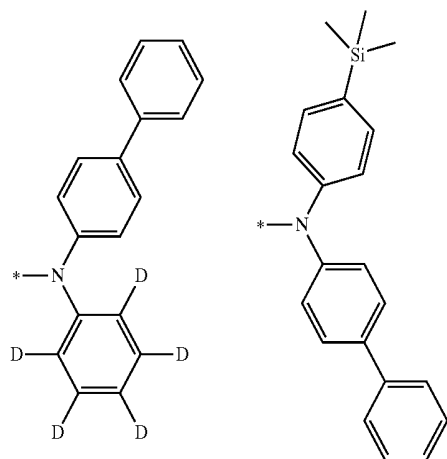
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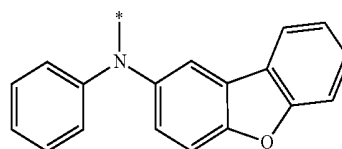
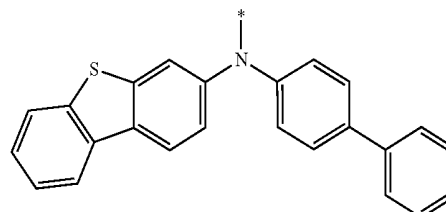
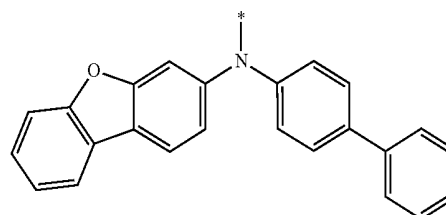
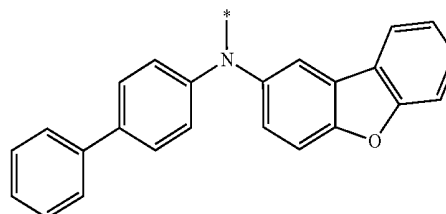
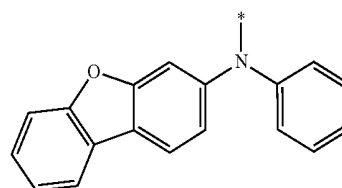
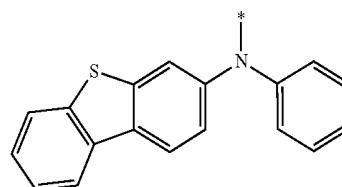
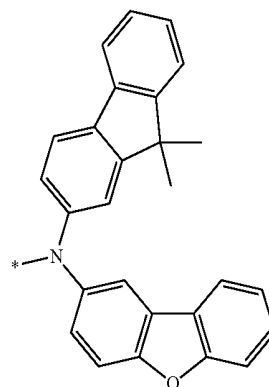
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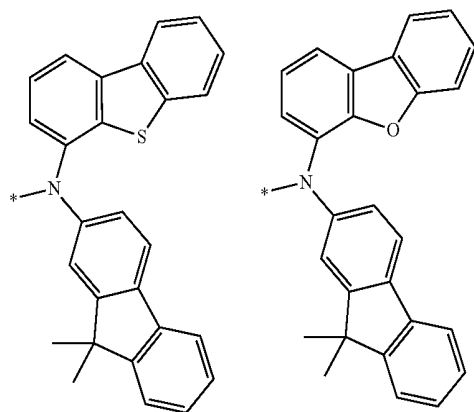
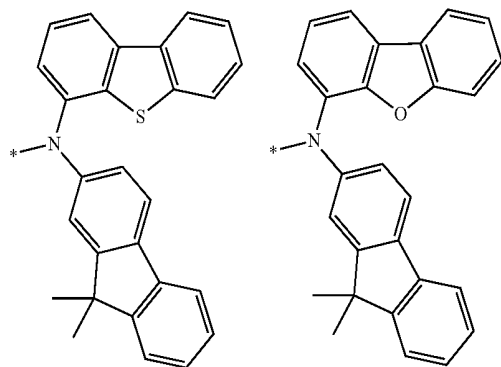
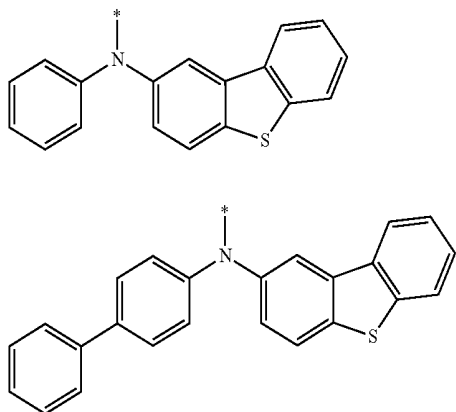
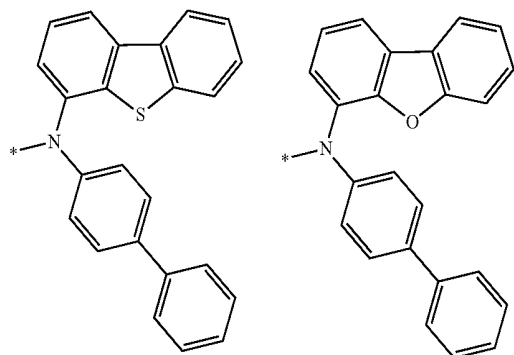
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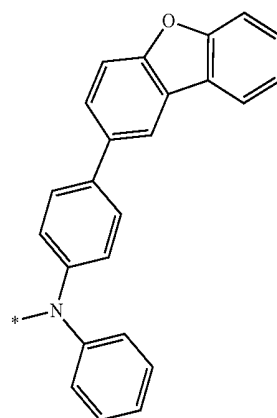
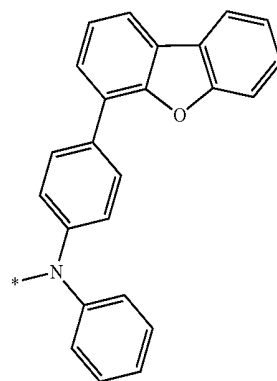
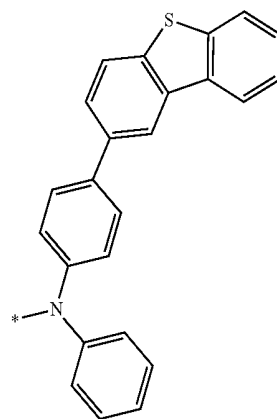
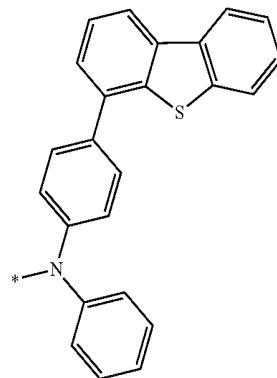
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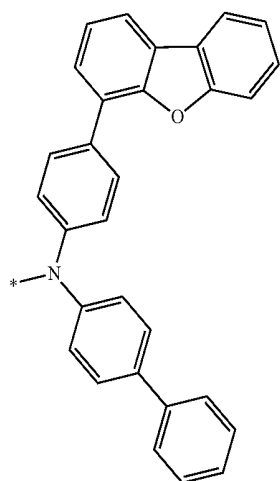
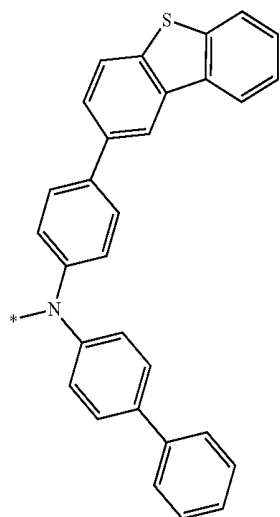
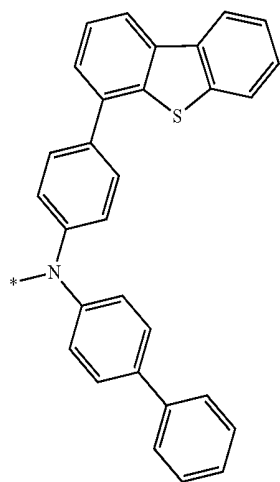
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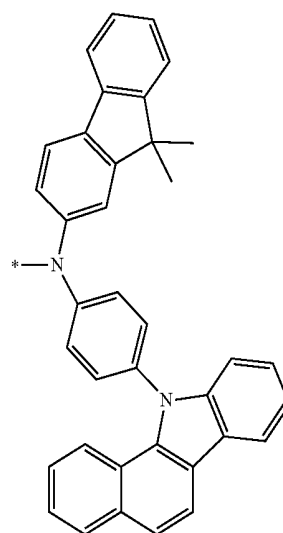
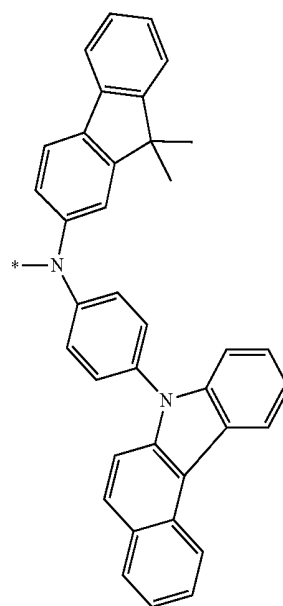
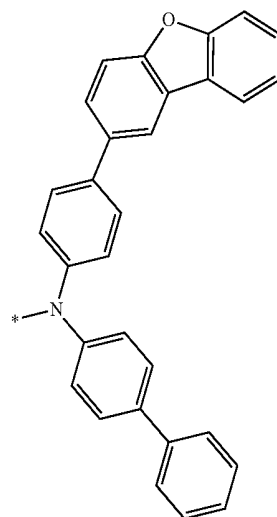
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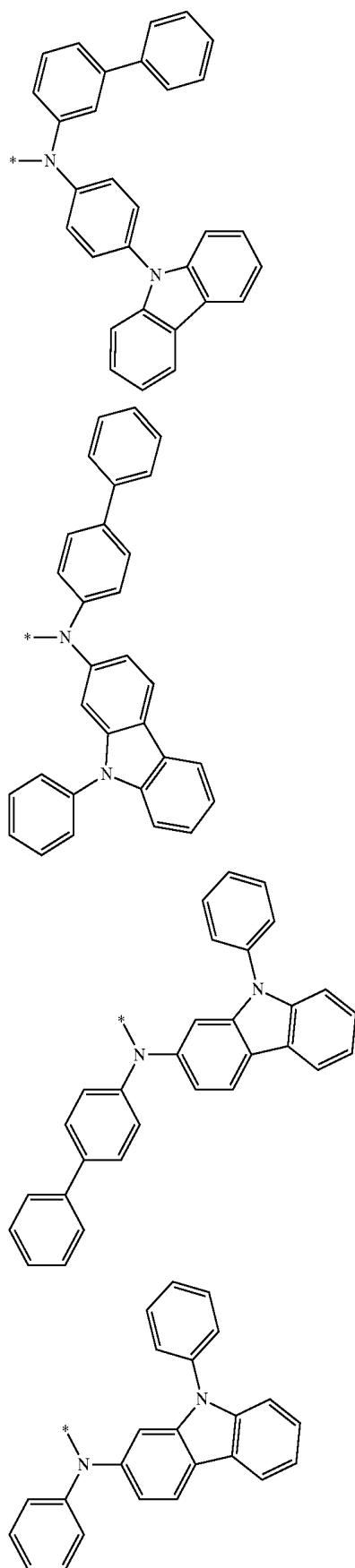
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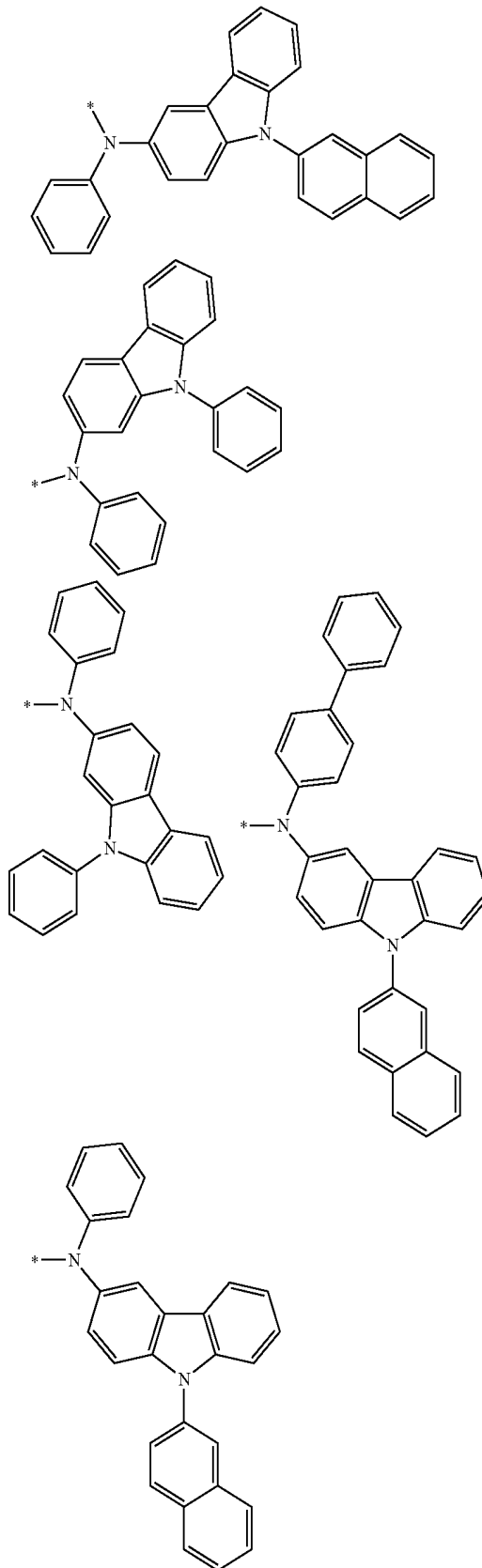
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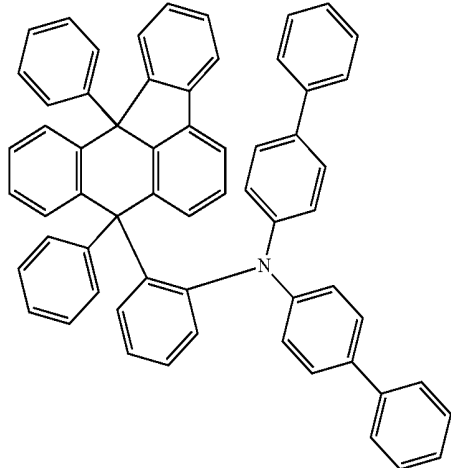
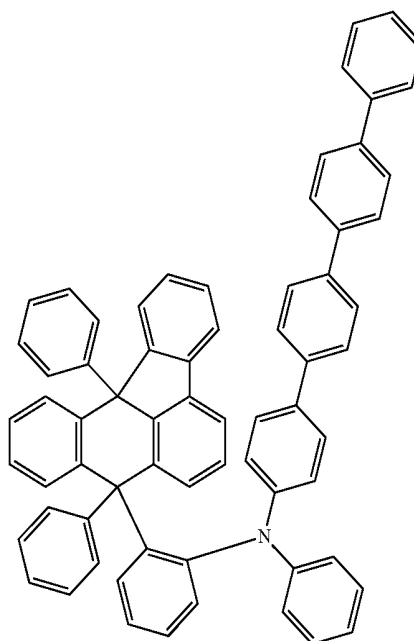
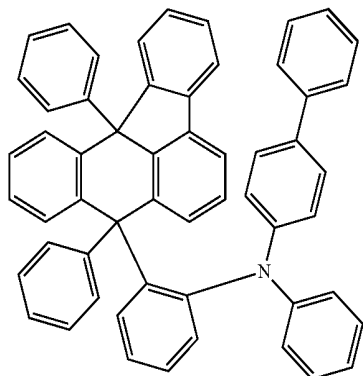
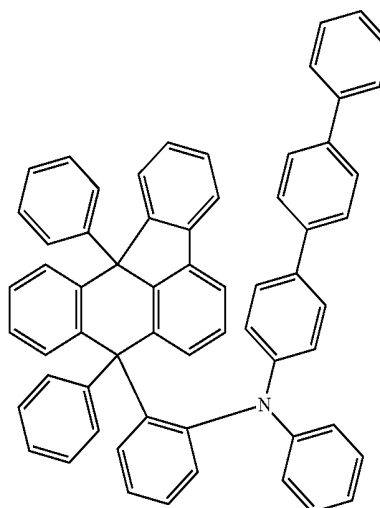
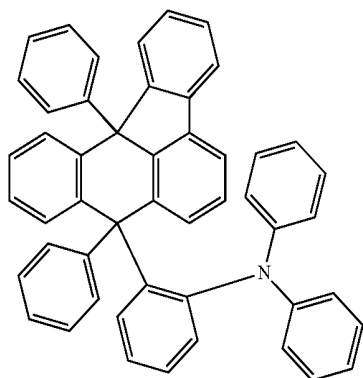
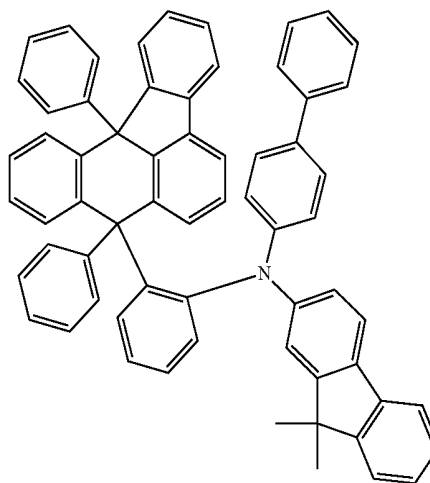


[0165] The structures may be unsubstituted or substituted with one or more substituents selected from the group

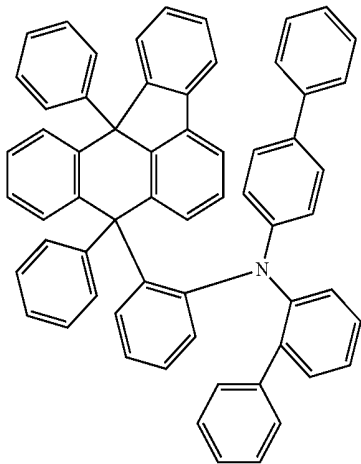
consisting of deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a phosphine oxide group; an alkoxy group; an aryloxy group; an alkylthioxy group; an arylthioxy group; an alkylsulfoxy group; an arylsulfoxy group; a silyl group; a boron group; an alkyl group; a cycloalkyl group; an alkenyl group; an aryl group; an aralkyl group; an aralkenyl group; an alkylaryl group; an alkylamine group; an aralkylamine group; a heteroarylamine group; an arylamine group; an arylphosphine group; and a heterocyclic group.

[0166] According to one embodiment of the present disclosure, the compound of Chemical Formula 1 may be any one selected from

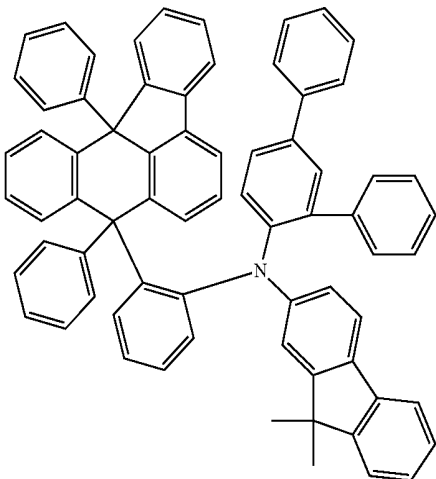
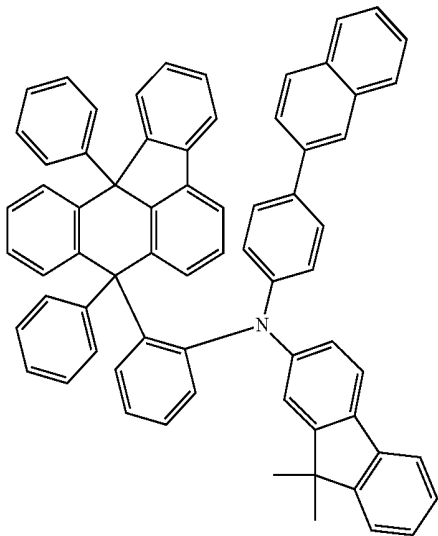
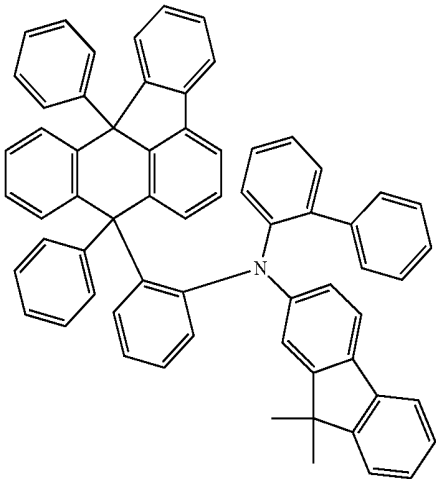
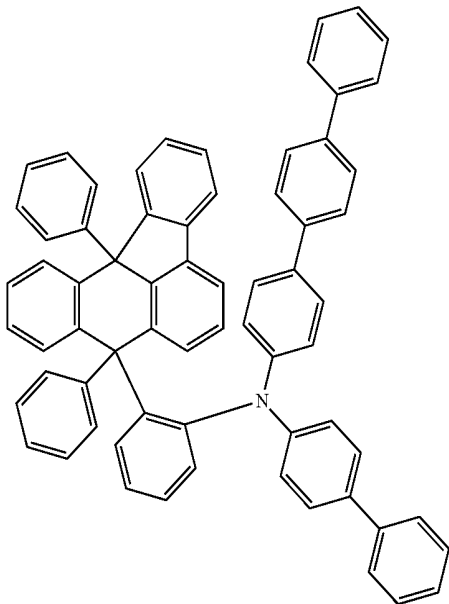
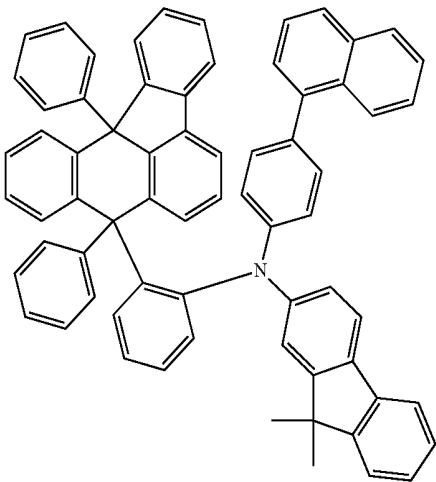
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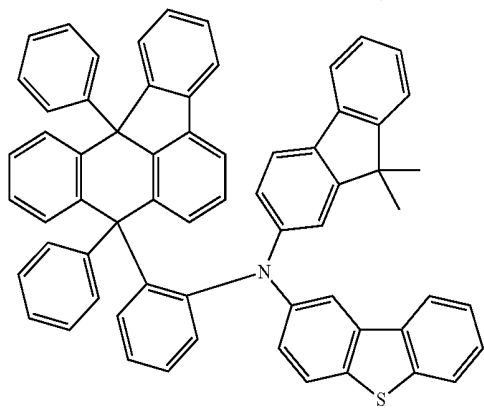
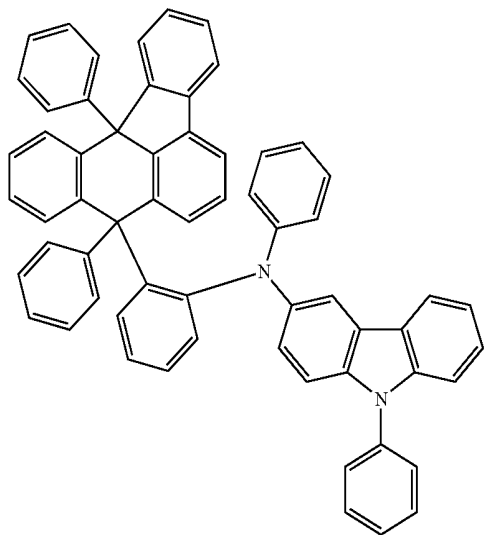
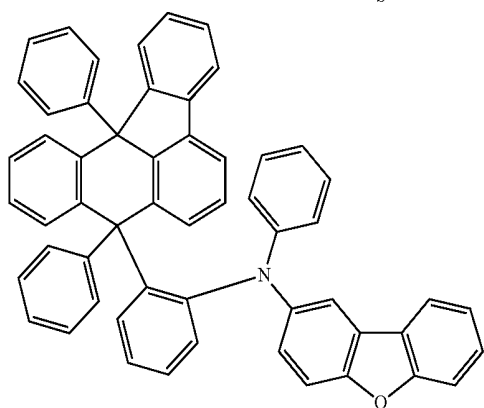
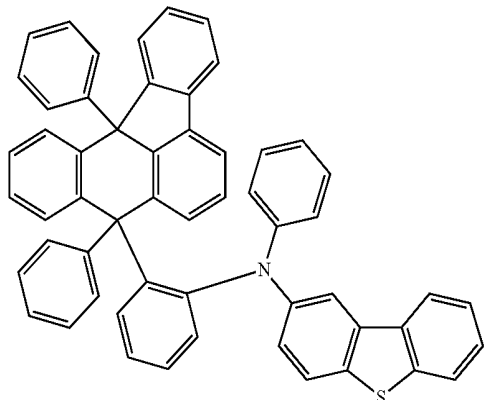
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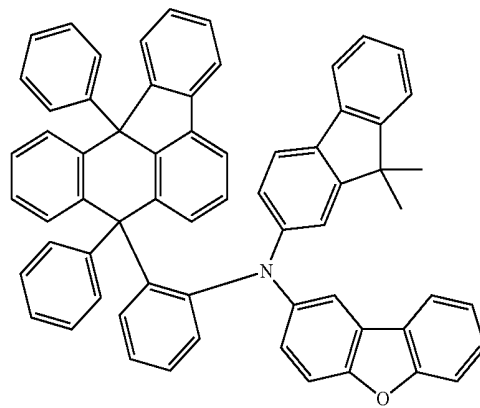
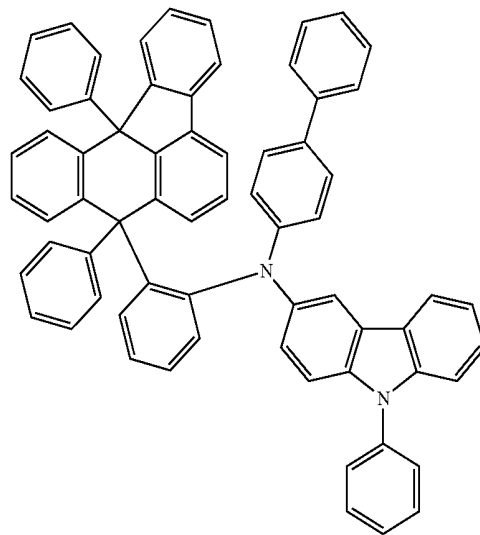
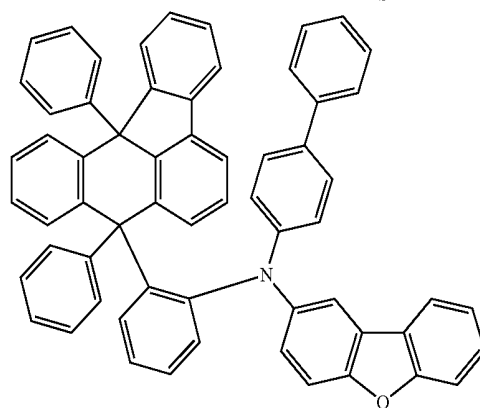
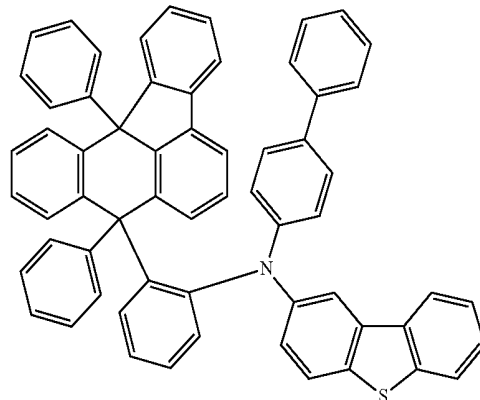
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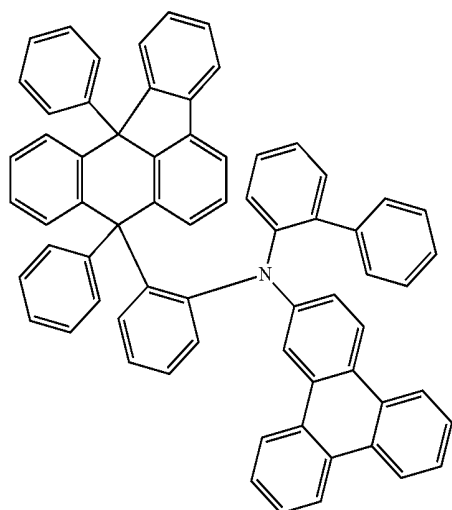
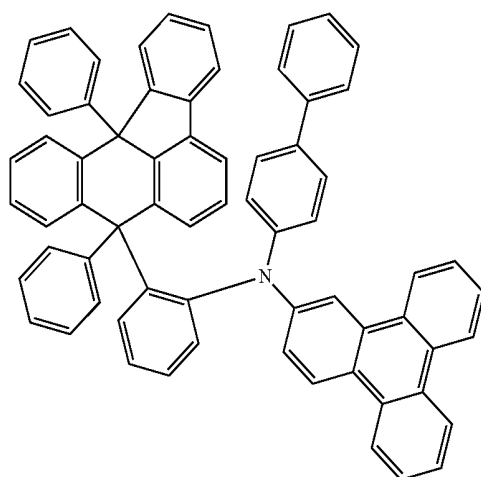
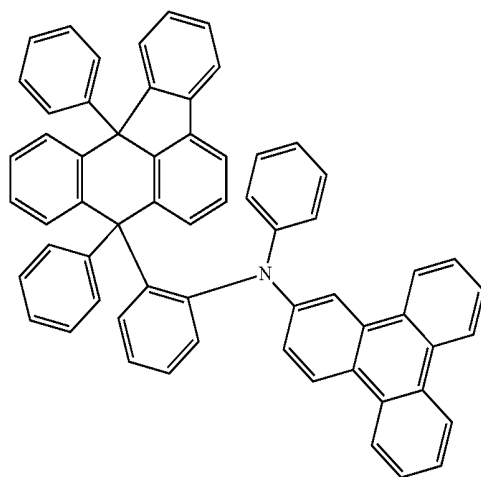
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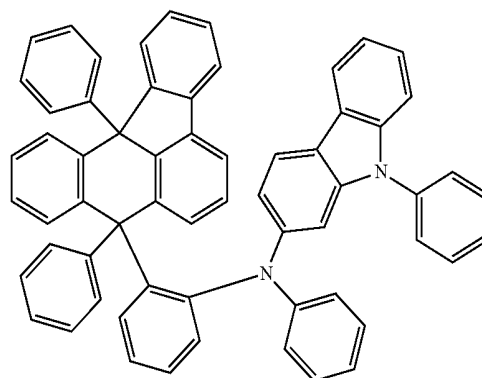
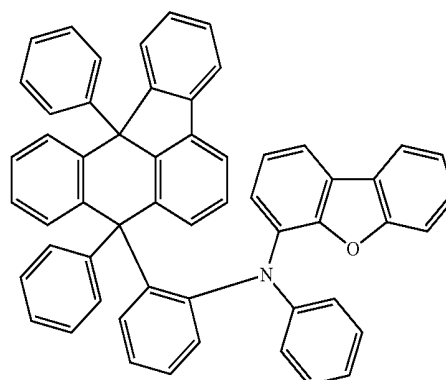
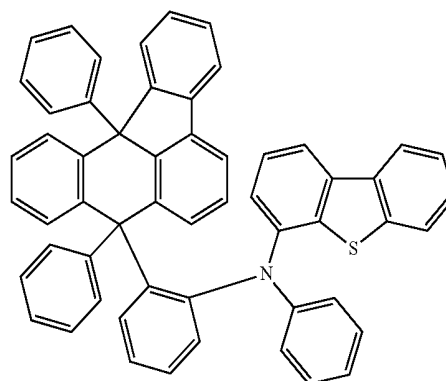
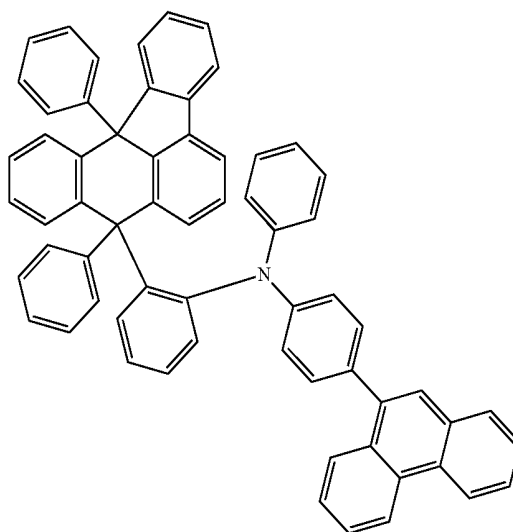
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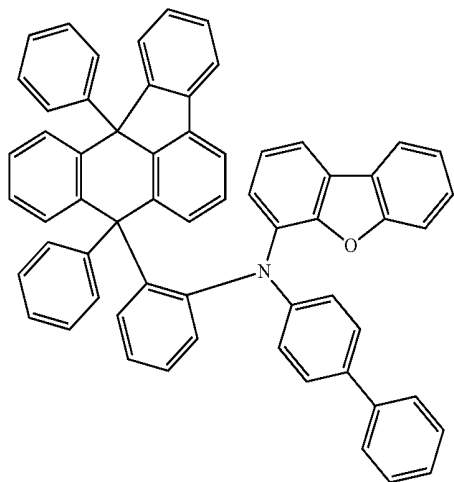
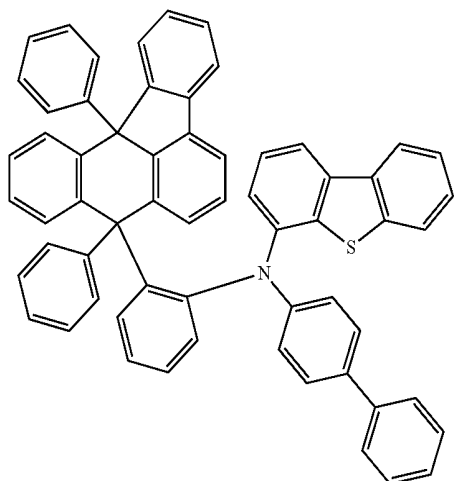
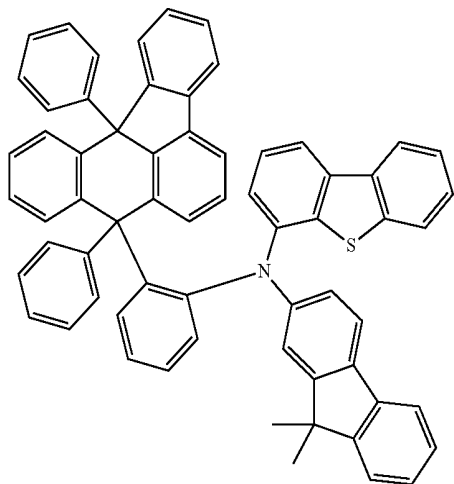
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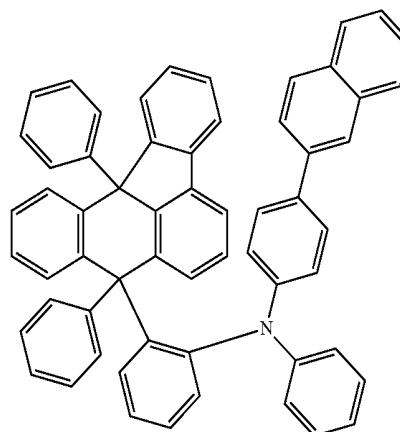
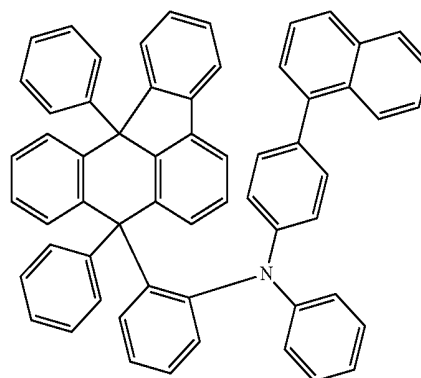
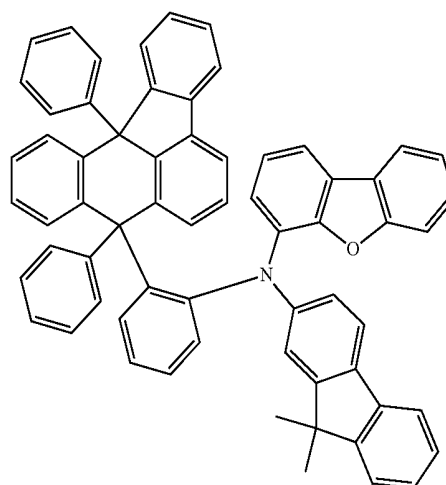
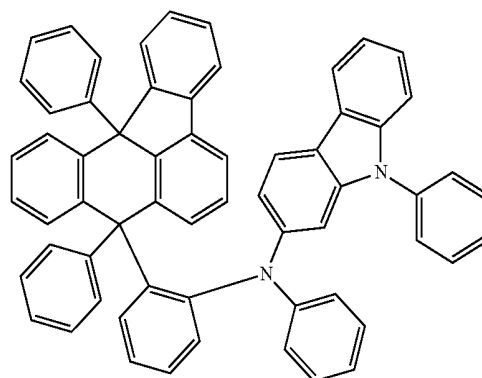
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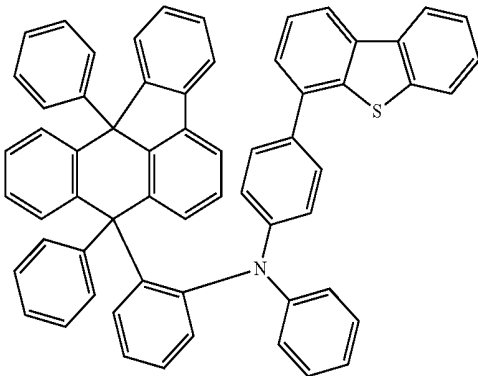
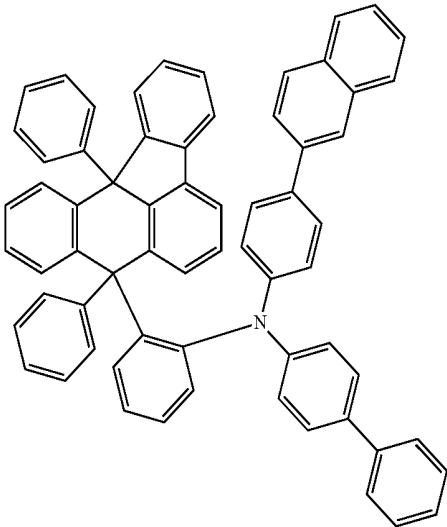
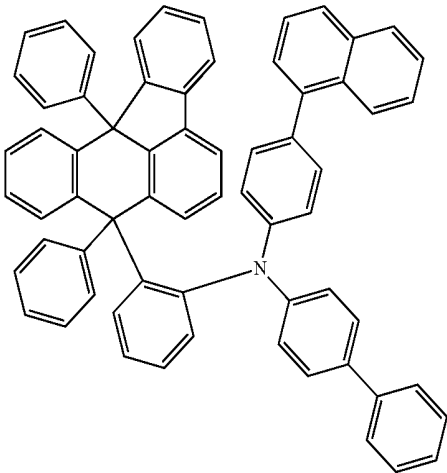
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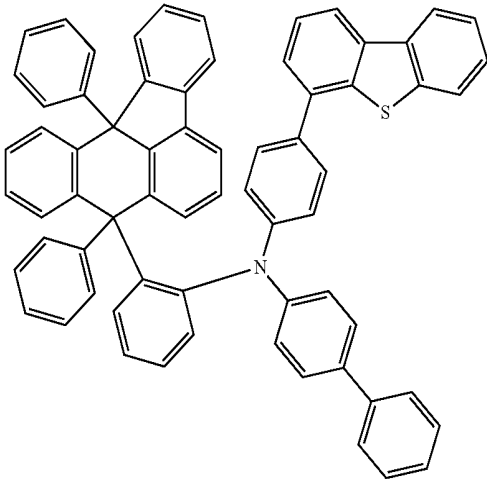
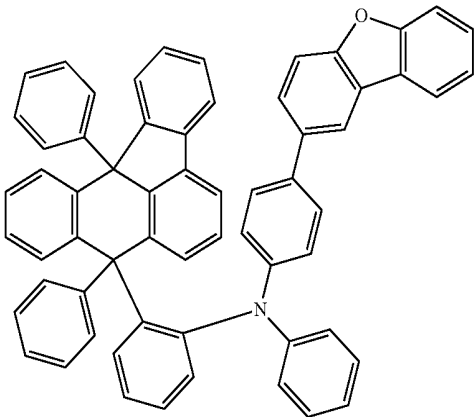
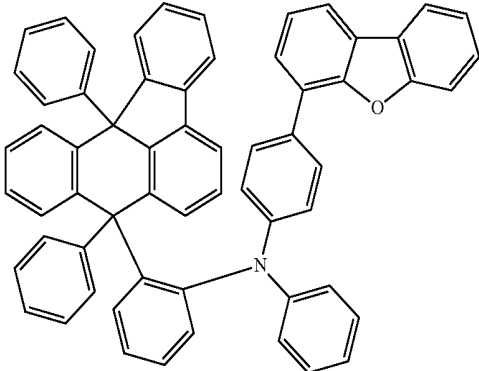
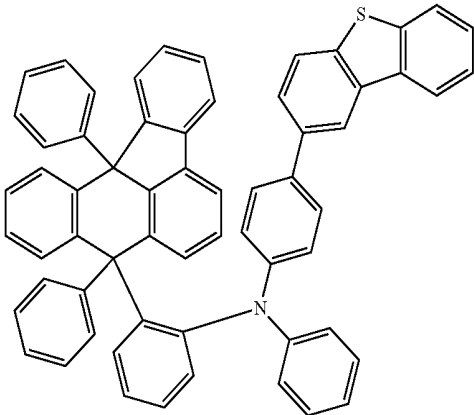
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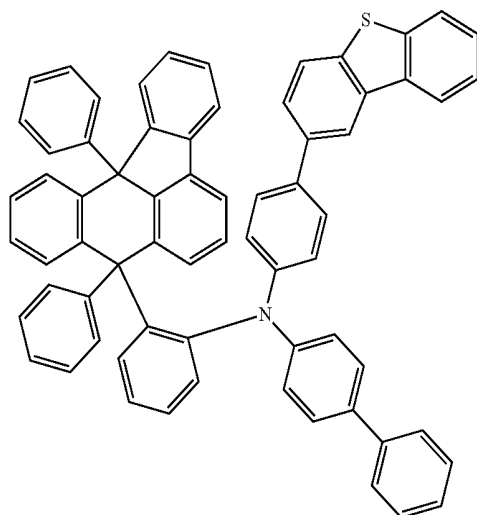
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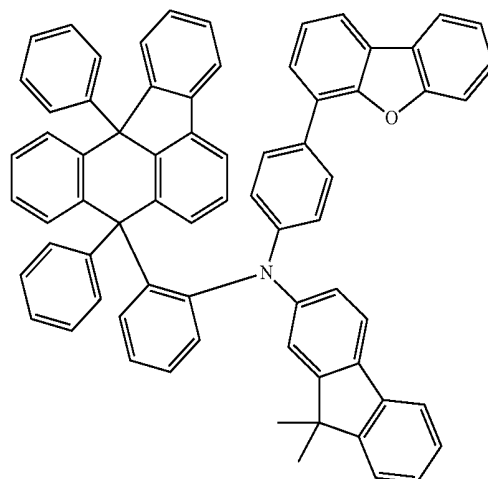
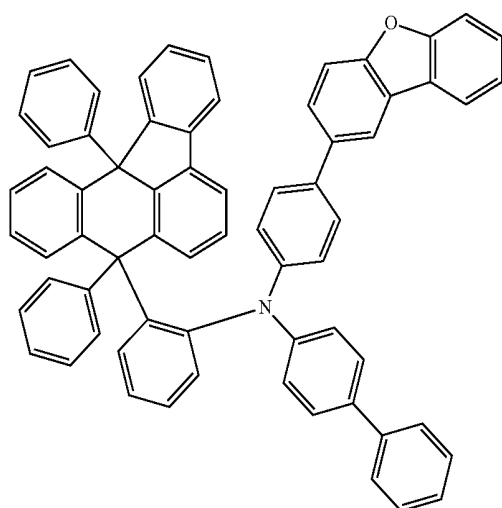
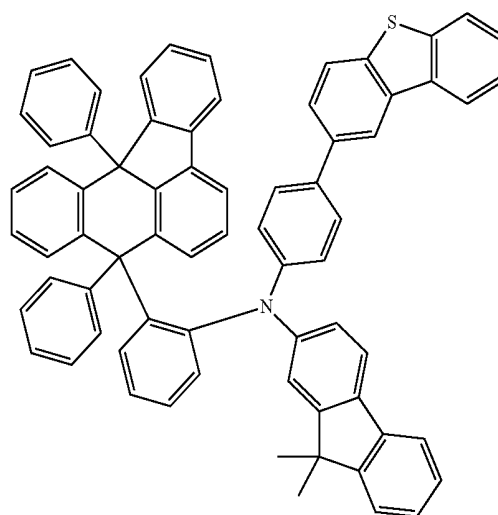
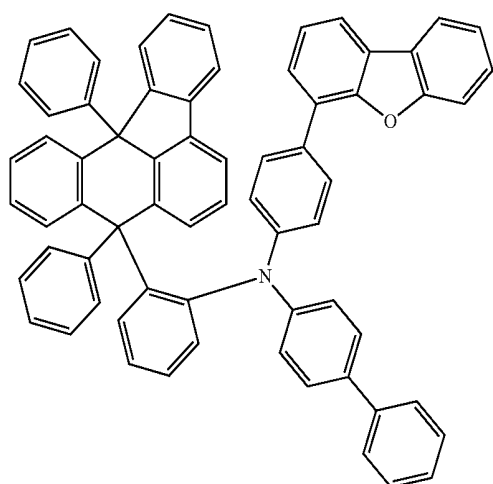
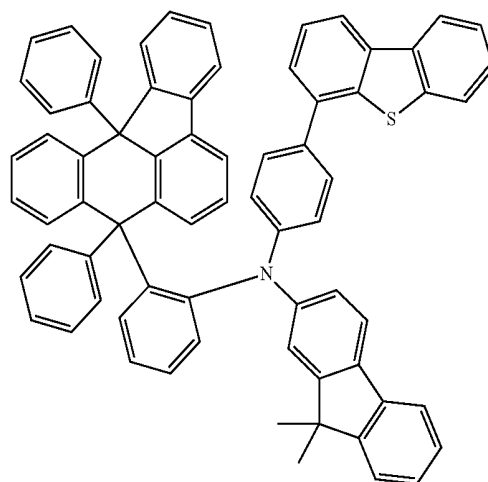
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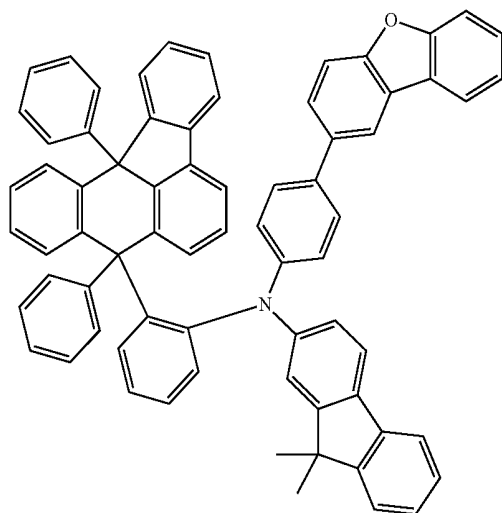
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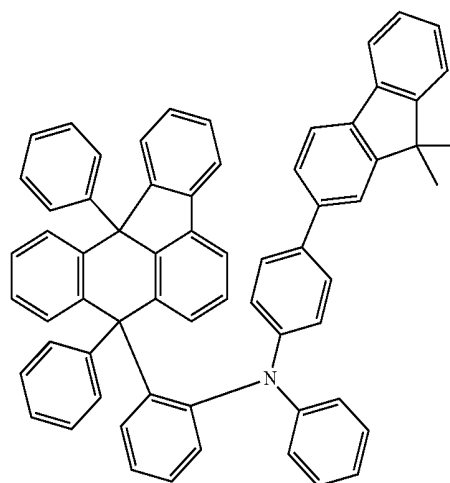
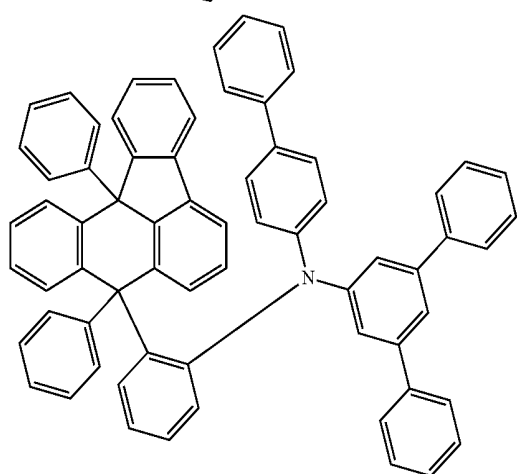
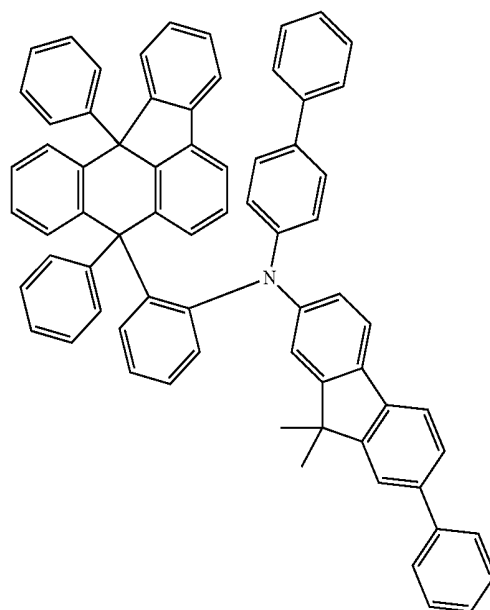
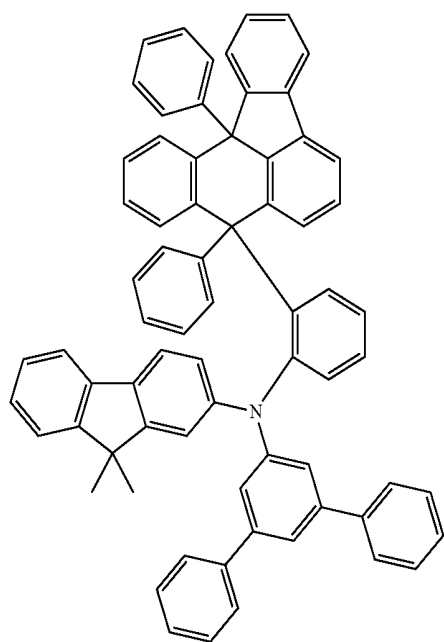
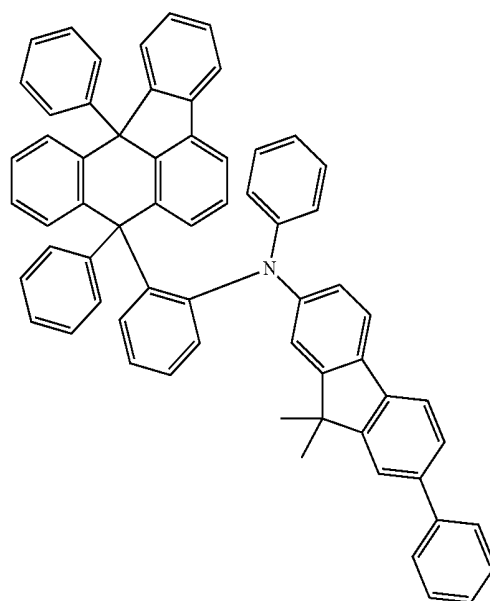
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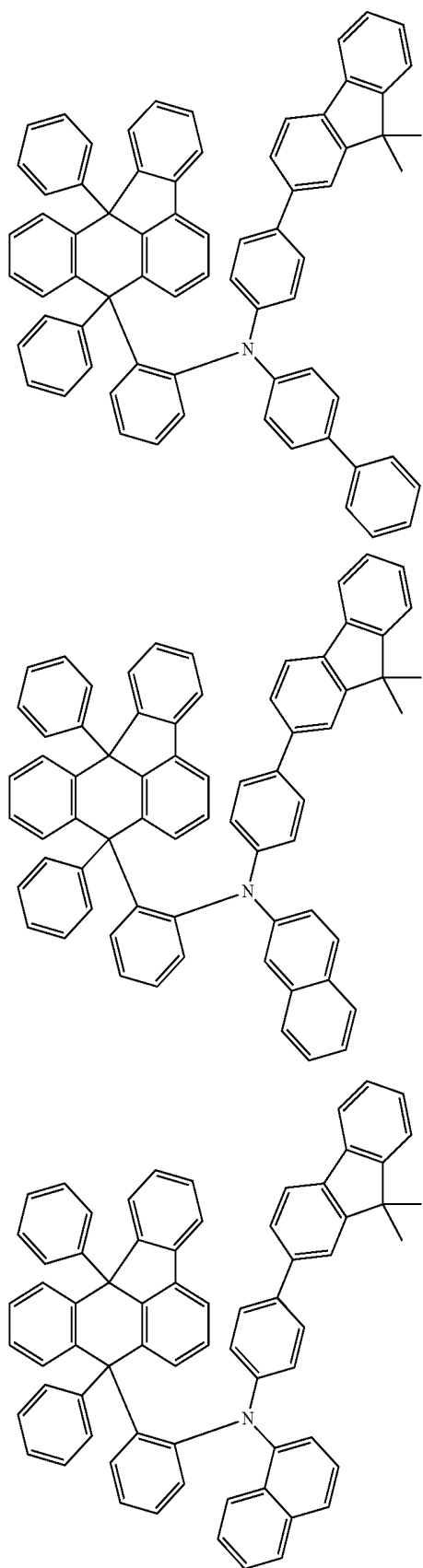
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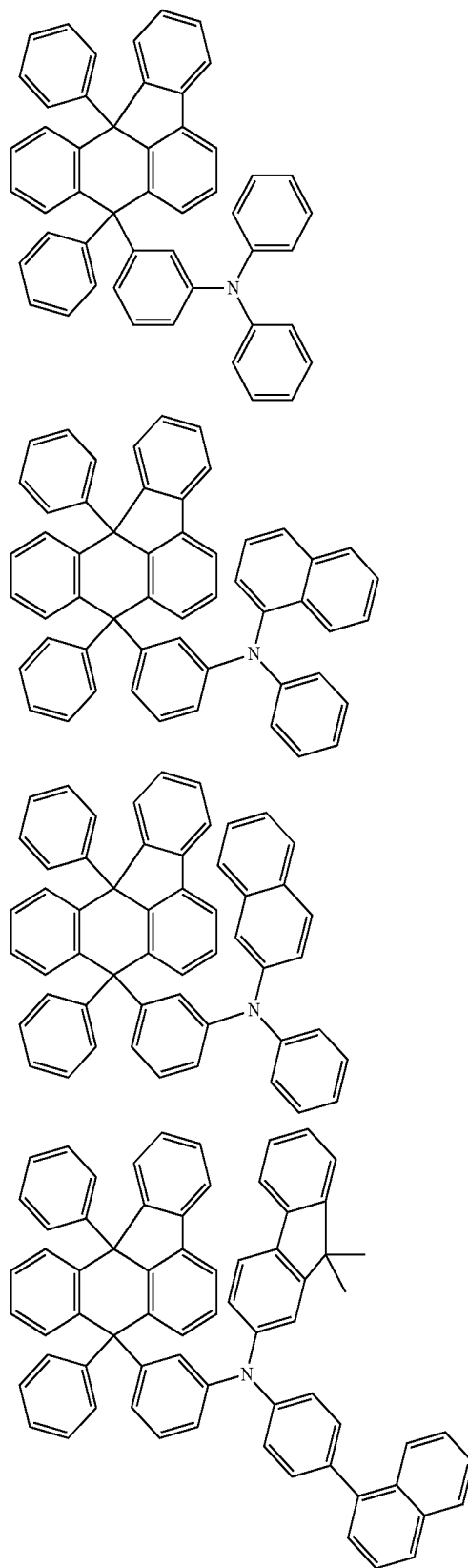
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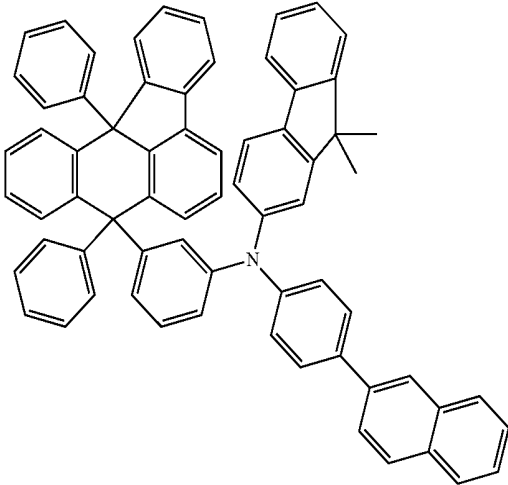
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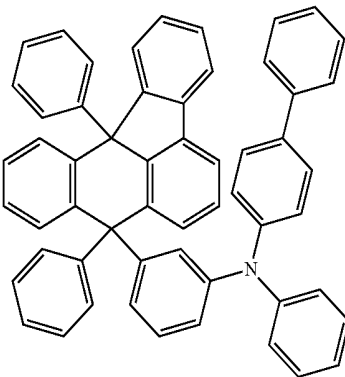
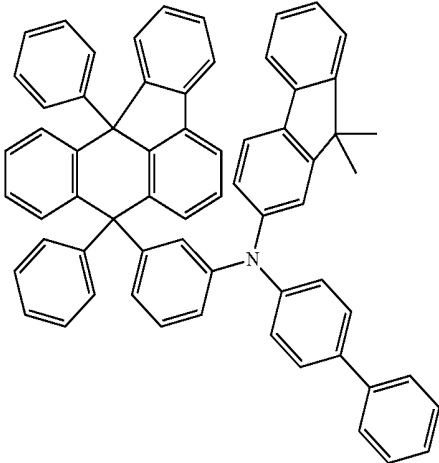
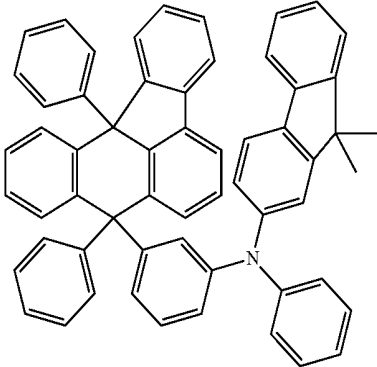
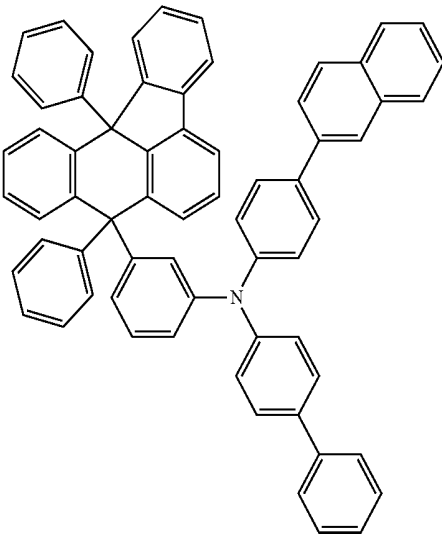
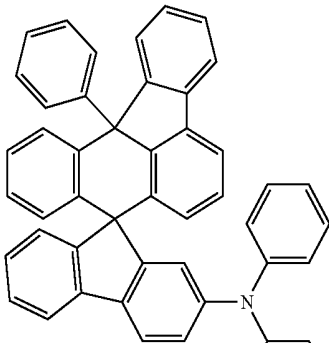
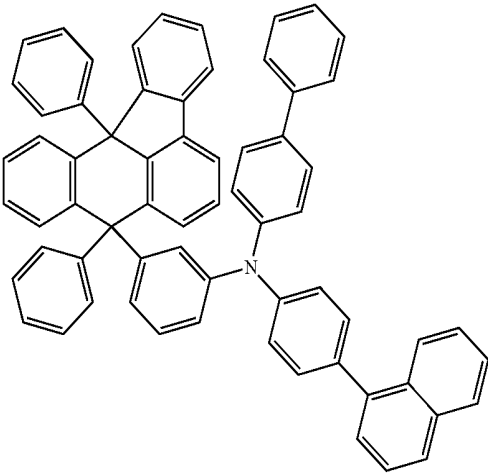
[0167] According to one embodiment of the present disclosure, the compound of Chemical Formula 1 may be any one selected from



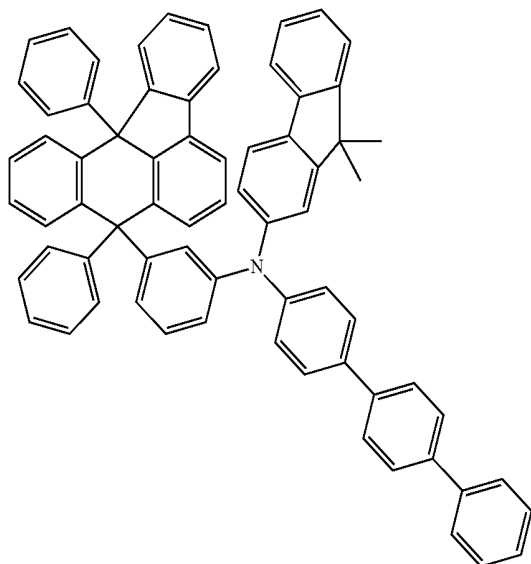
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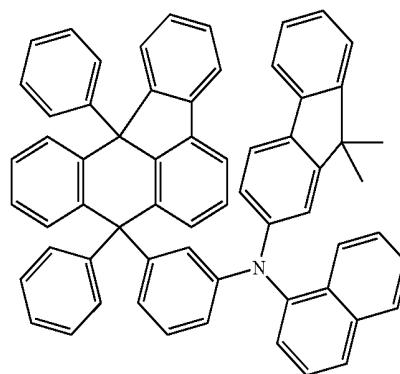
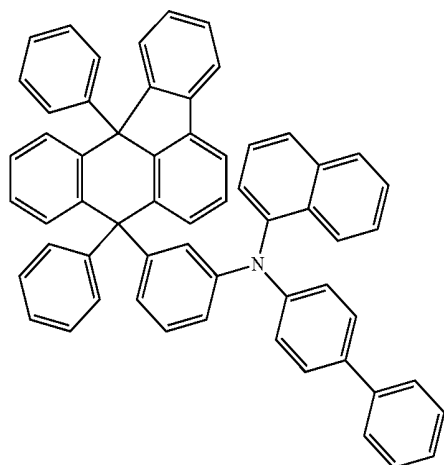
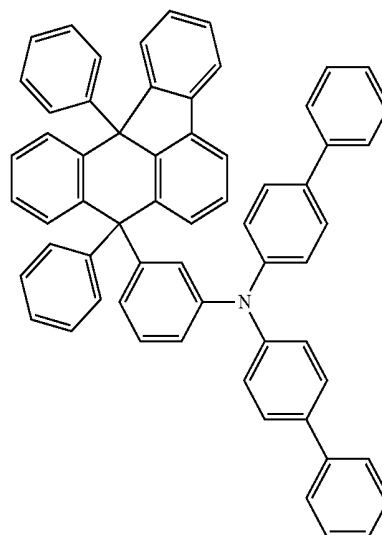
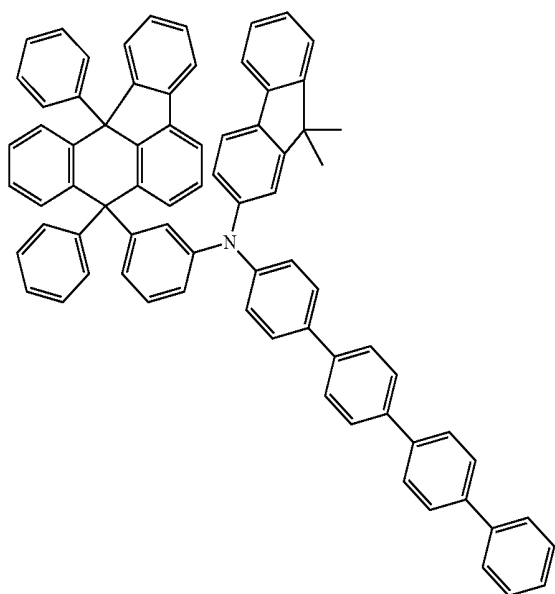
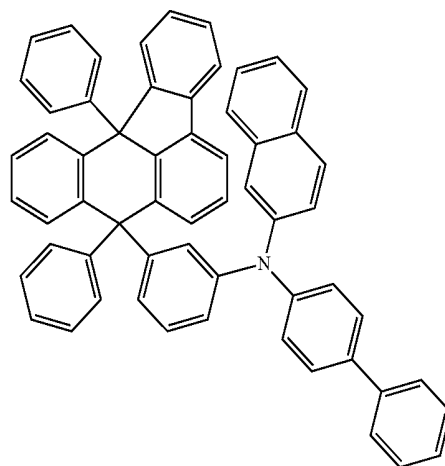
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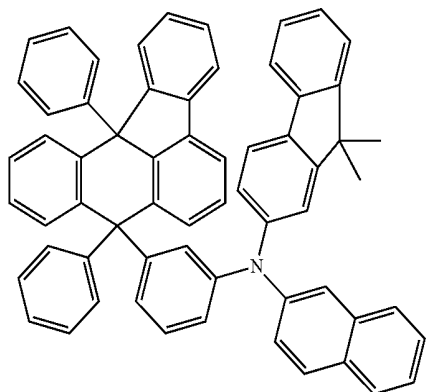
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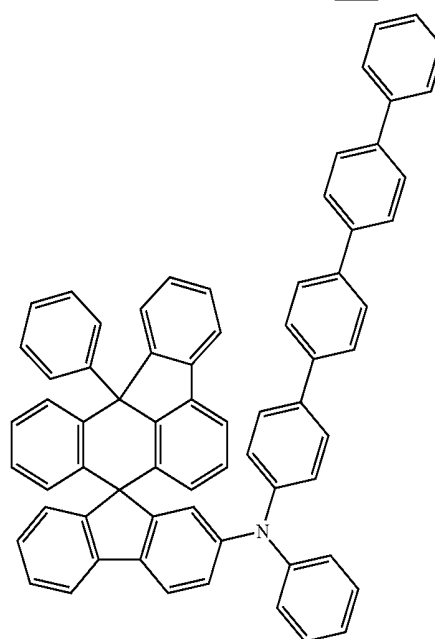
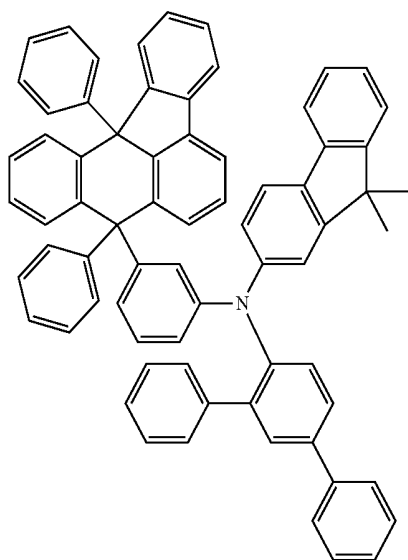
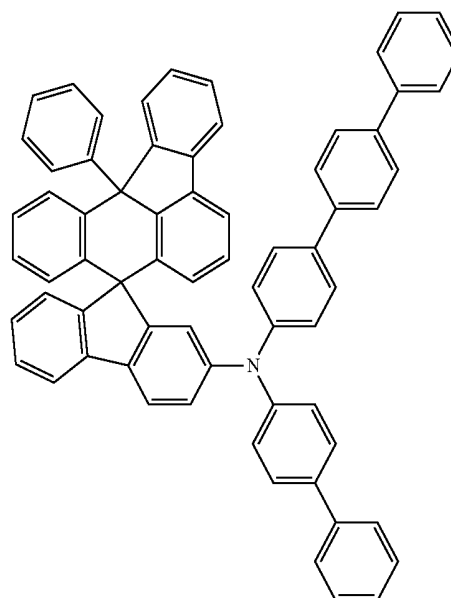
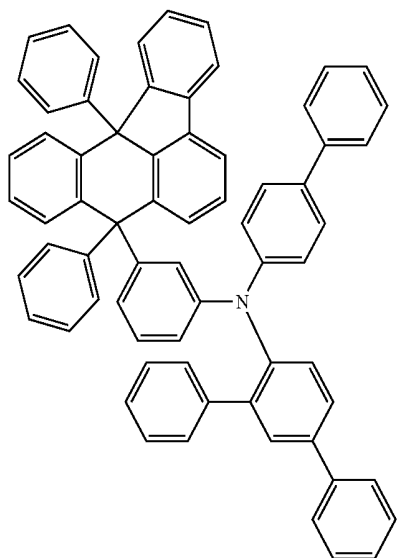
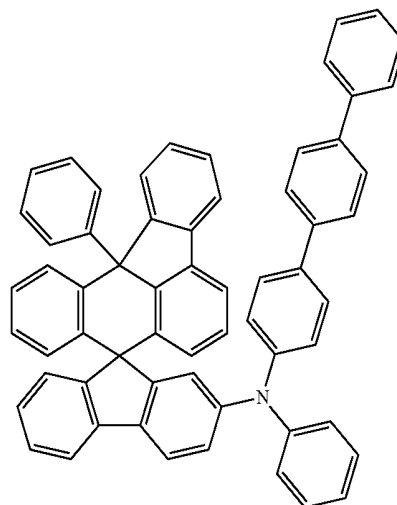
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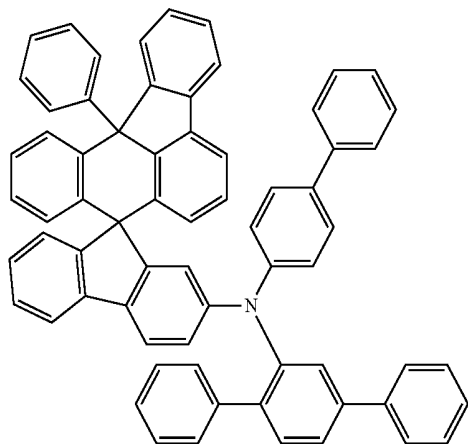
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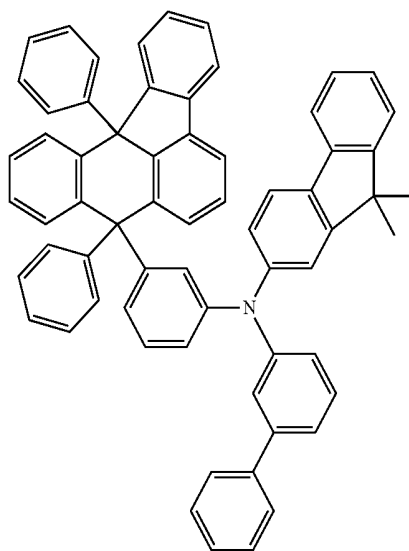
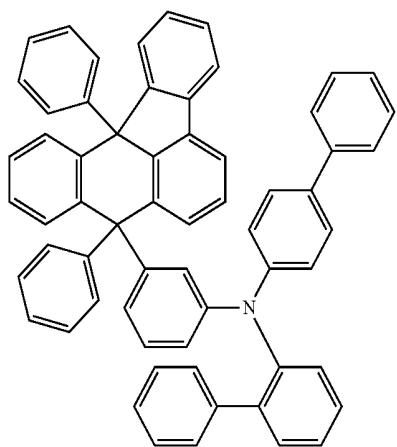
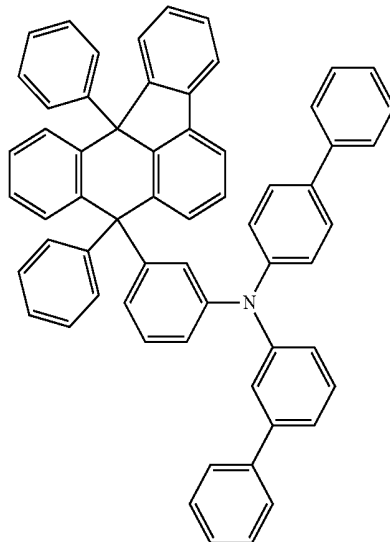
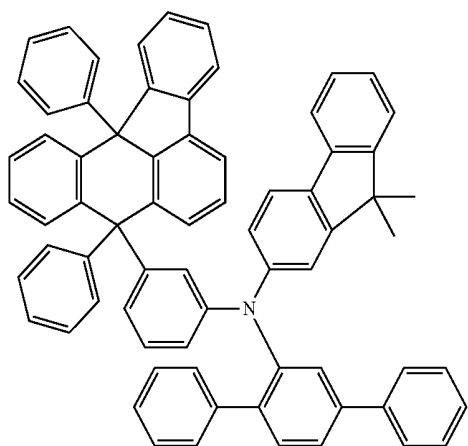
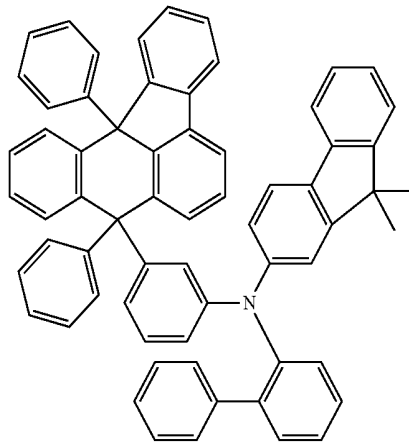
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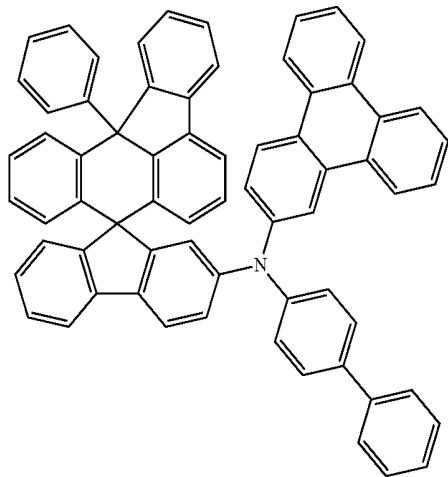
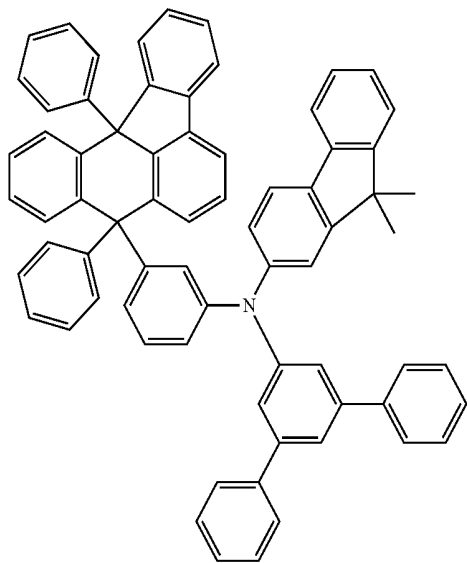
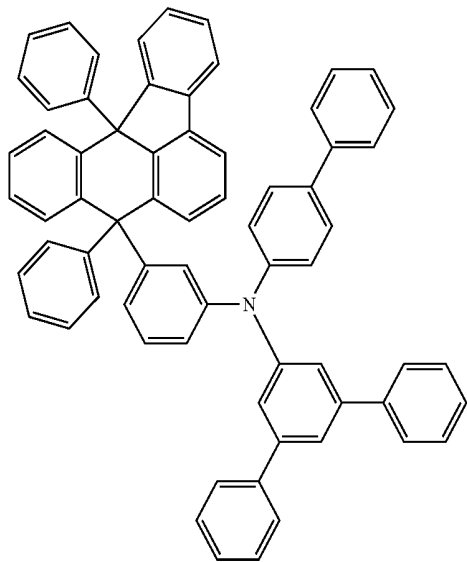
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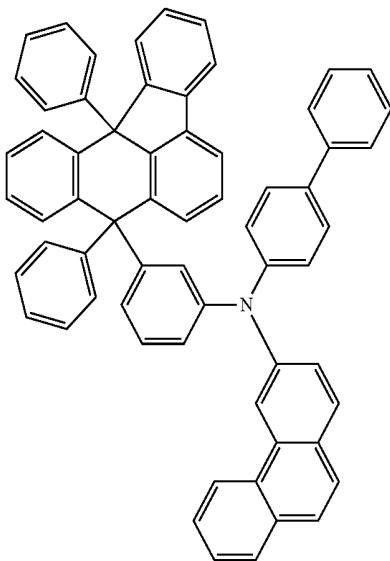
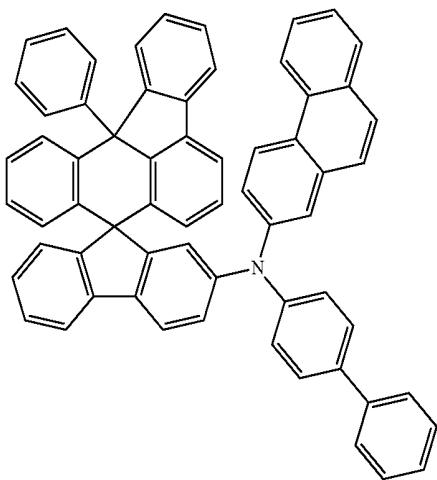
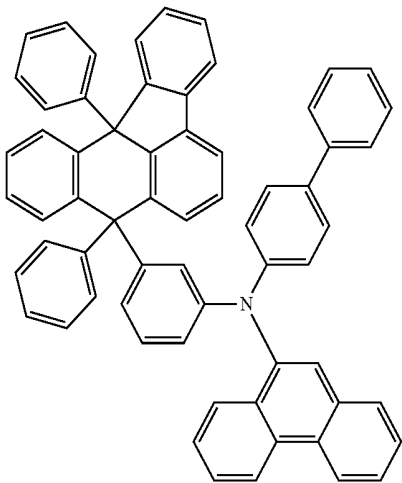
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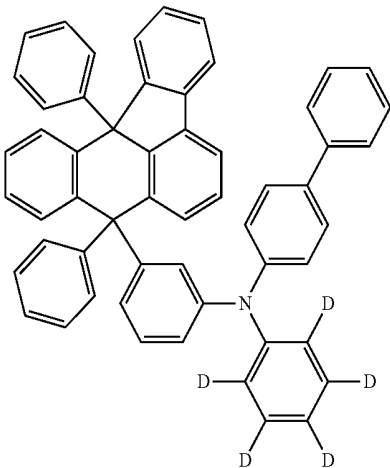
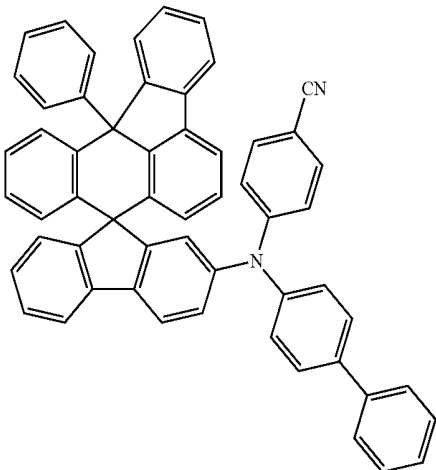
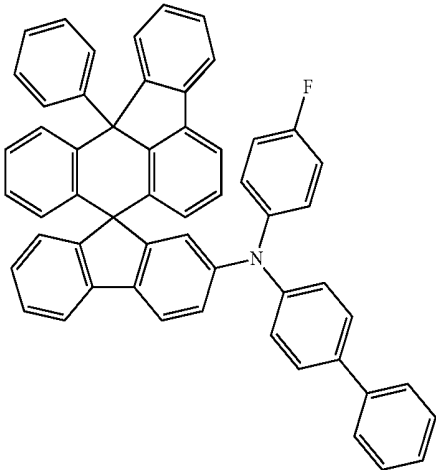
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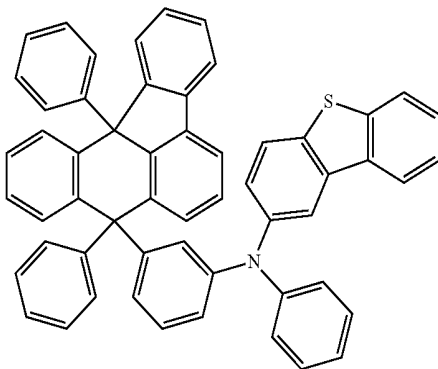
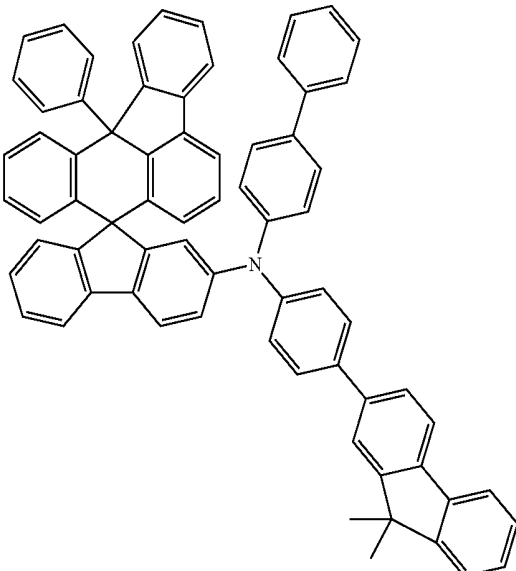
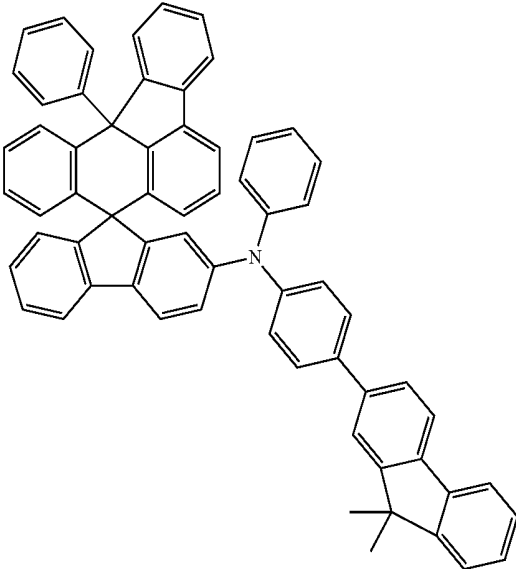
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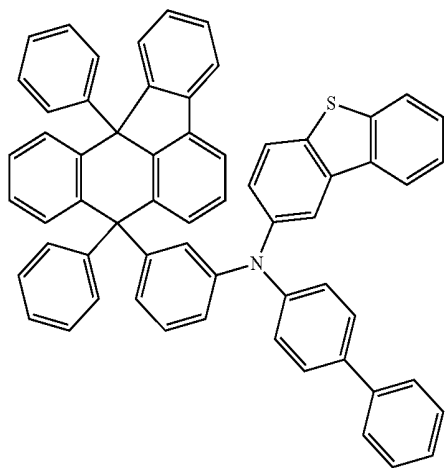
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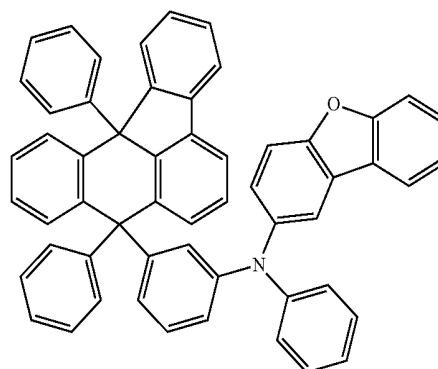
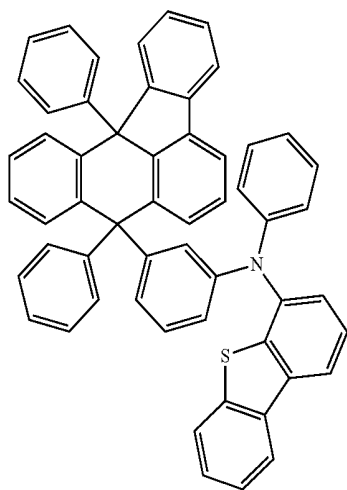
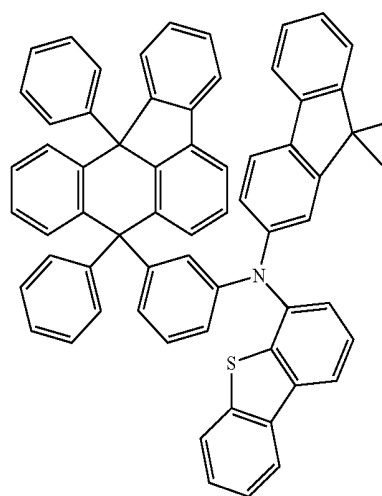
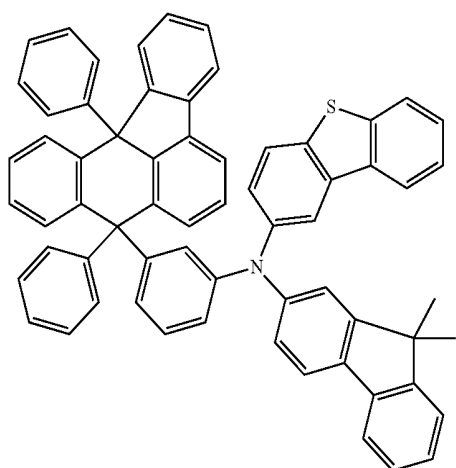
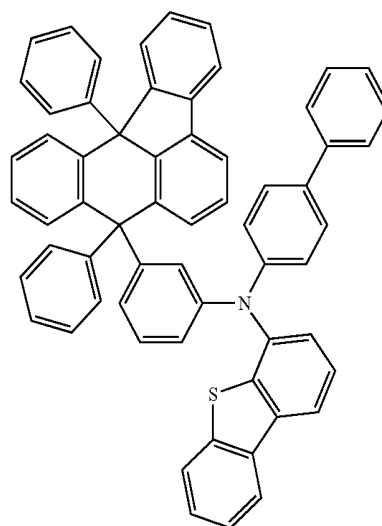
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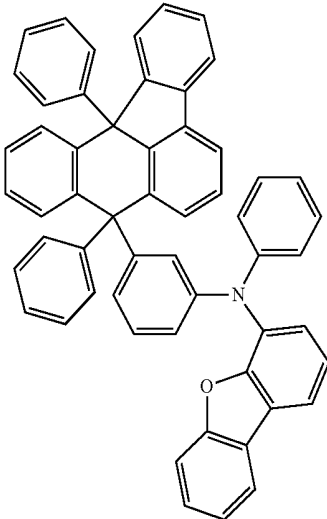
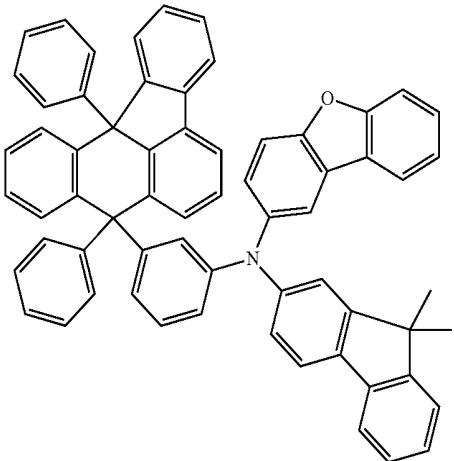
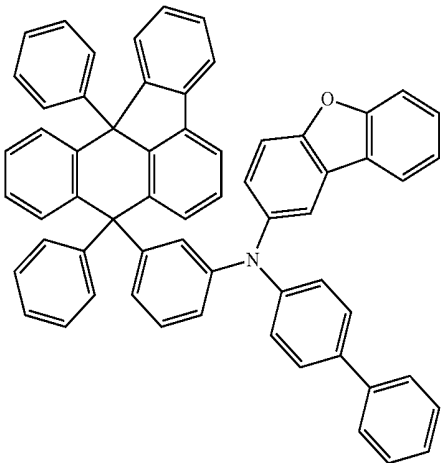
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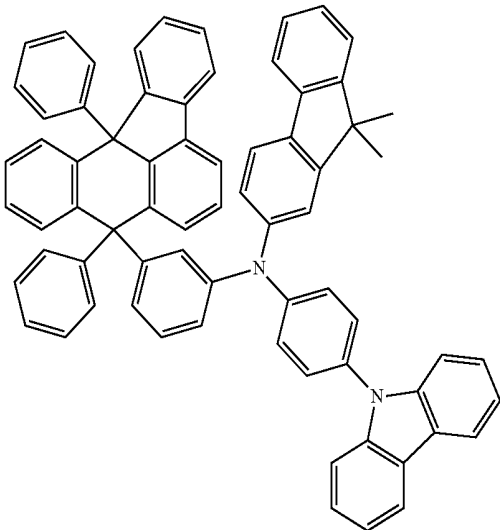
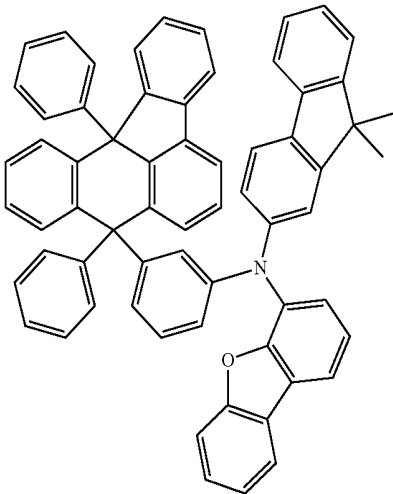
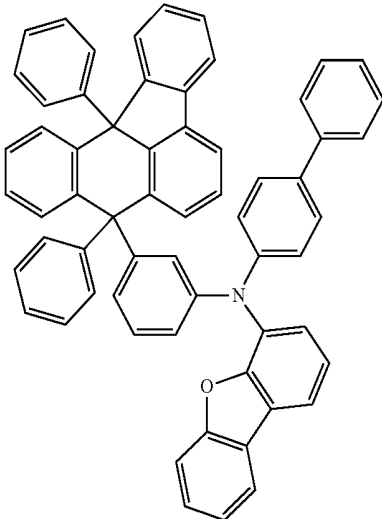
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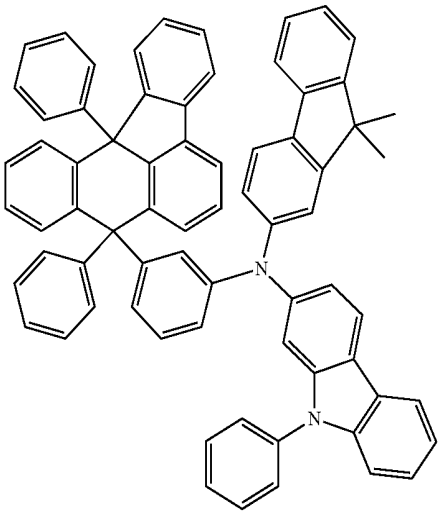
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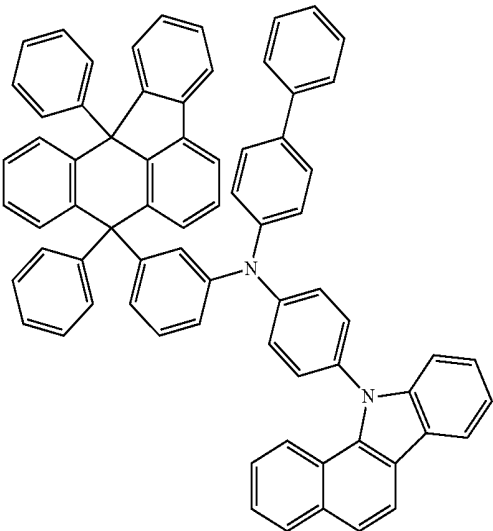
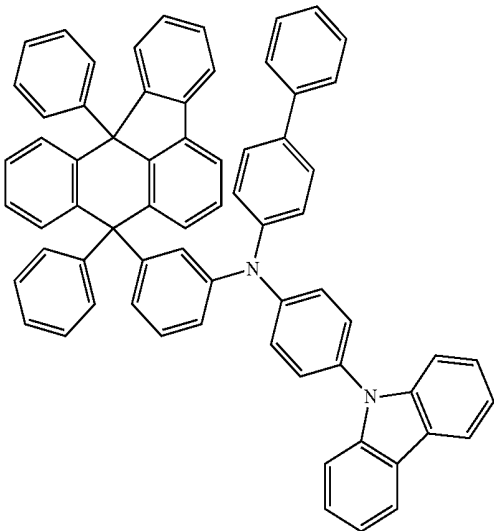
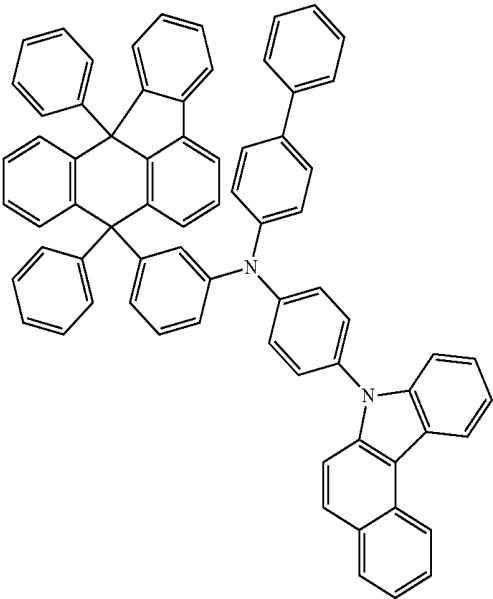
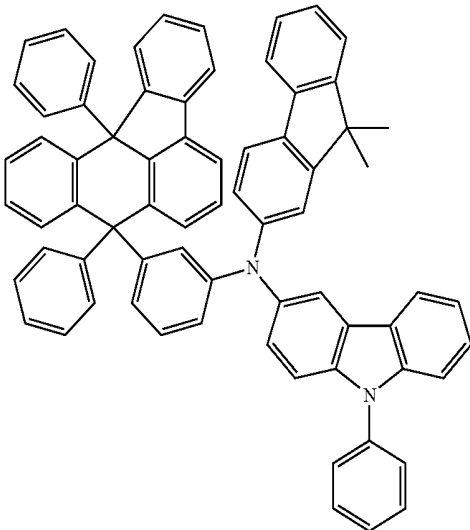
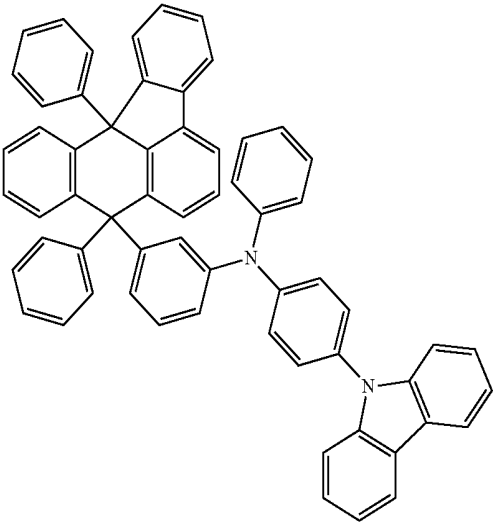
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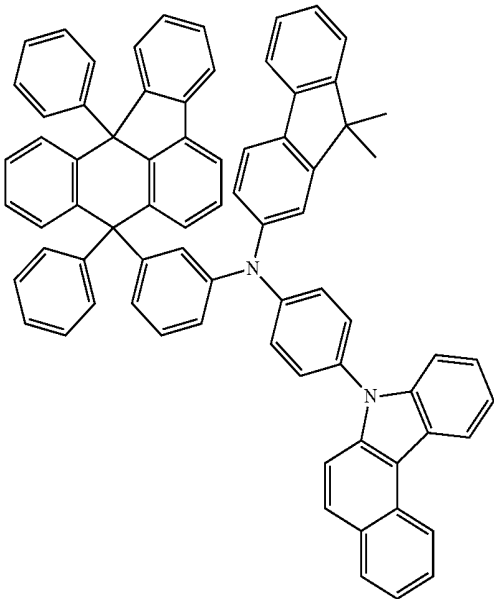
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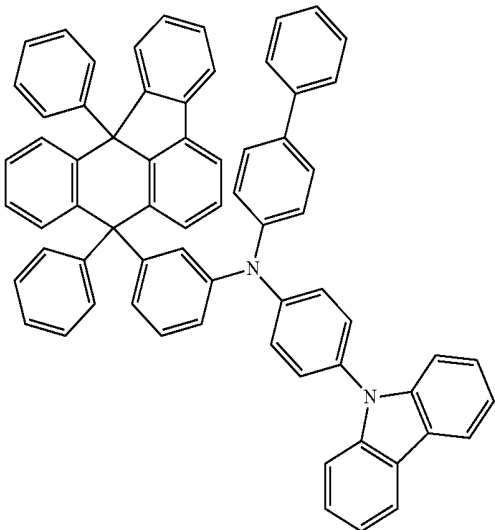
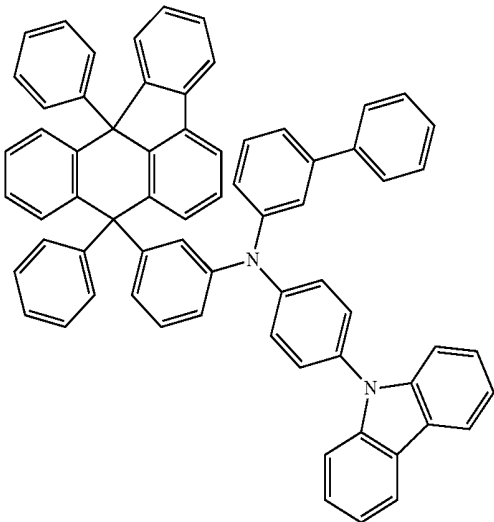
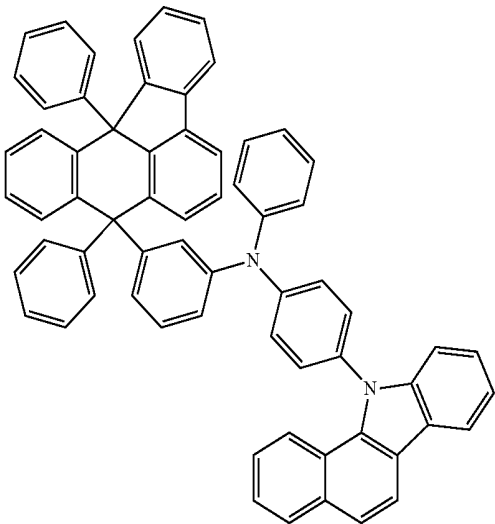
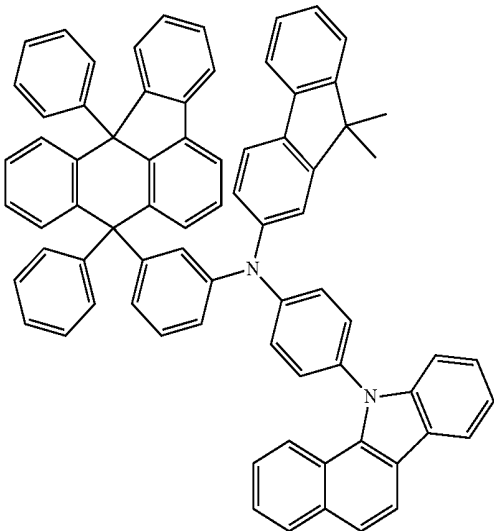
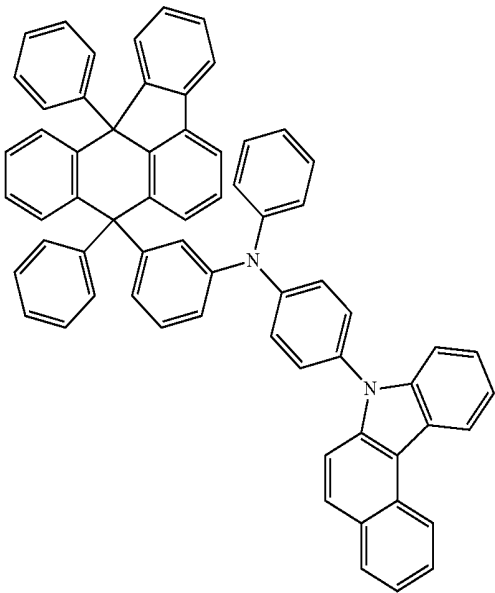
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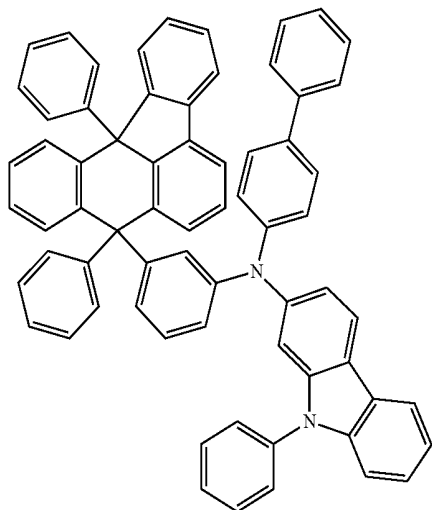
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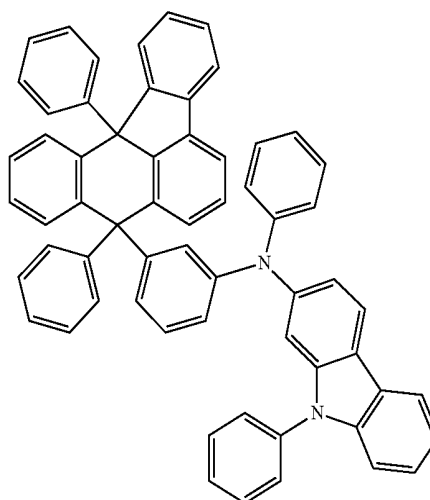
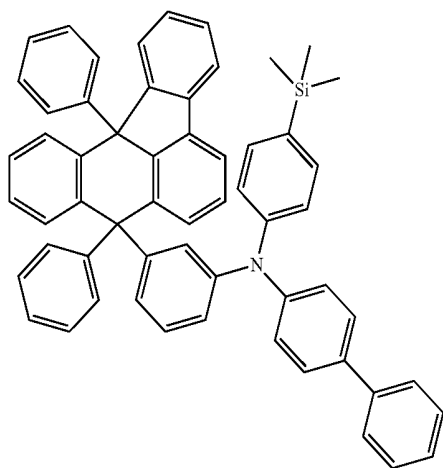
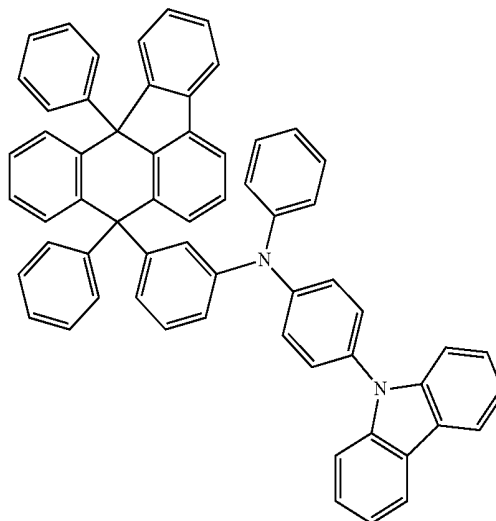
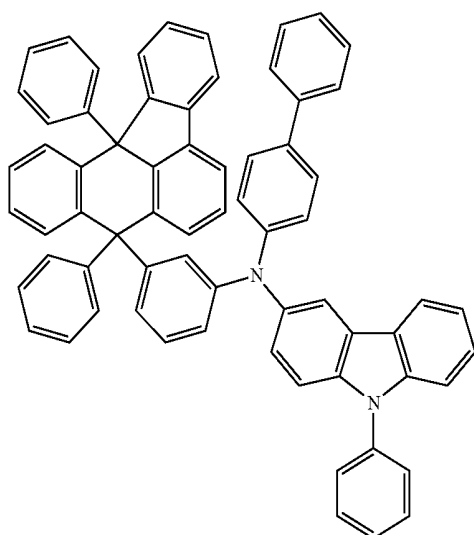
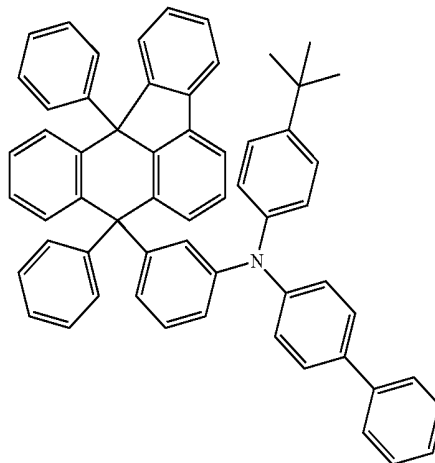
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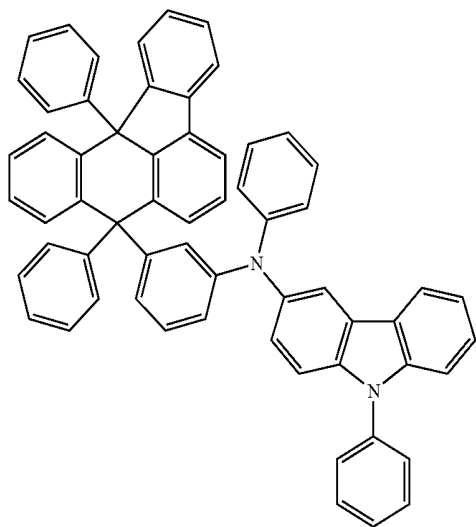
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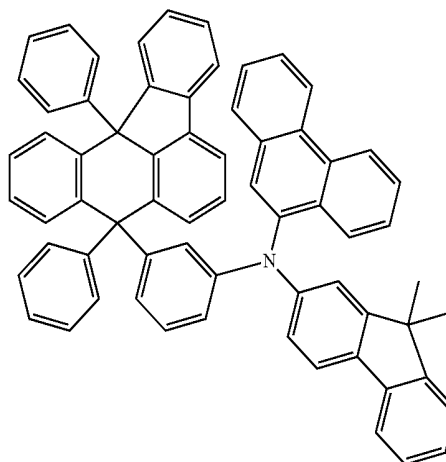
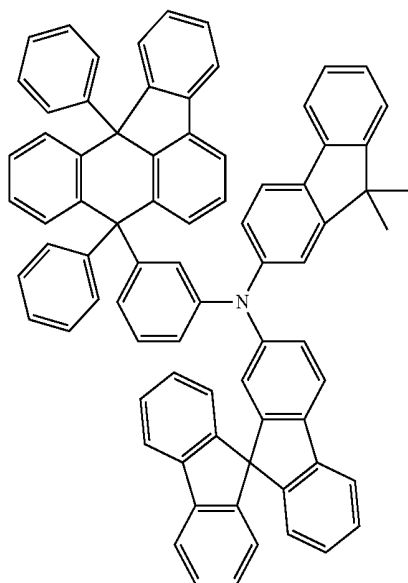
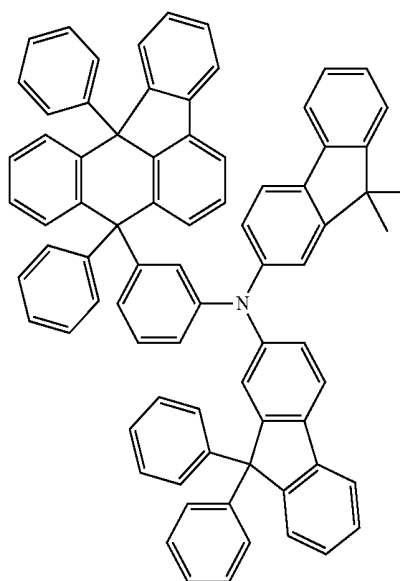
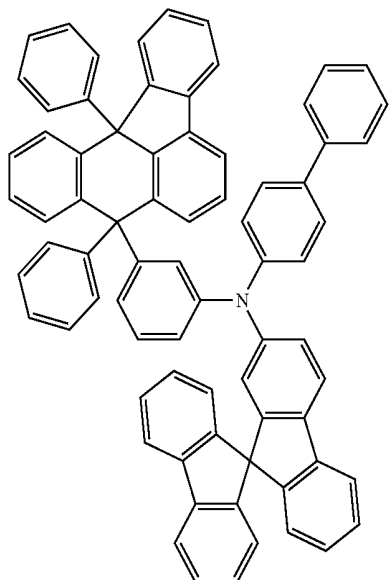
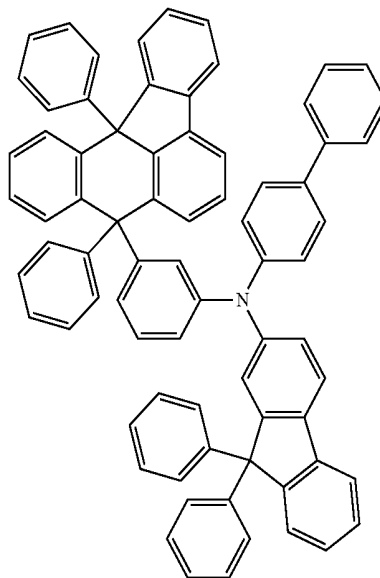
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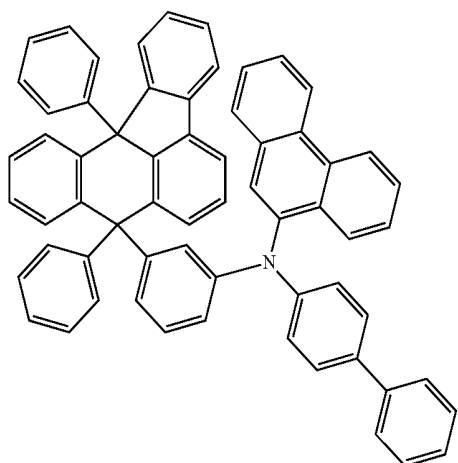
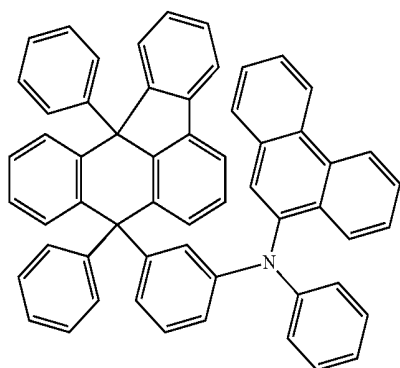
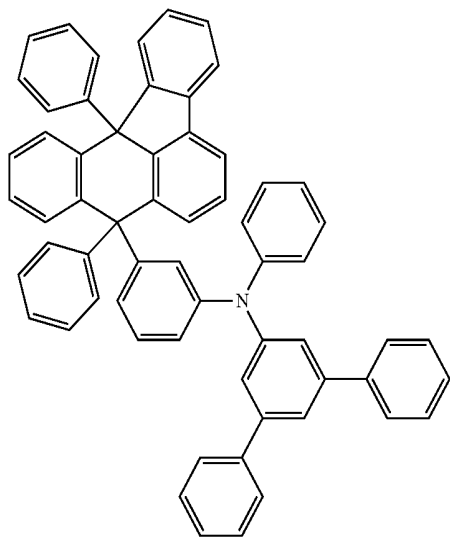
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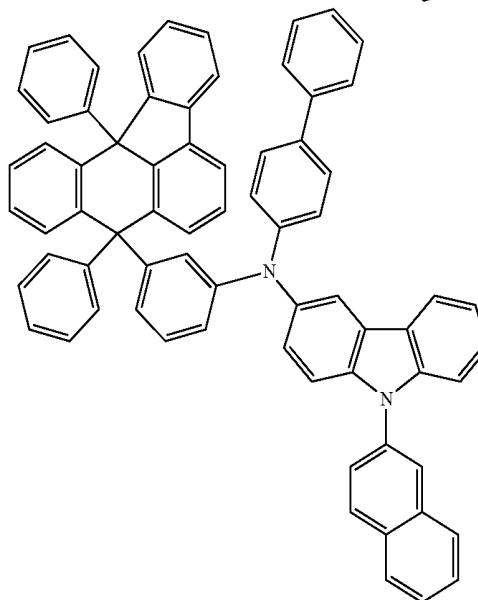
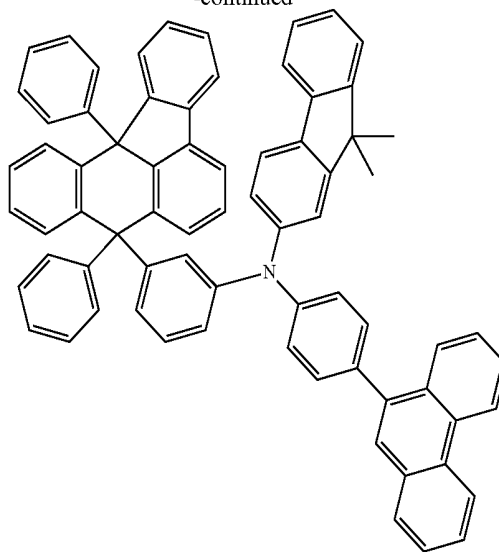
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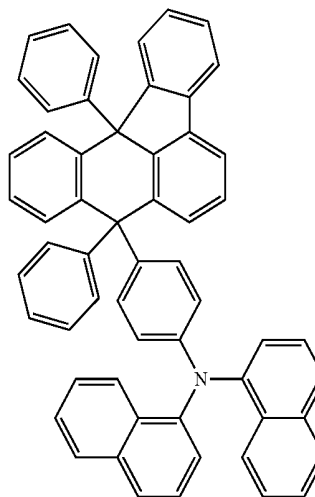
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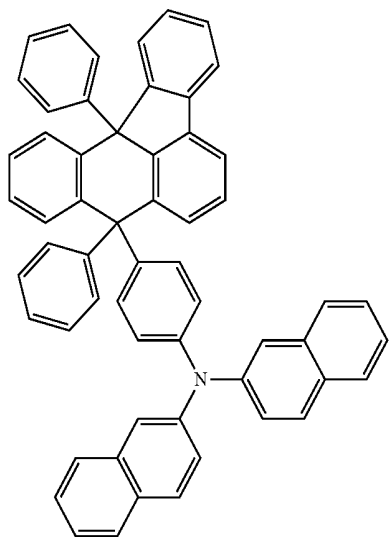
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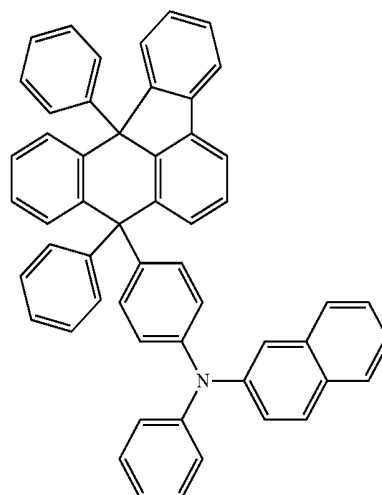
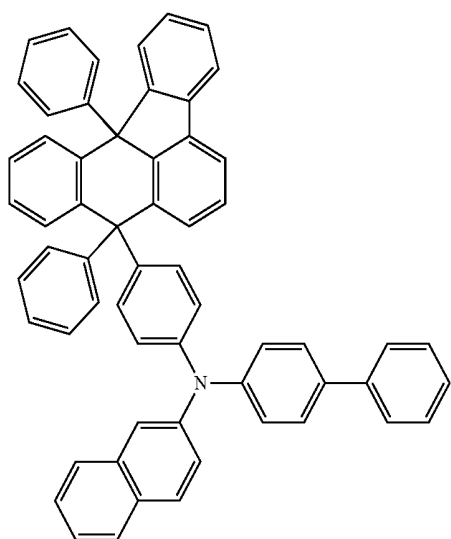
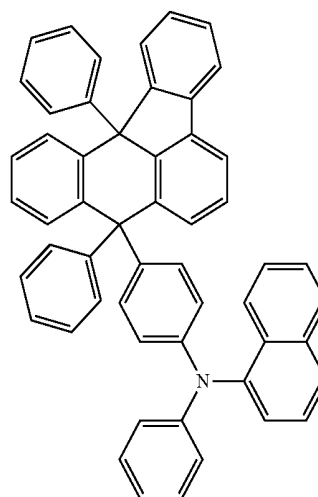
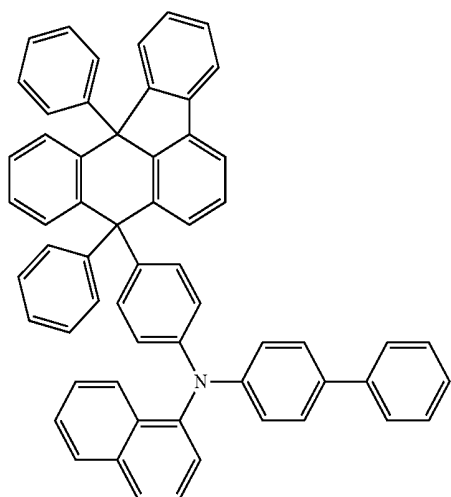
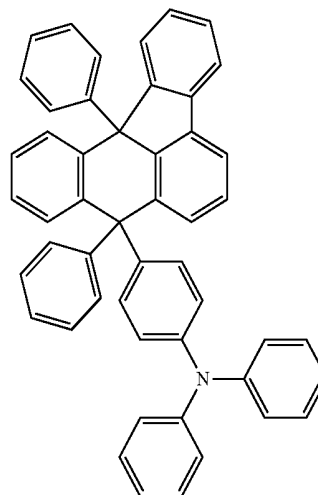
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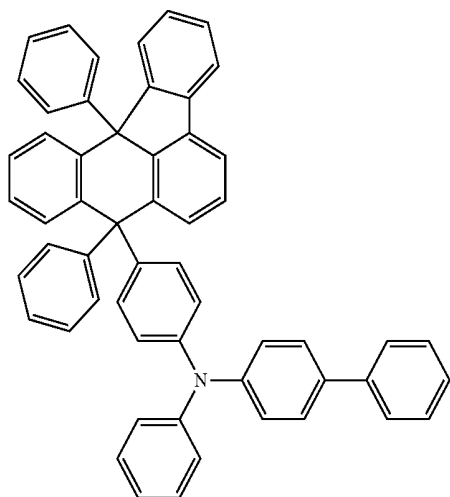
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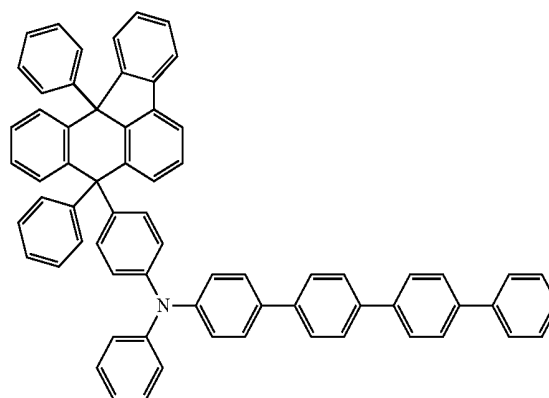
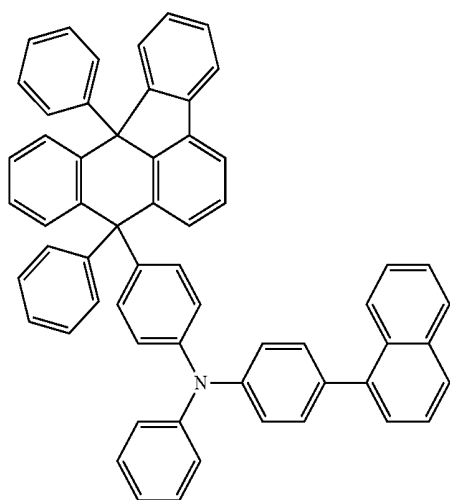
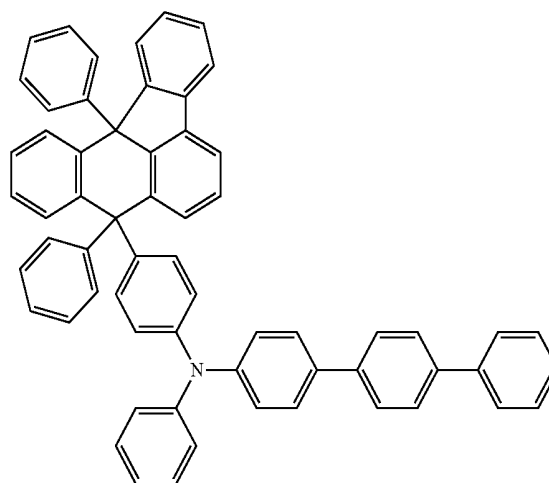
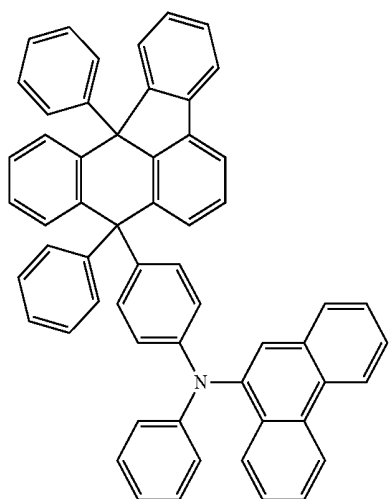
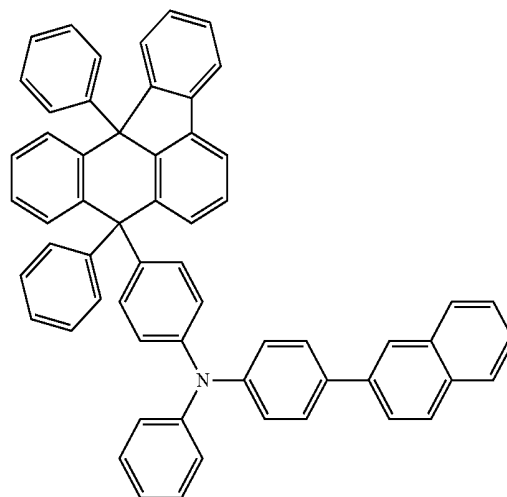
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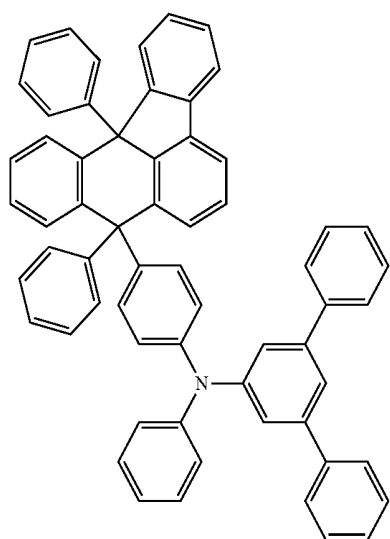
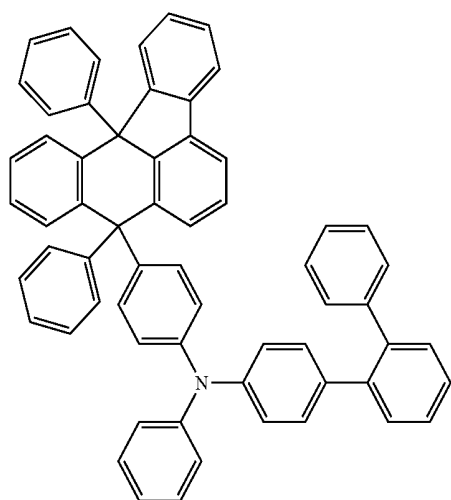
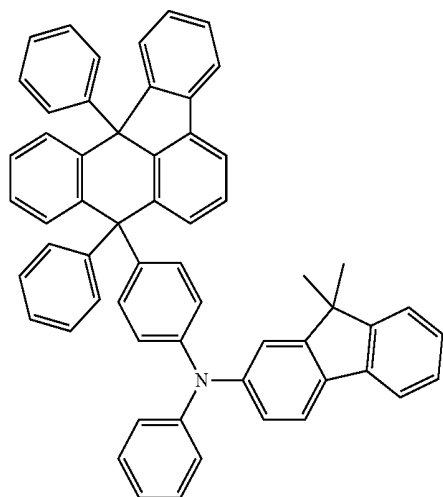
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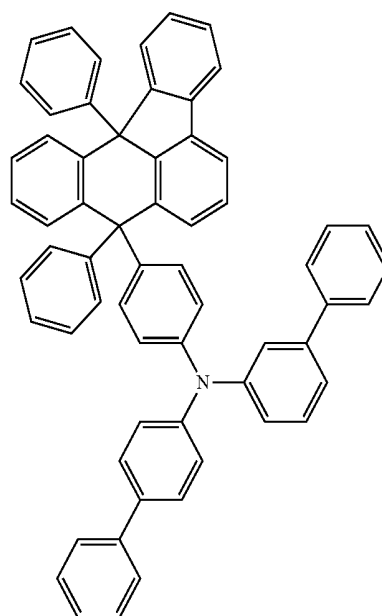
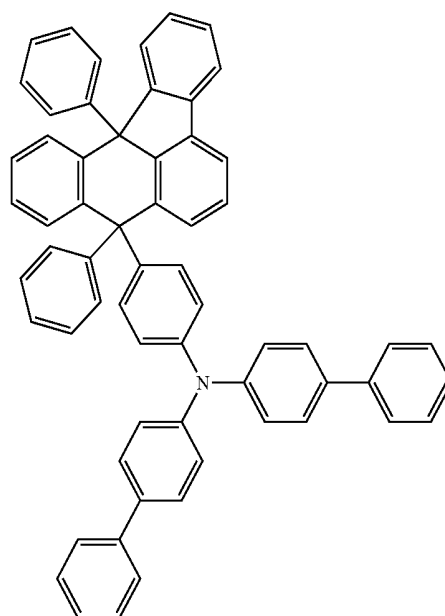
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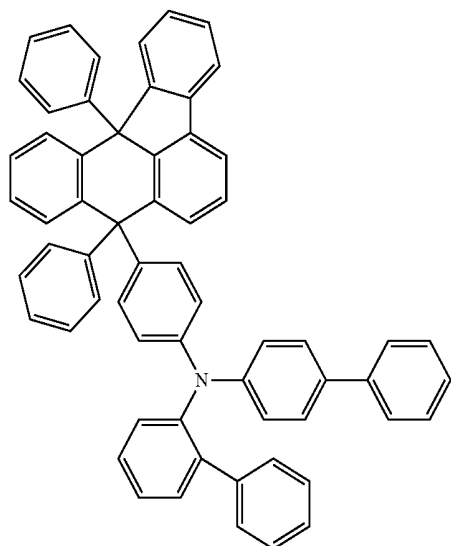
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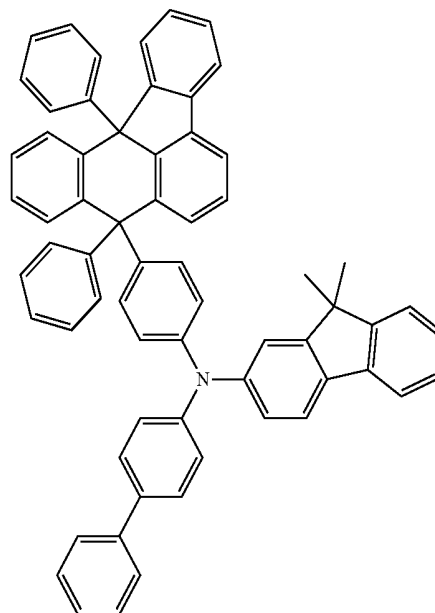
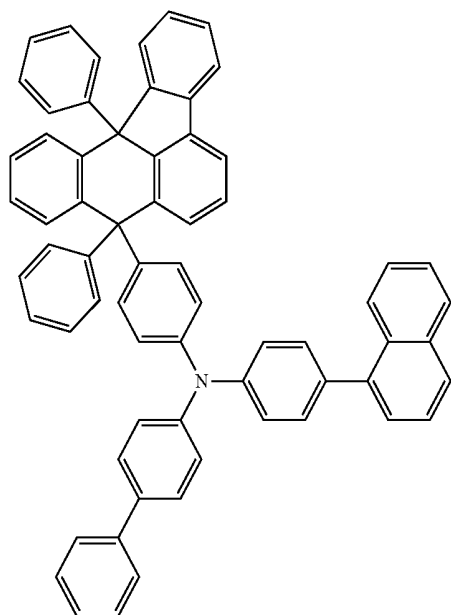
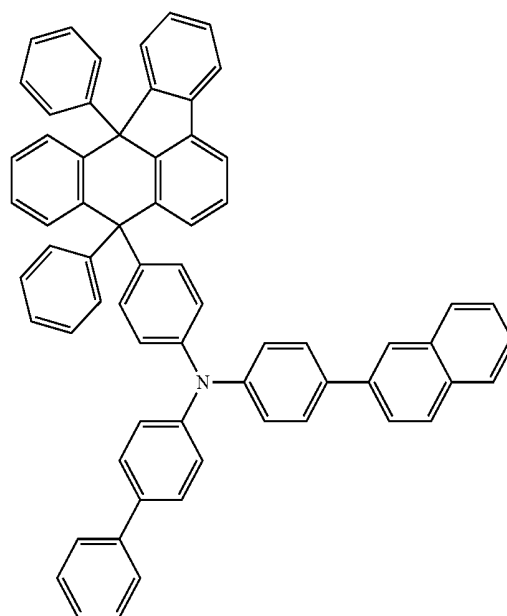
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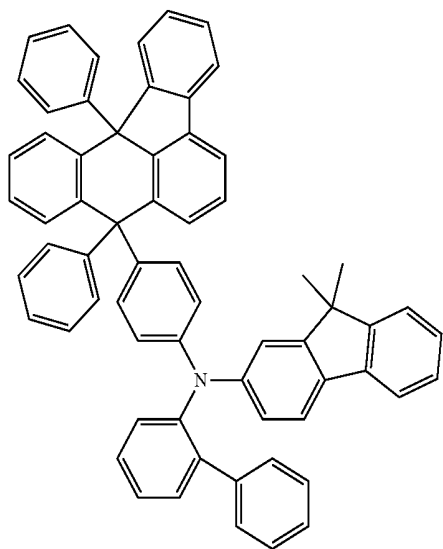
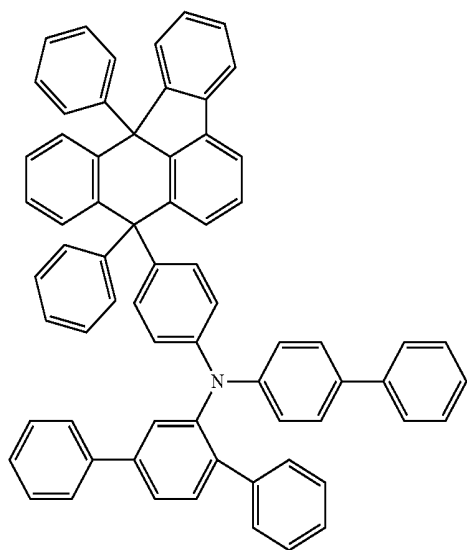
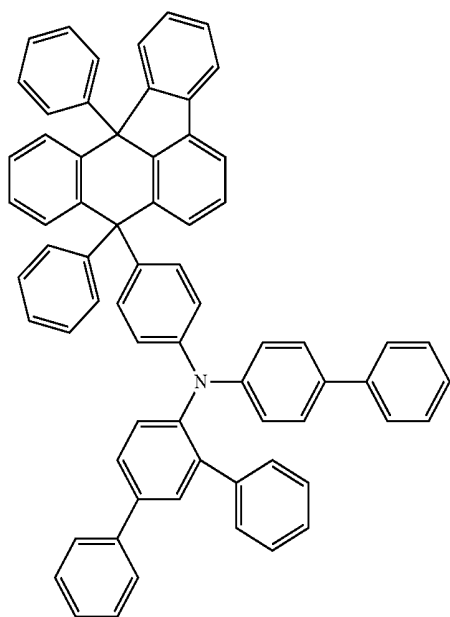
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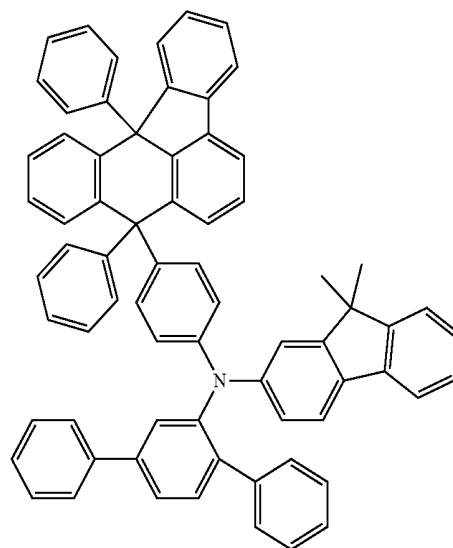
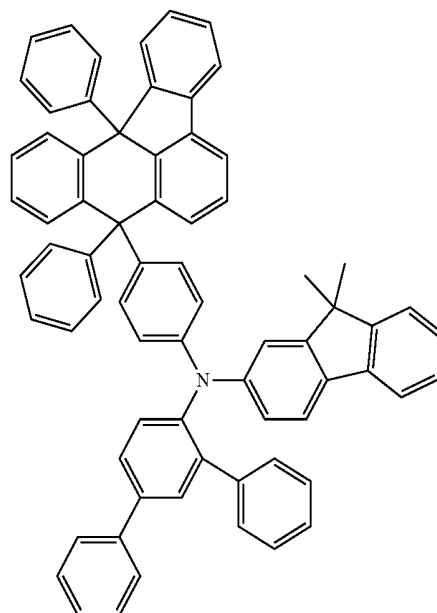
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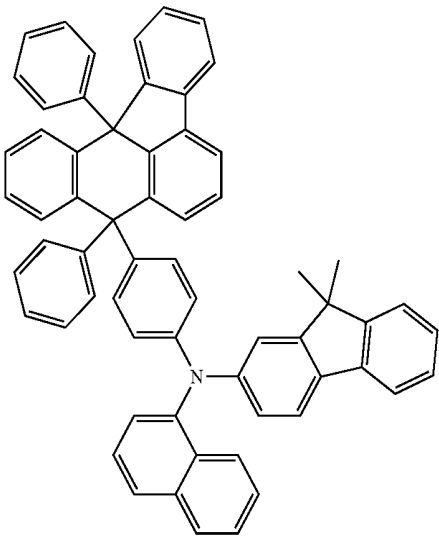
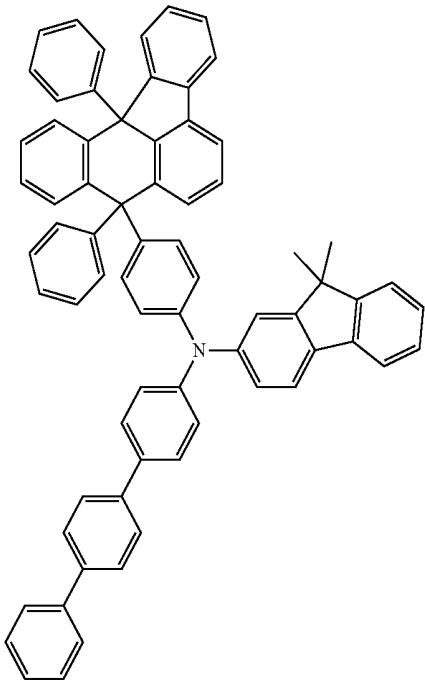
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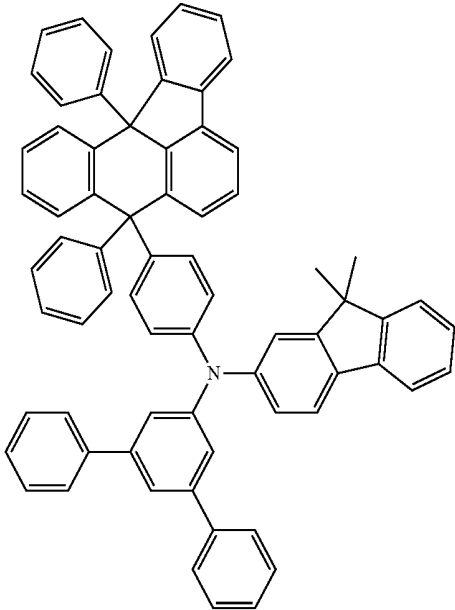
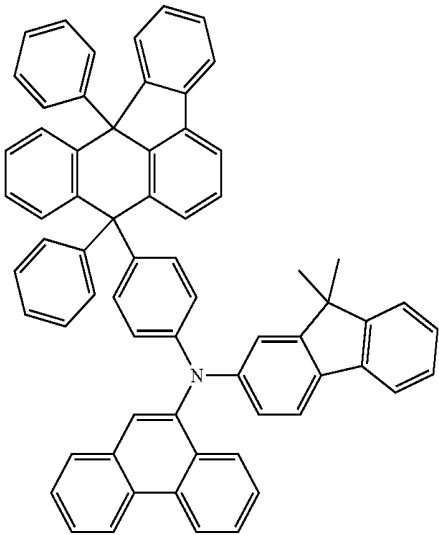
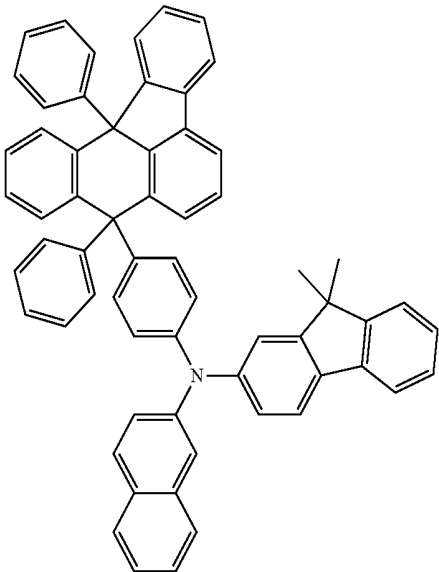
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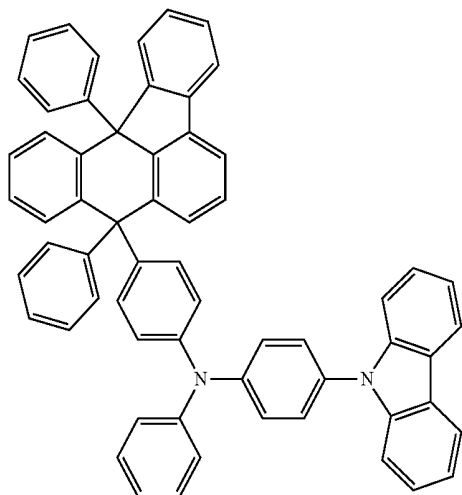
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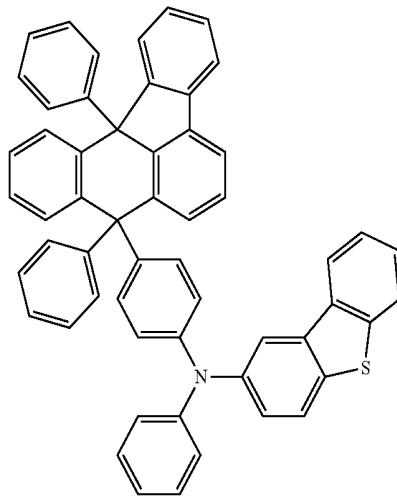
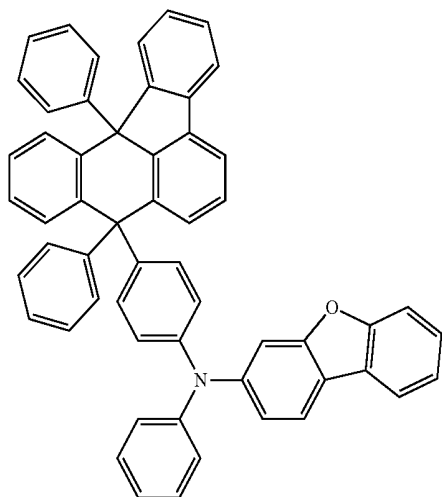
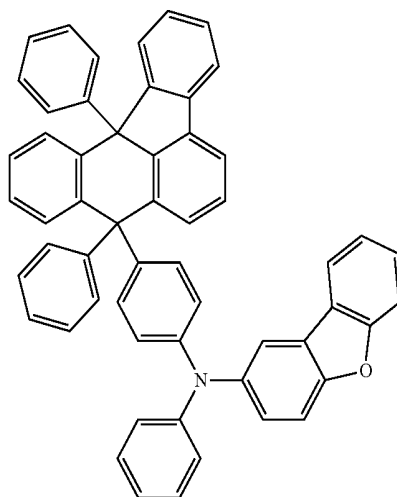
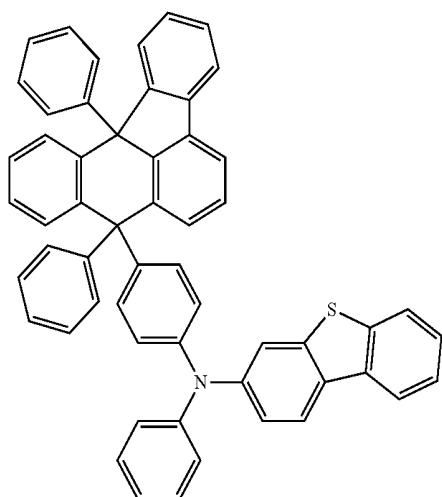
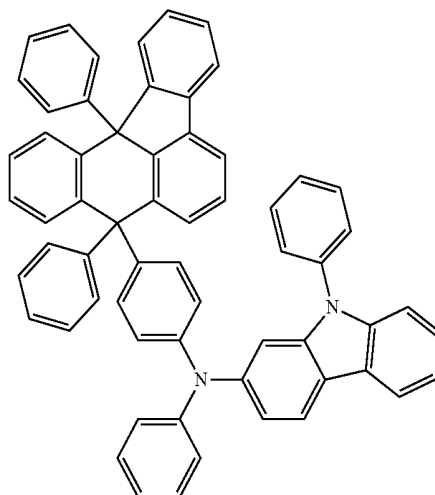
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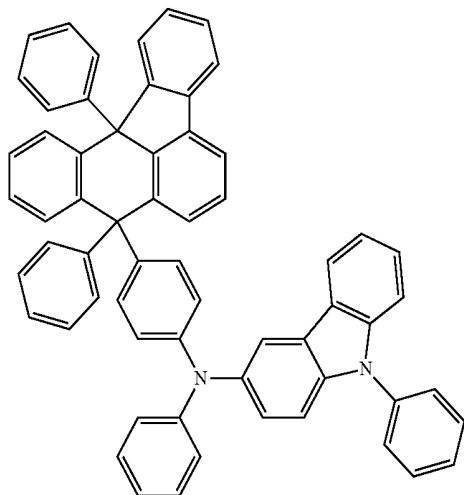
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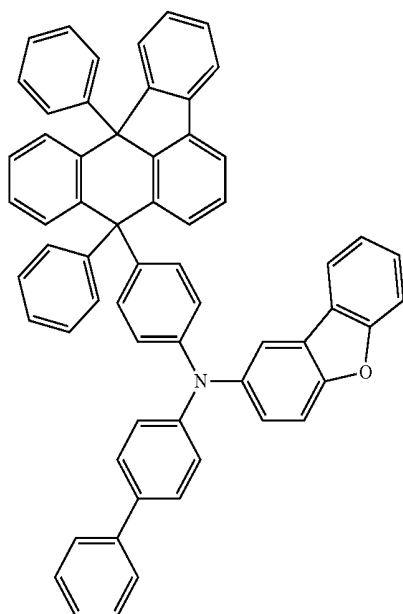
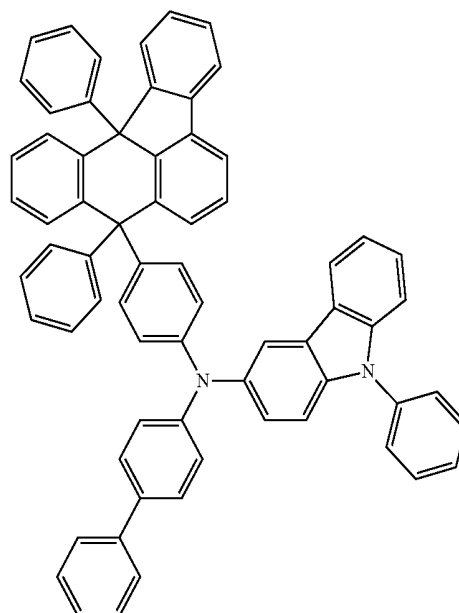
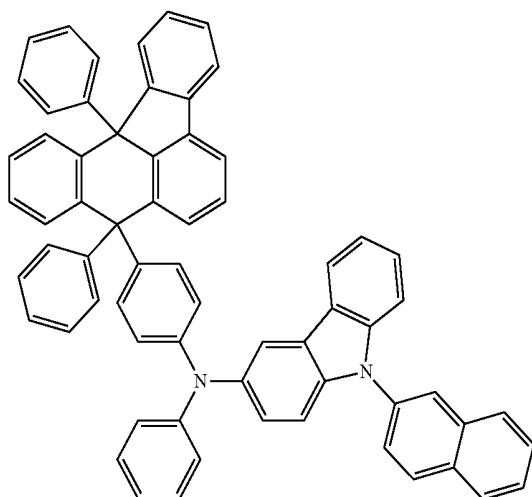
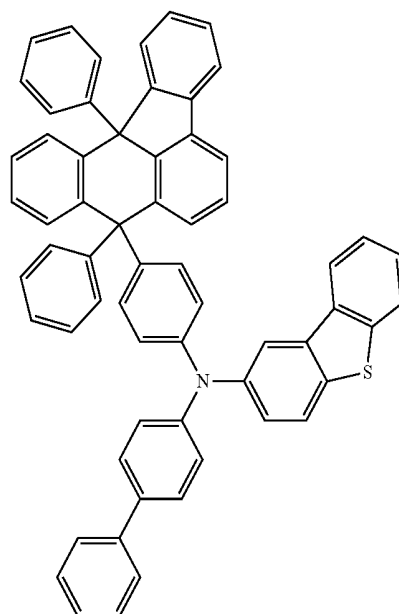
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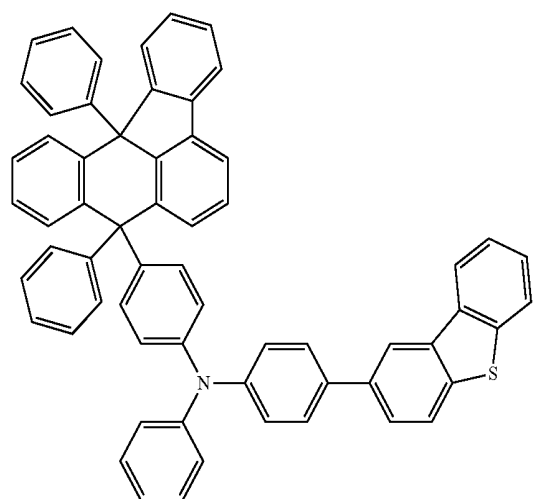
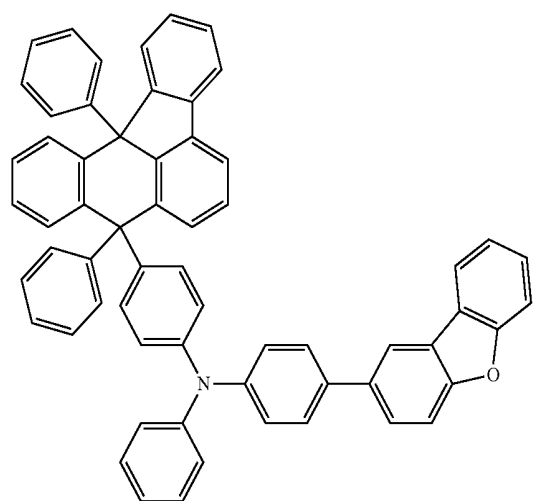
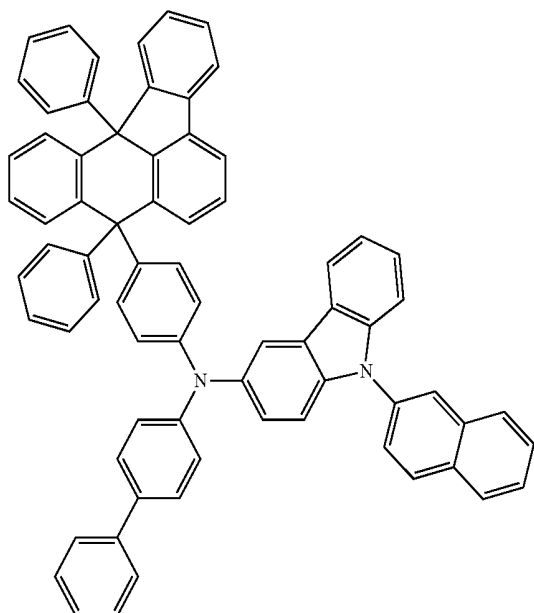
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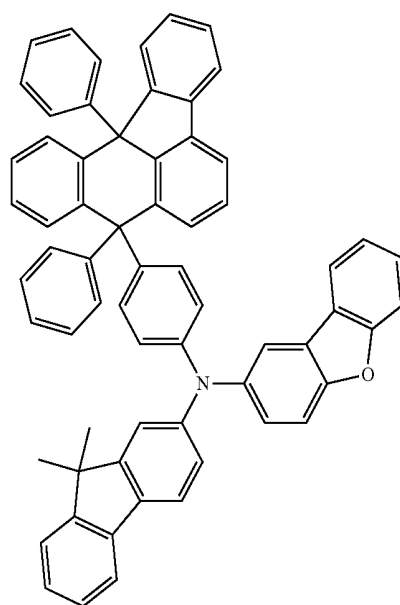
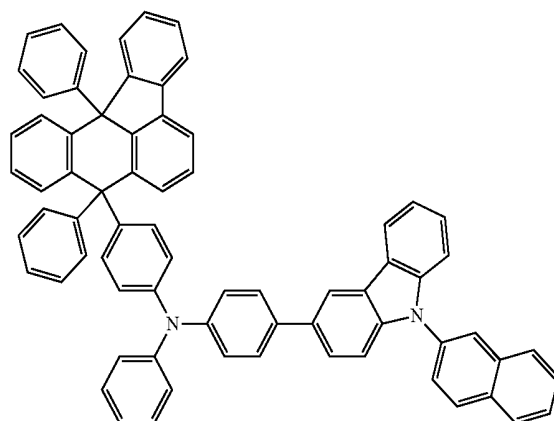
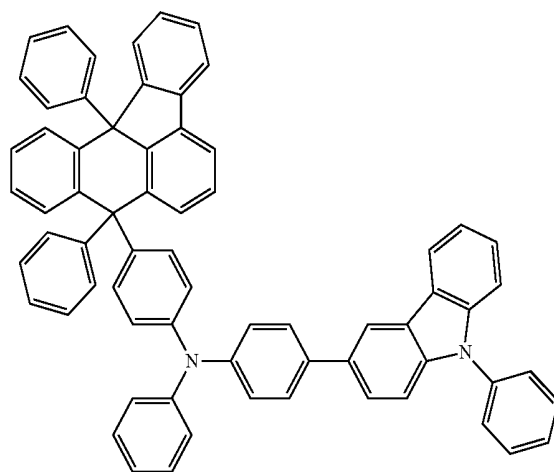
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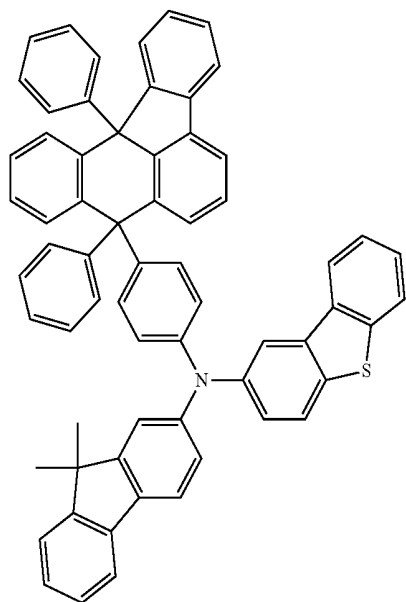
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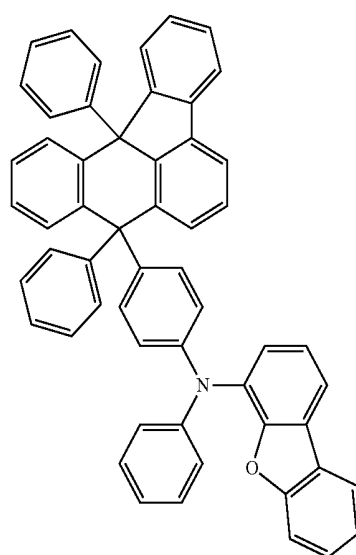
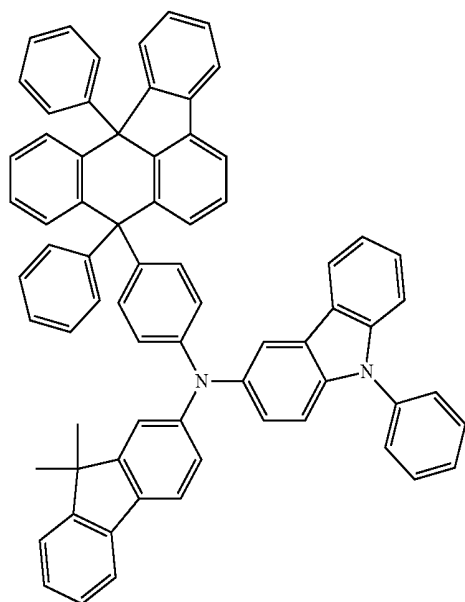
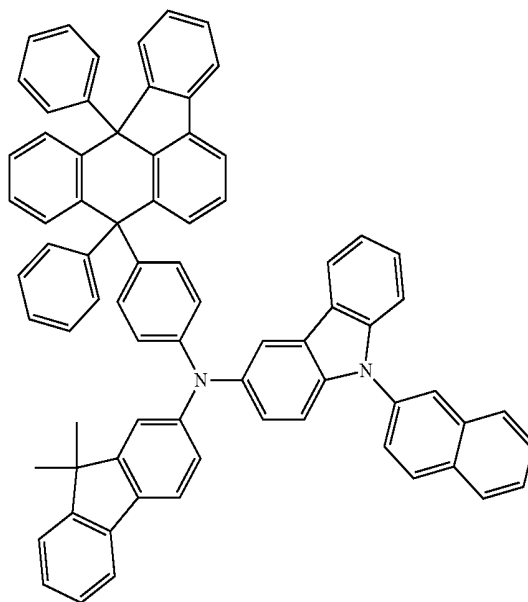
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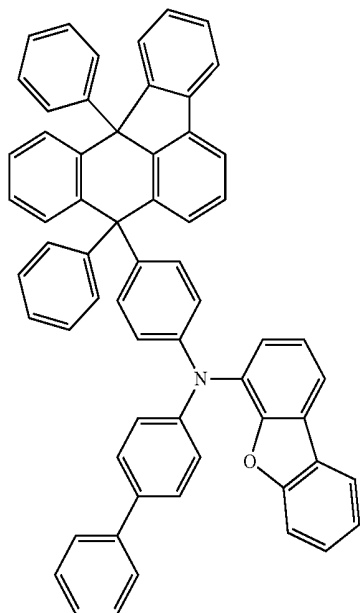
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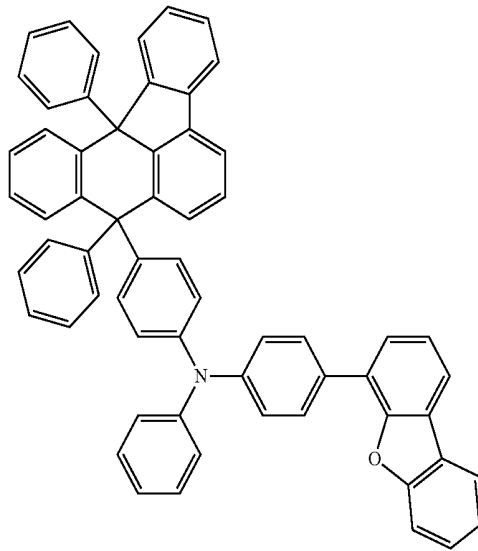
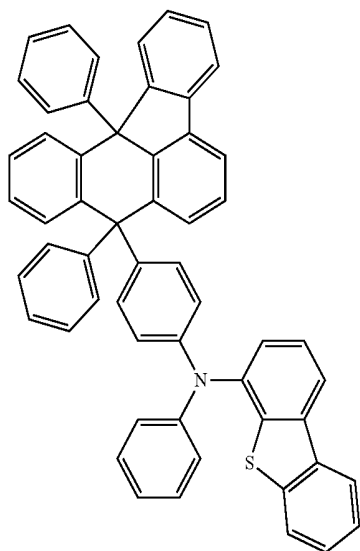
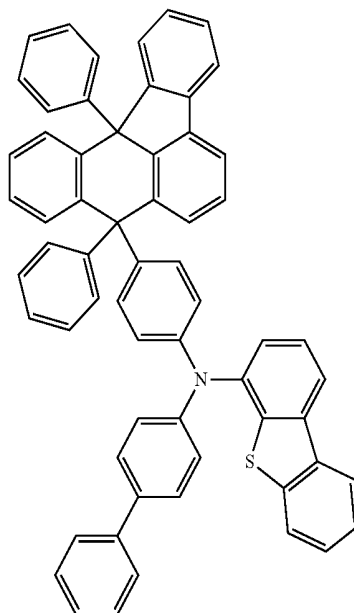
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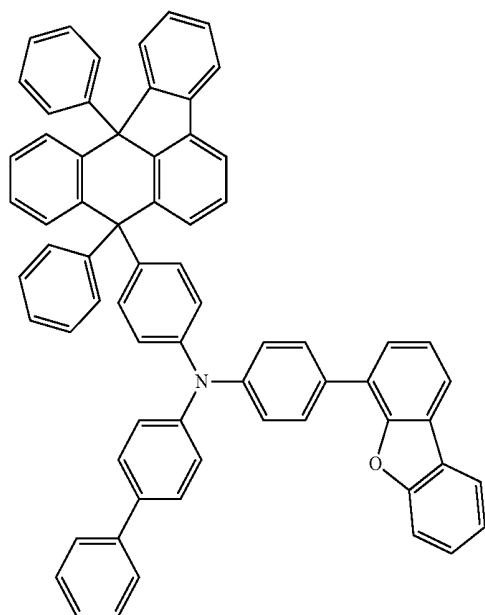
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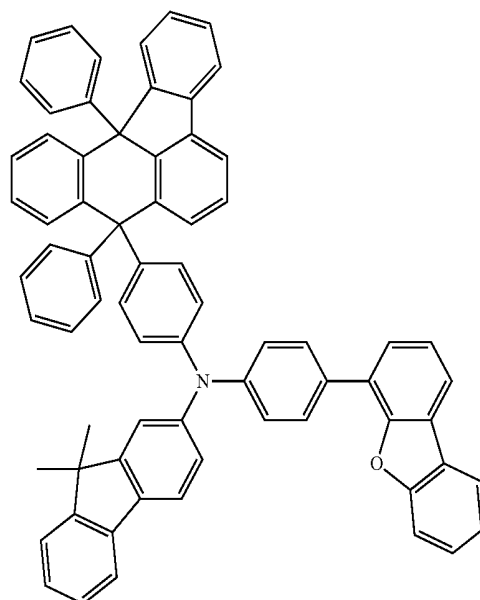
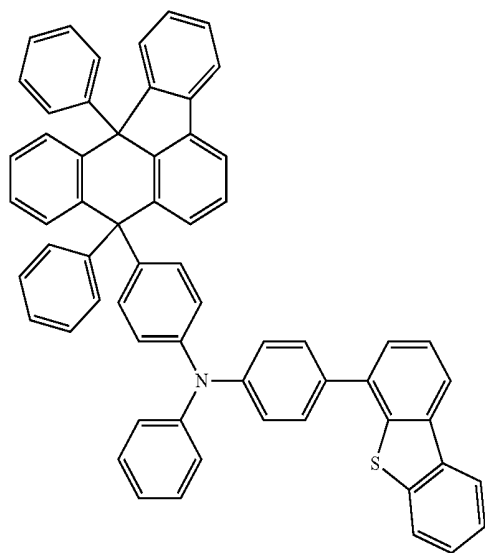
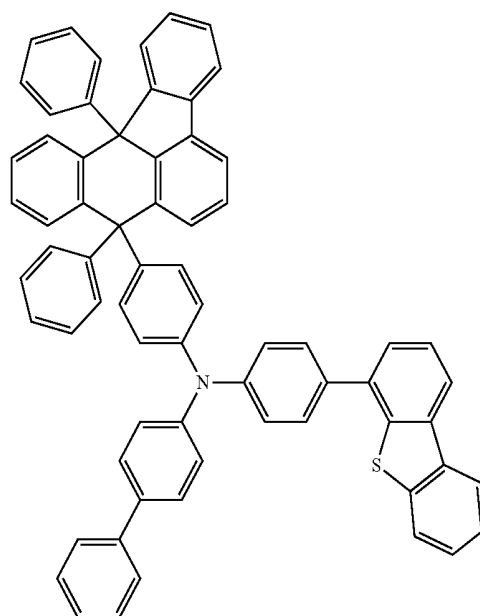
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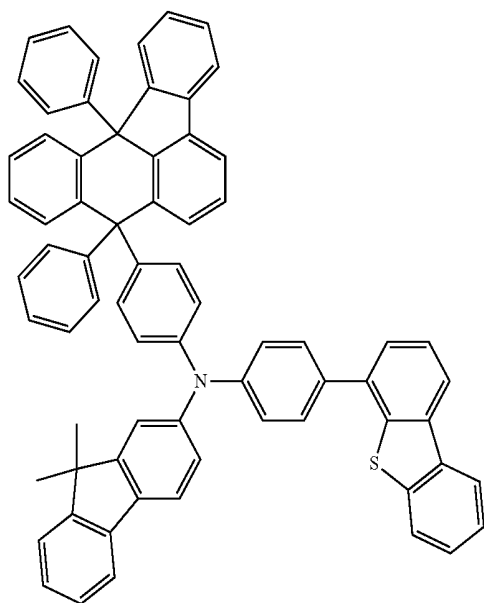
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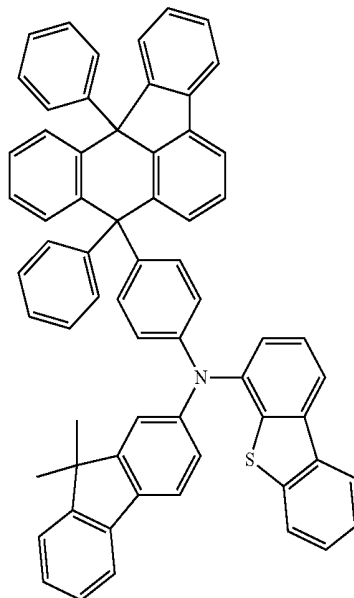
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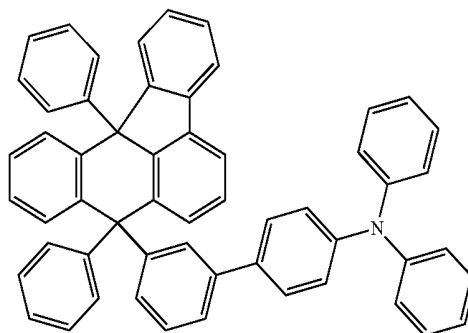
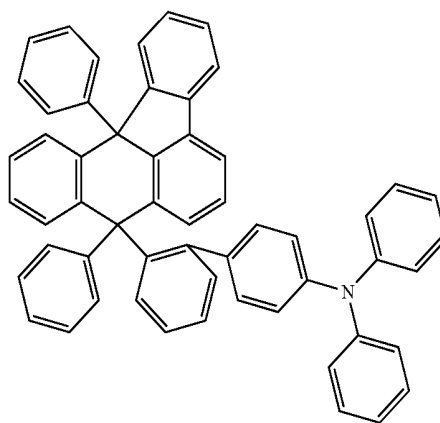
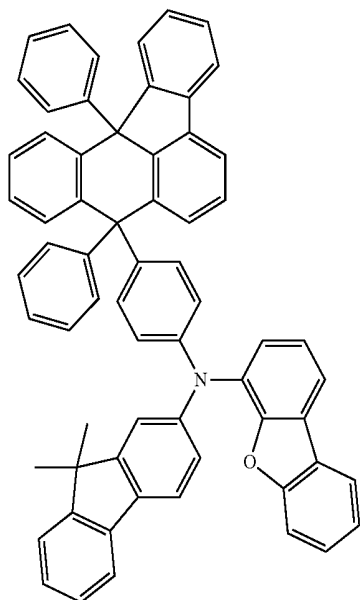
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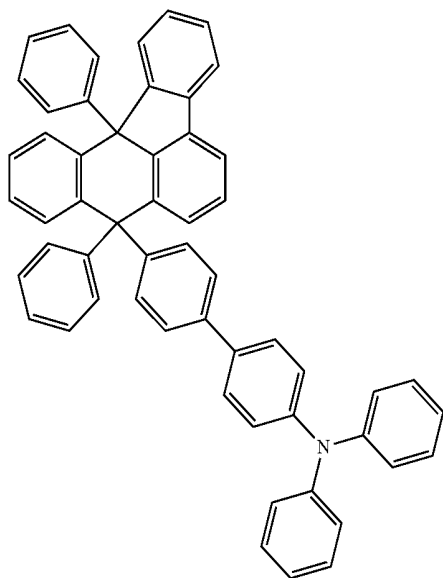
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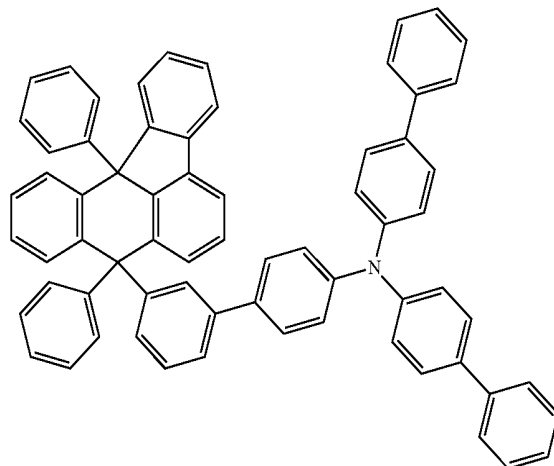
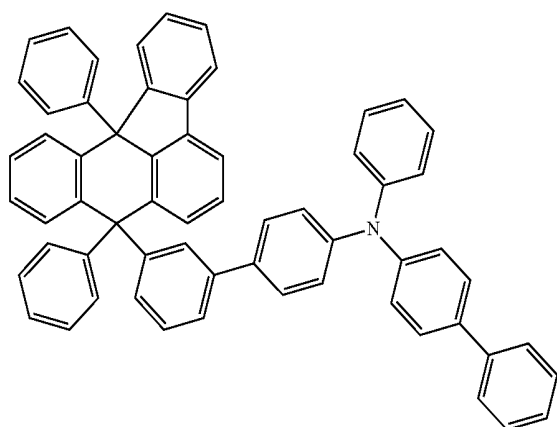
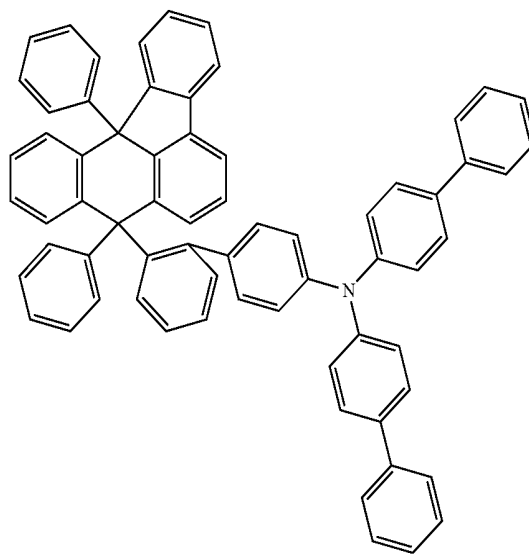
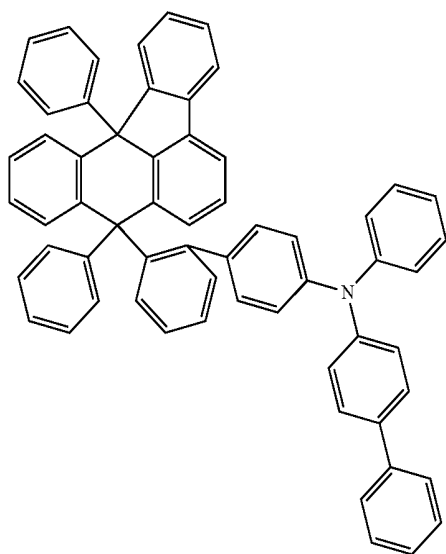
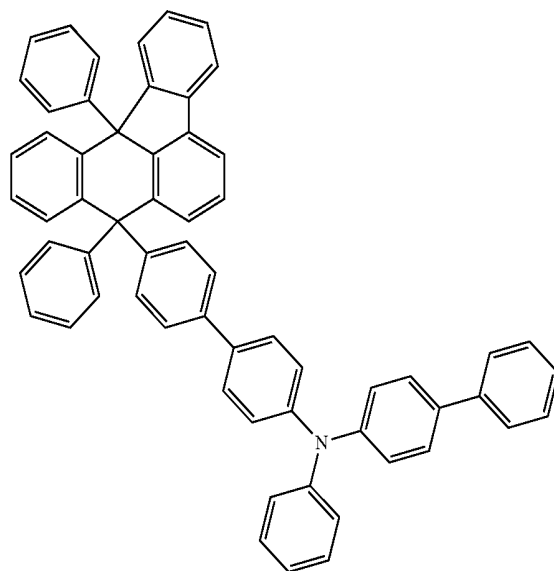
[0169] According to one embodiment of the present disclosure, the compound of Chemical Formula 1 may be any one selected from



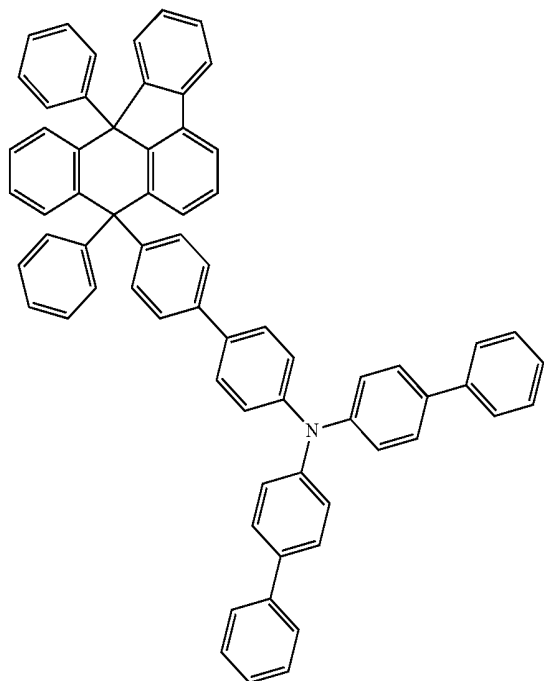
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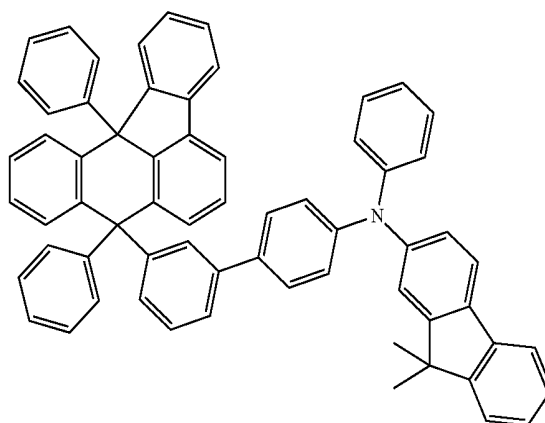
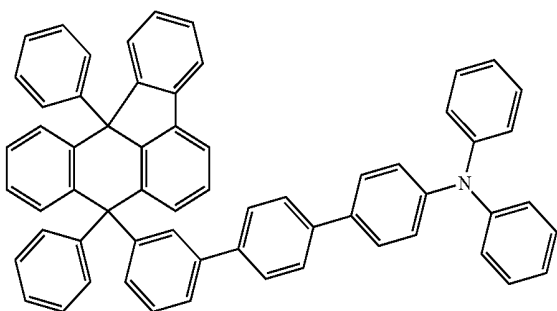
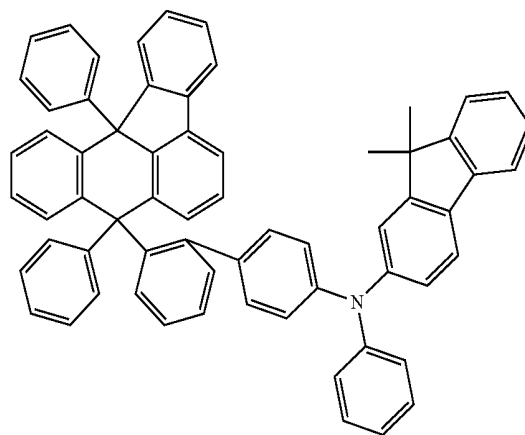
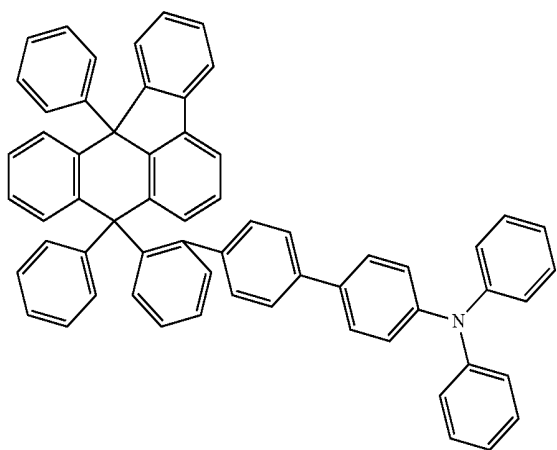
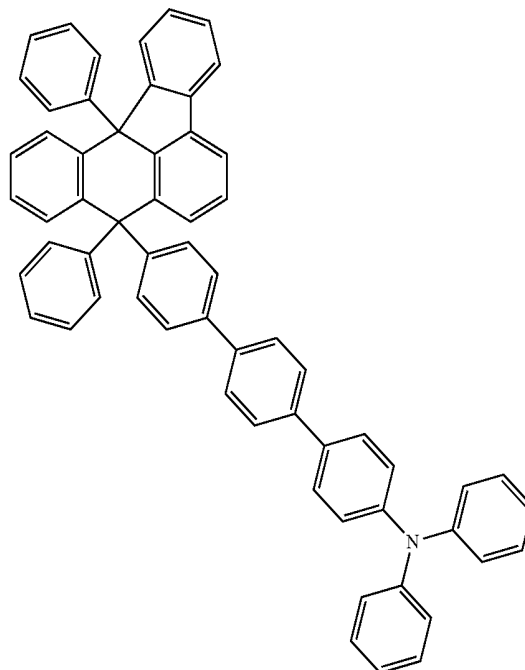
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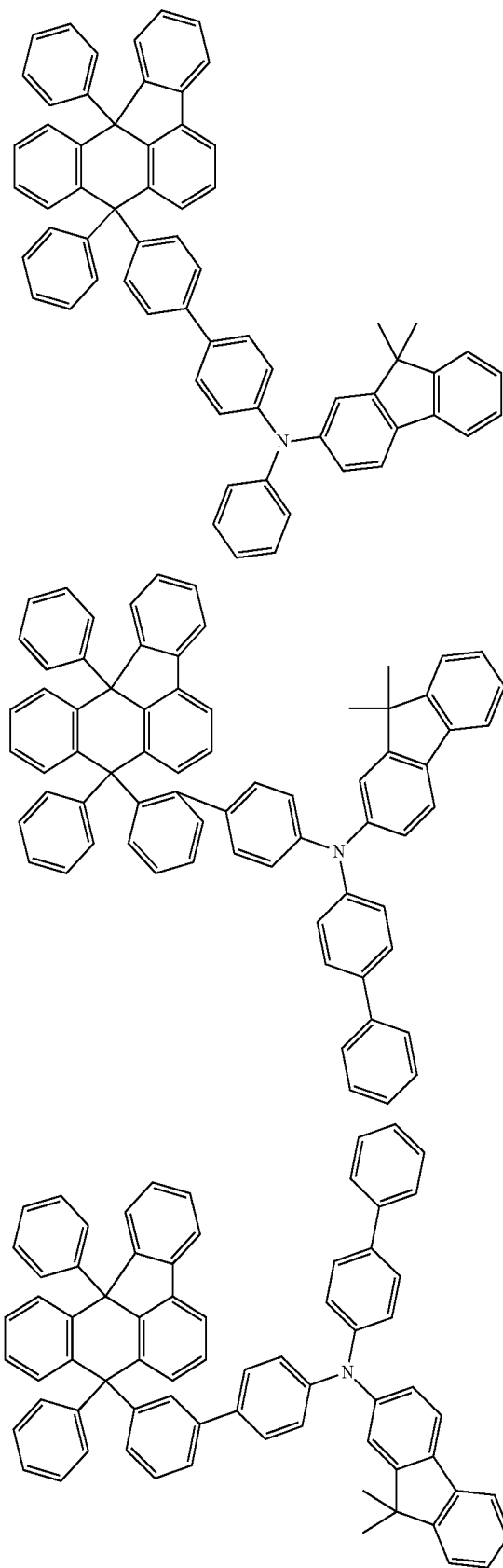
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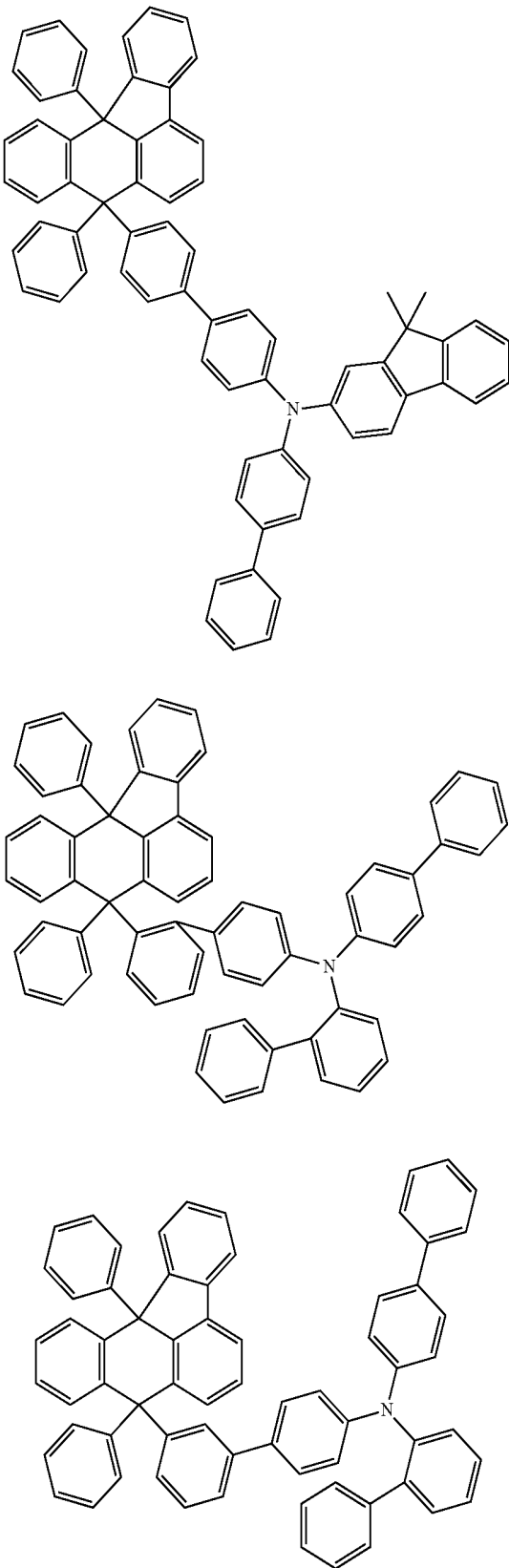
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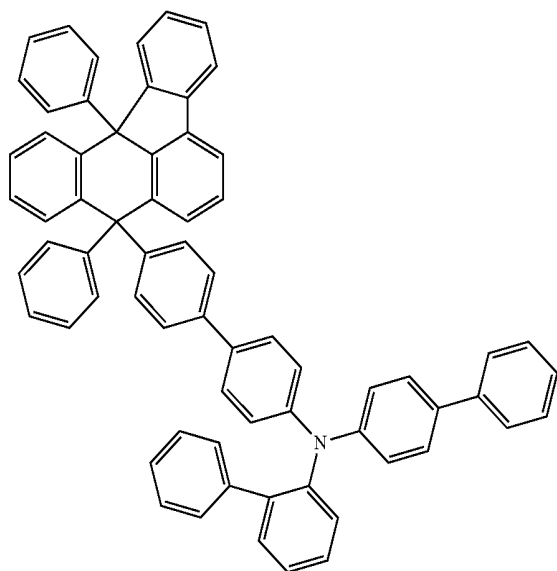
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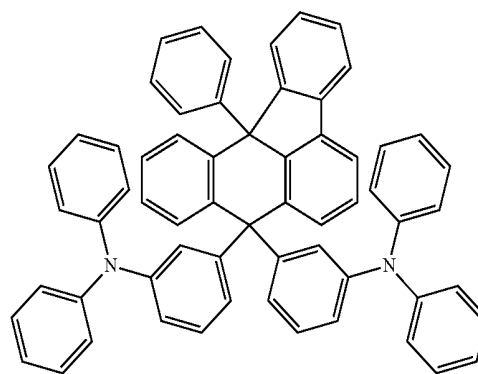
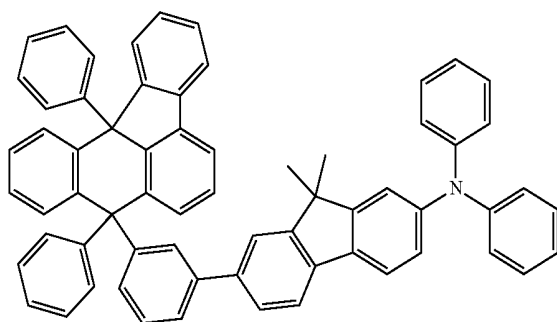
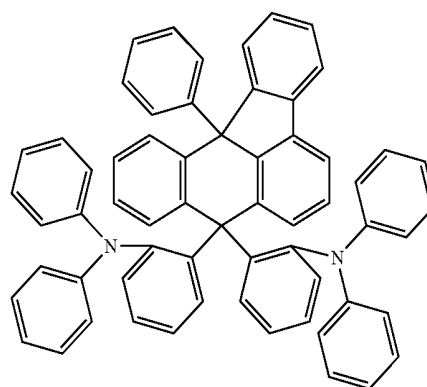
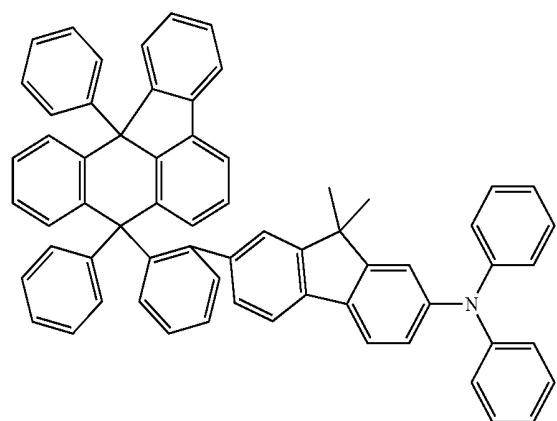
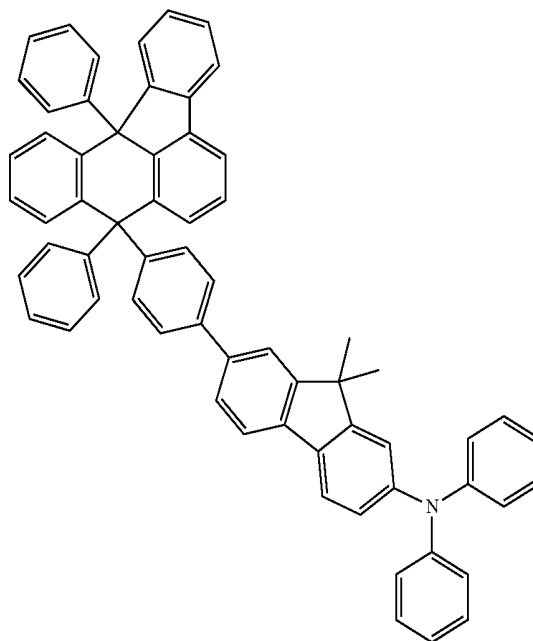
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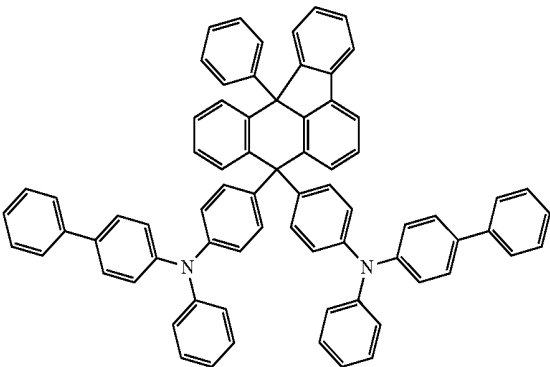
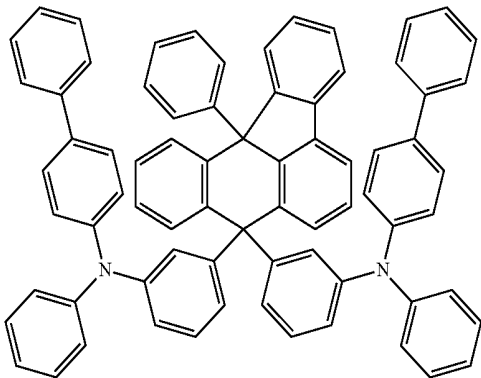
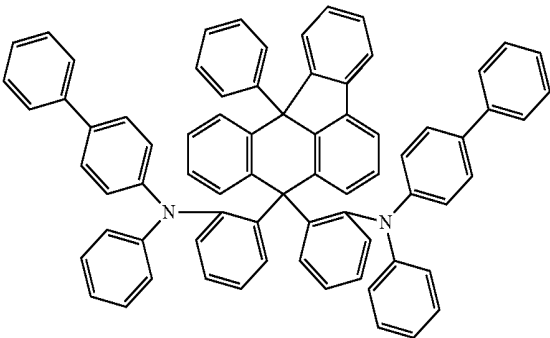
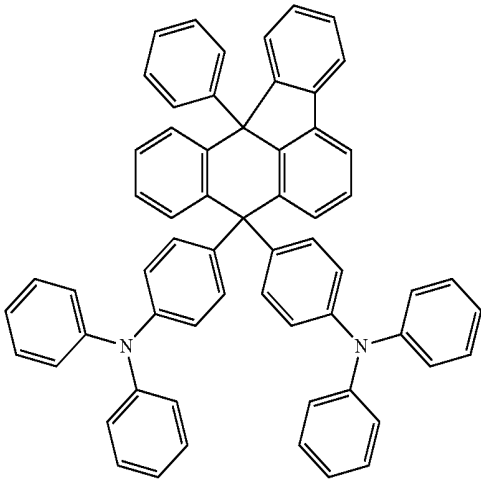
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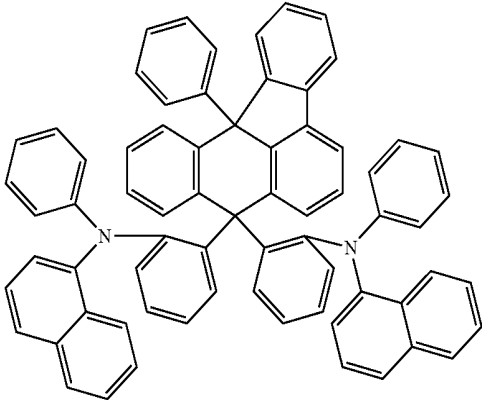
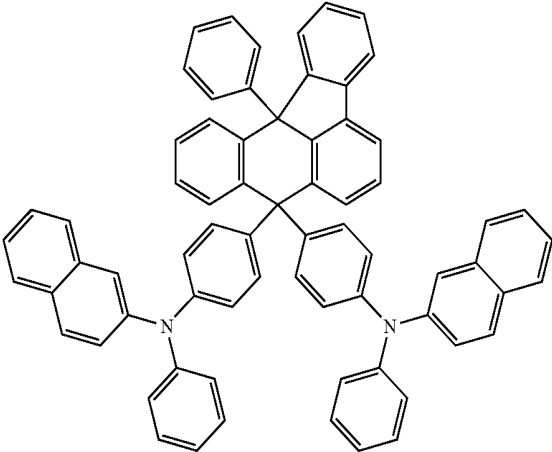
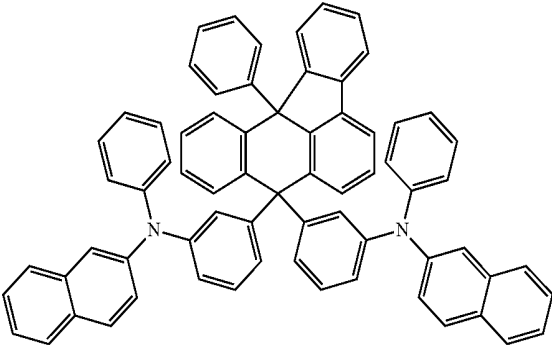
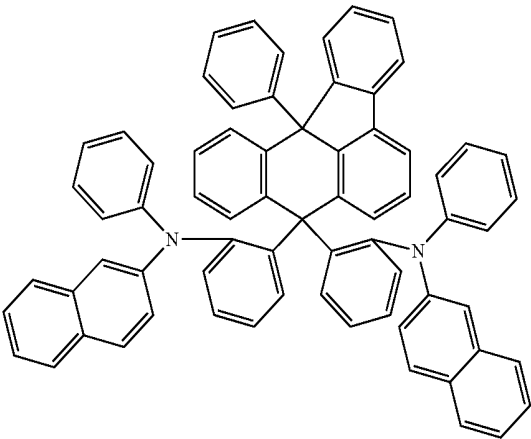
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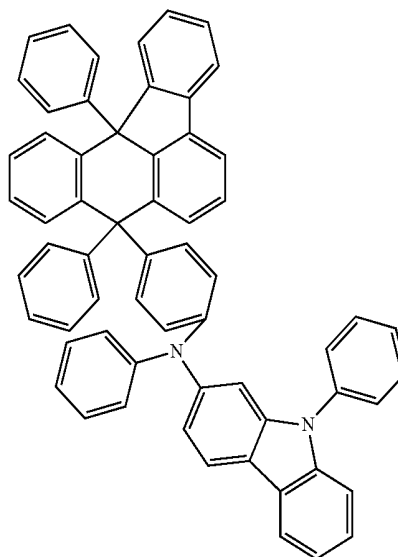
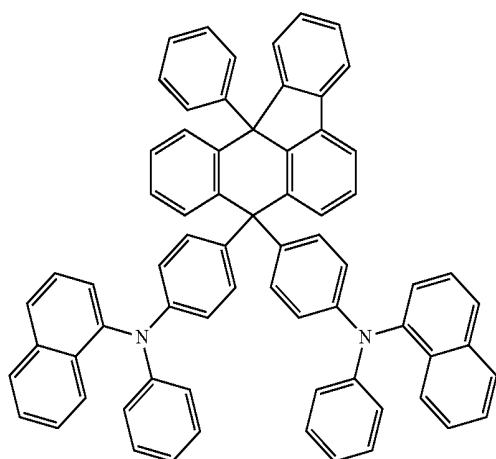
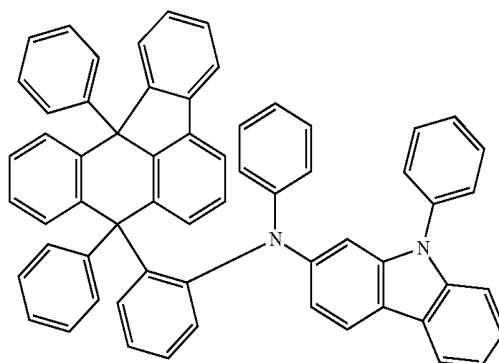
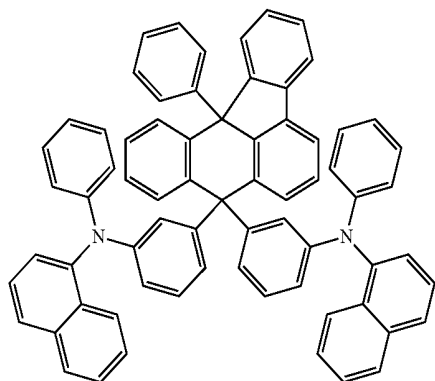
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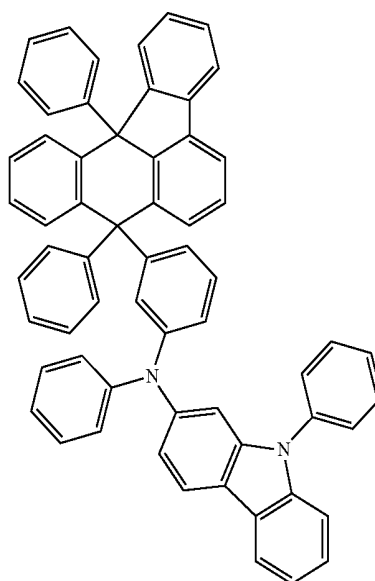
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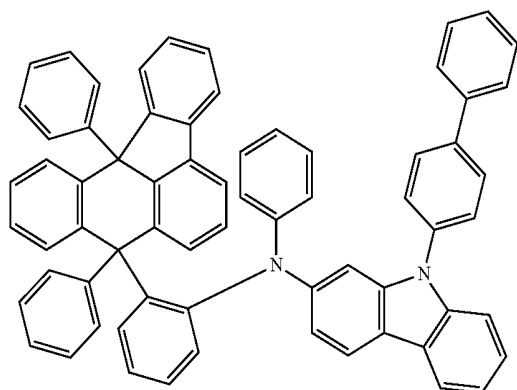
[0170] According to one embodiment of the present specification, in Chemical Formula 1, a is 1 or 2, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; substituted or unsubstituted arylene; or substituted or unsubstituted heteroarylene, m is an integer of 1 to 2, A is $-NAr_1Ar_2$, and at least one of Ar1 and Ar2 is a substituted or unsubstituted carbazole group, or a substituted or unsubstituted benzocarbazole group, and the remainder is a substituted or unsubstituted aryl group or a substituted or unsubstituted heteroaryl group.

[0171] According to one embodiment of the present specification, in Chemical Formula 1, a is 1 or 2, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; arylene; or heteroarylene, m is an integer of 1 to 2, A is $-NAr_1Ar_2$, and at least one of Ar1 and Ar2 is a carbazole group unsubstituted or substituted with an aryl group, or a benzocarbazole group unsubstituted or substituted with an aryl group, and the remainder is a substituted or unsubstituted aryl group.

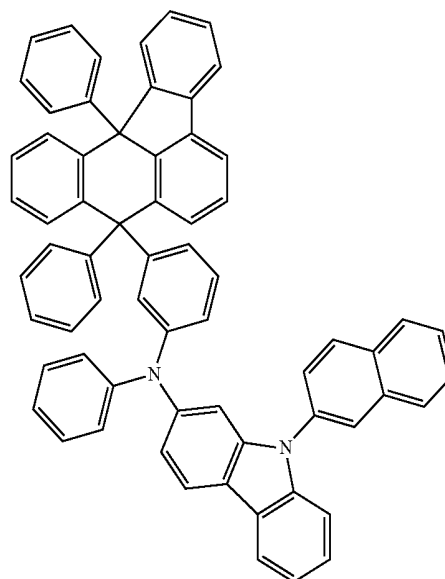
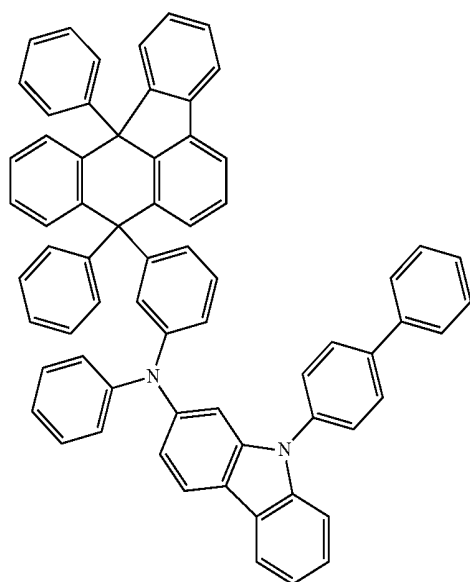
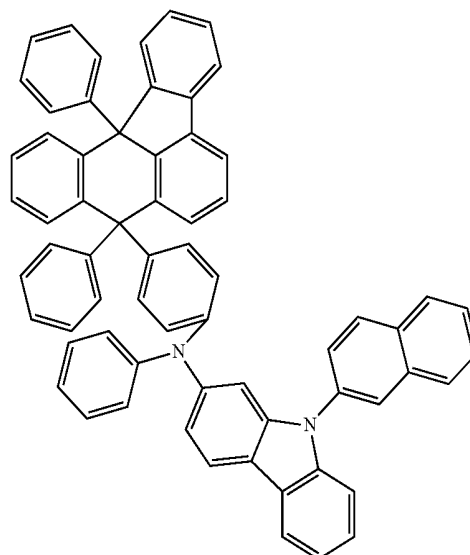
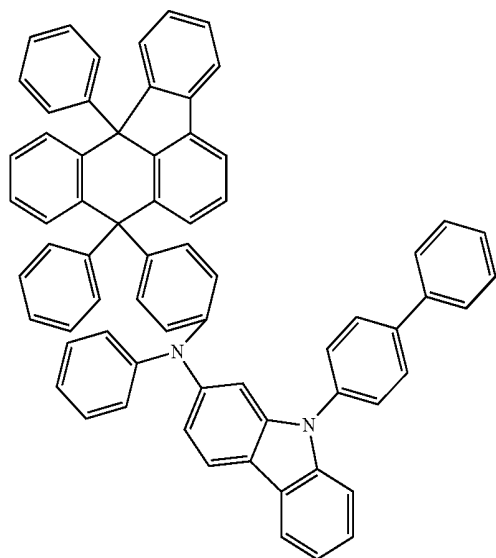
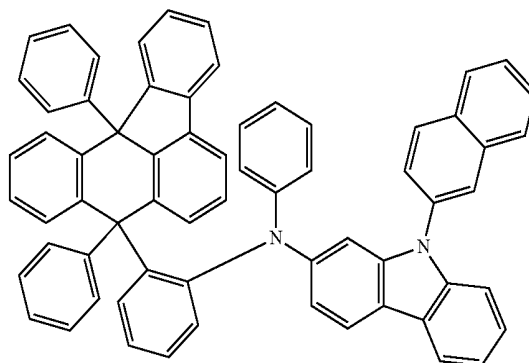
[0172] According to one embodiment of the present disclosure, the compound of Chemical Formula 1 may be any one selected from among the following compounds.



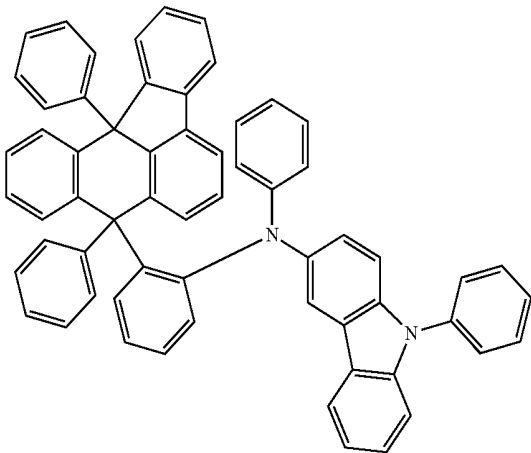
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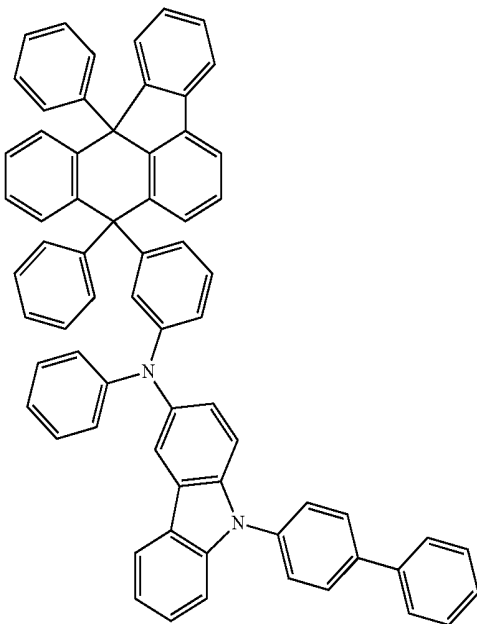
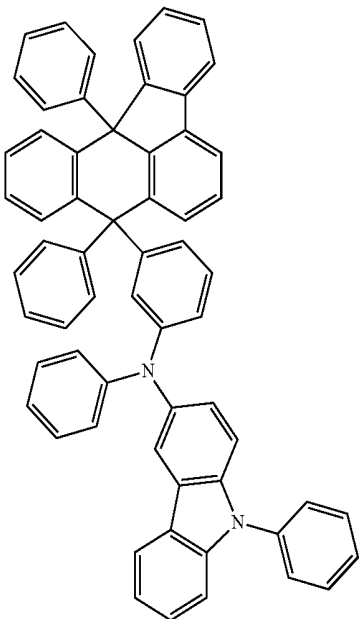
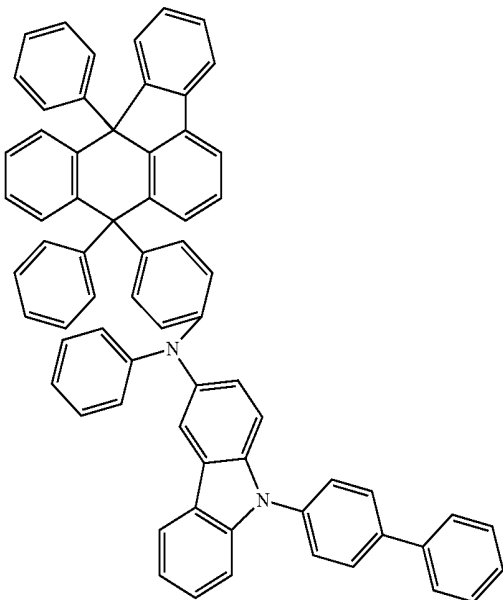
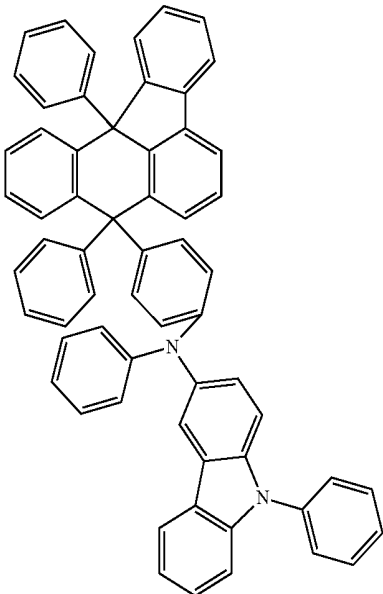
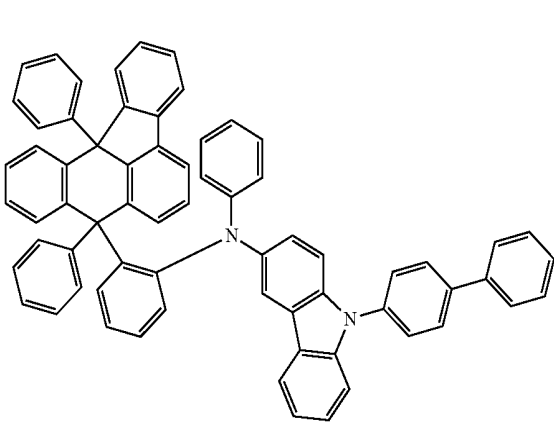
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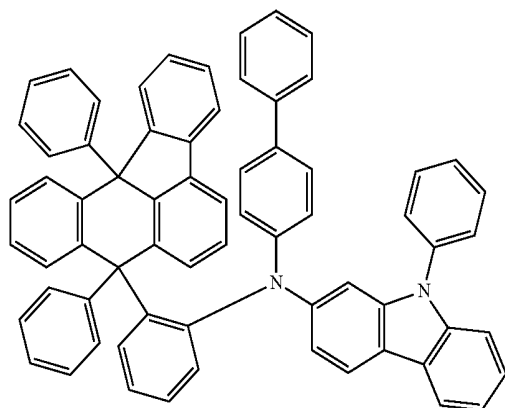
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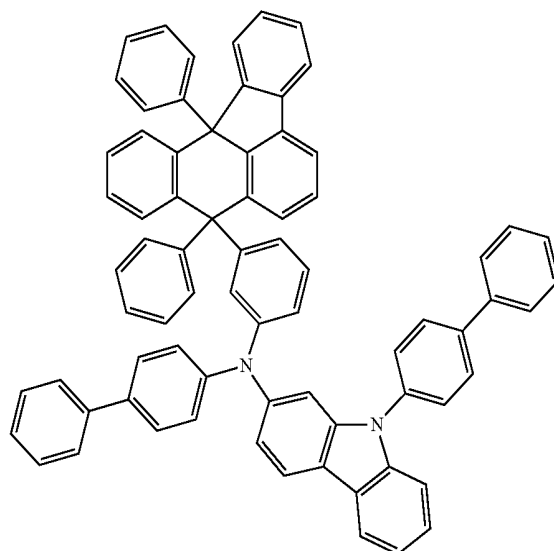
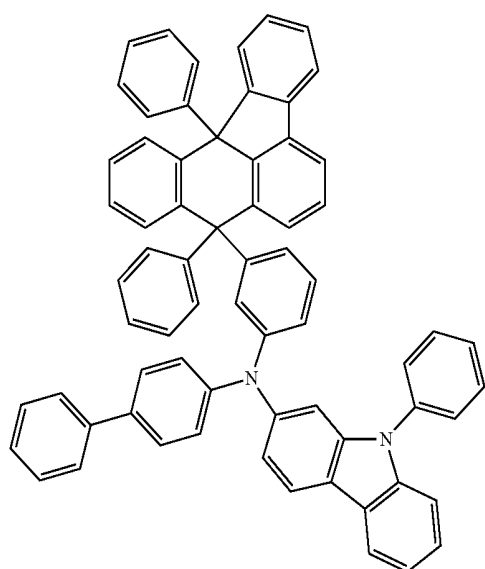
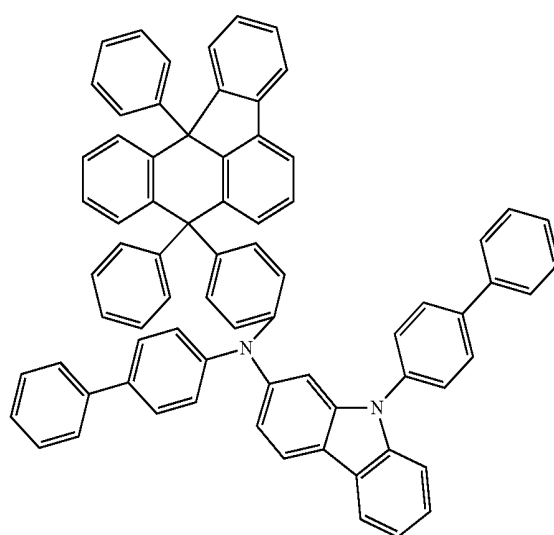
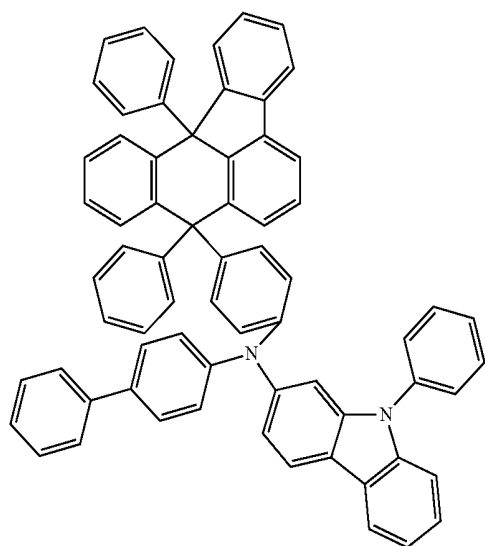
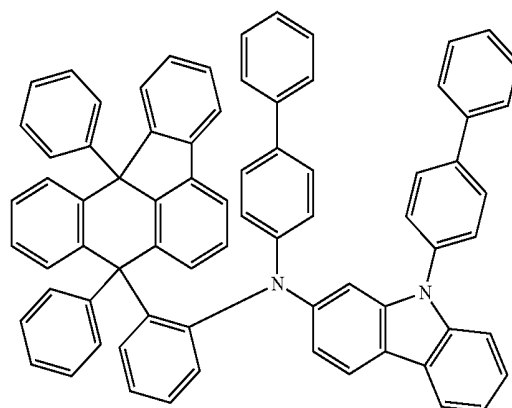
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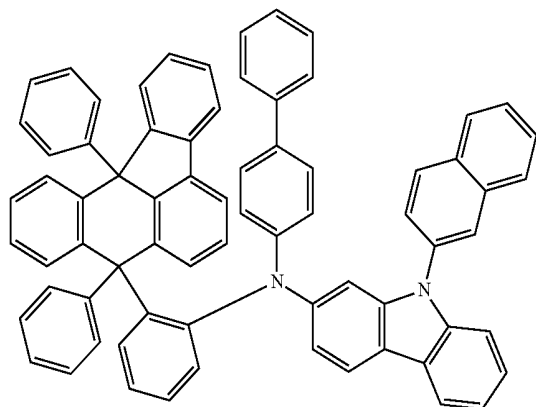
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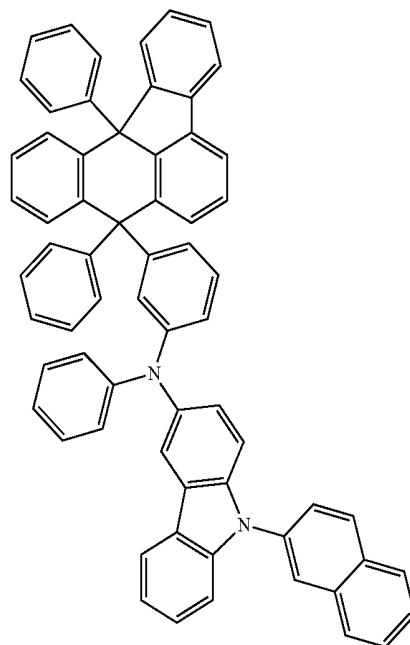
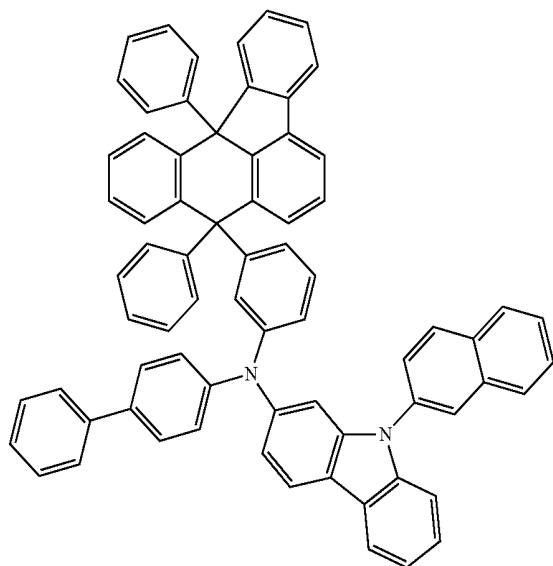
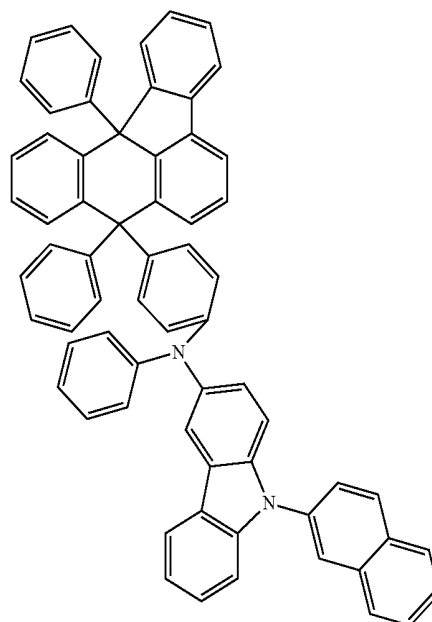
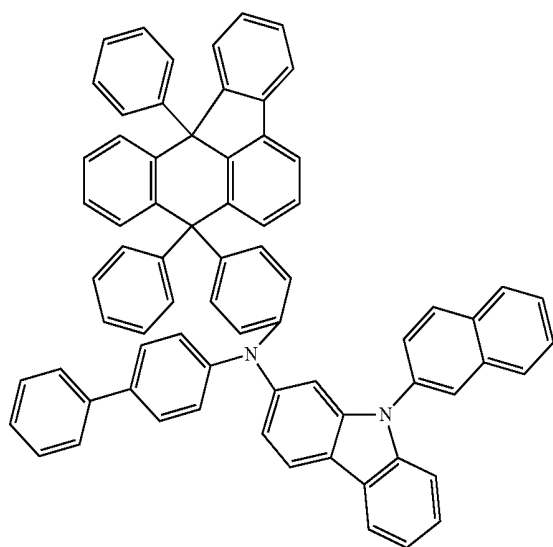
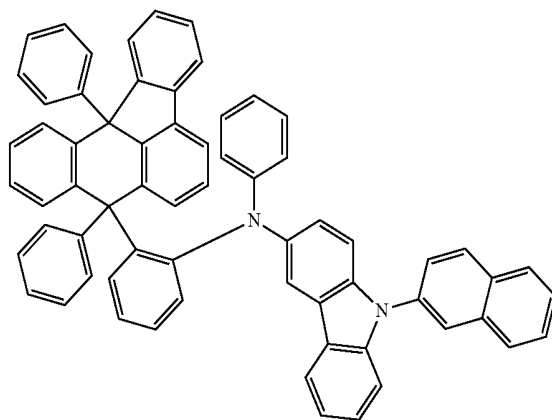
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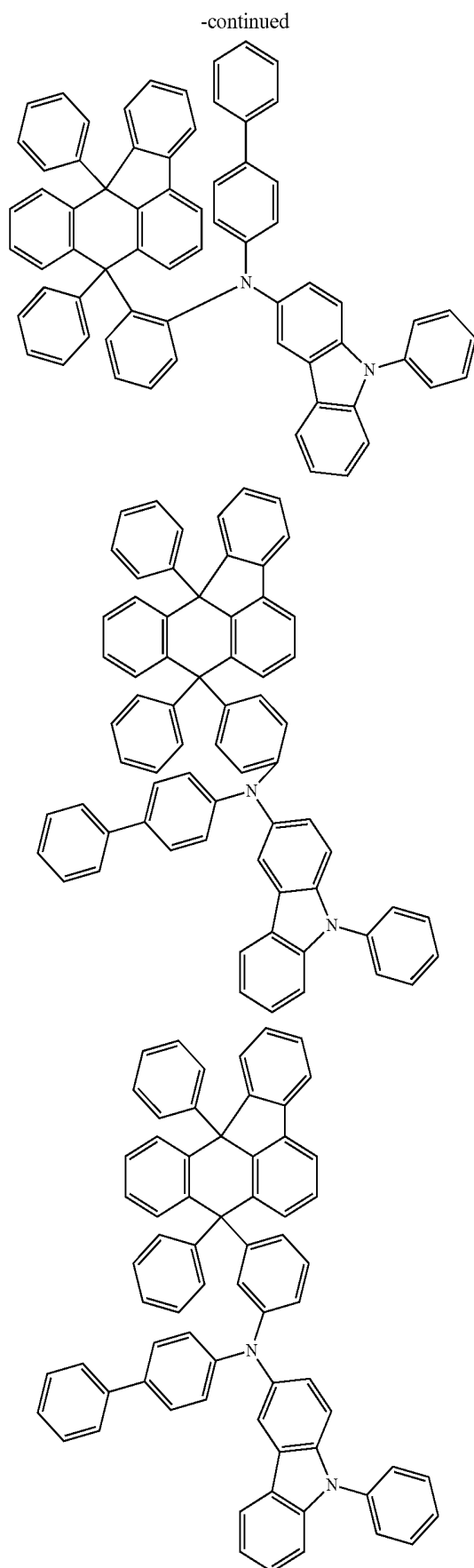


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[0173] According to one embodiment of the present specification, in Chemical Formula 1, a is from 1 to 10, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group, m is an integer of 1 to 10, and A is a substituted or unsubstituted N-containing heterocyclic group.

[0174] According to one embodiment of the present specification, in Chemical Formula 1, a is 1 or 2, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group, m is 1 or 2, and A is a substituted or unsubstituted N-containing heterocyclic group.

[0175] According to one embodiment of the present specification, in Chemical Formula 1, a is 1 or 2, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; or an arylene group having 6 to 20 carbon atoms, m is 1 or 2, and A is an N-containing heterocyclic group unsubstituted or substituted with an aryl group or a heterocyclic group.

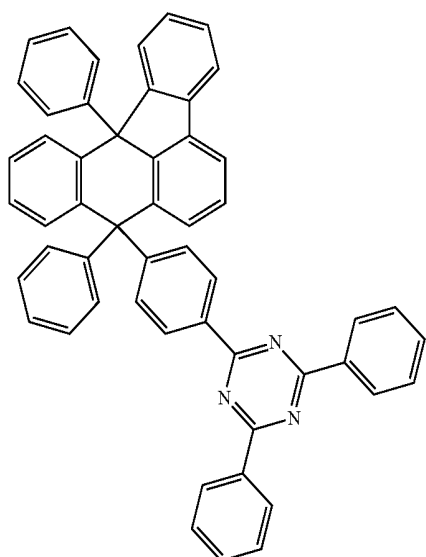
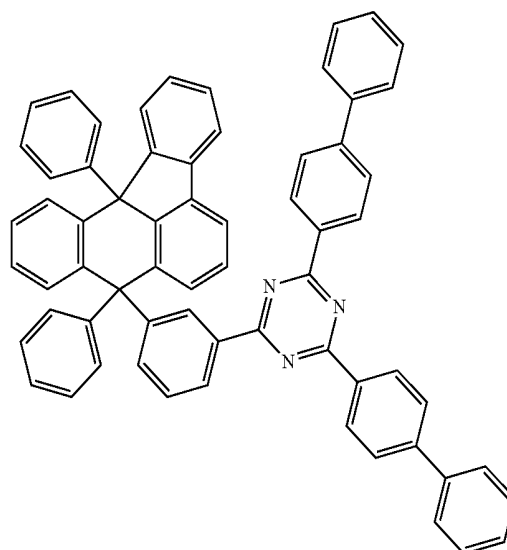
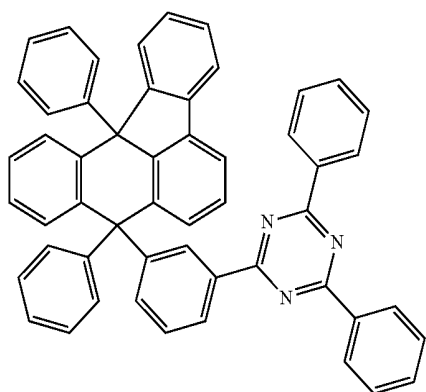
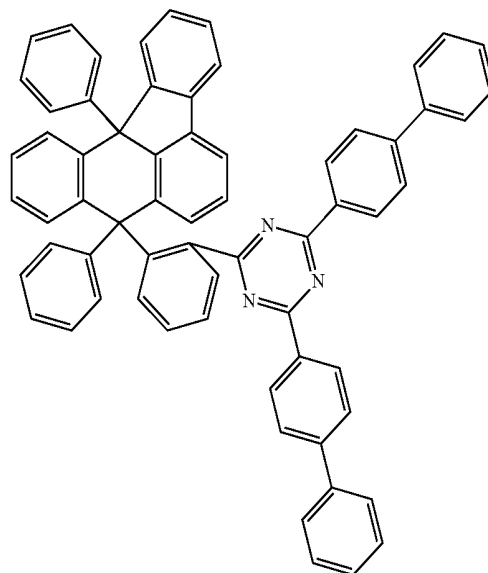
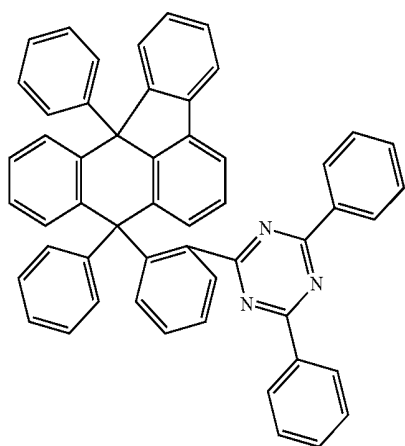
[0176] According to one embodiment of the present specification, in Chemical Formula 1, a is 1 or 2, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; or an arylene group having 6 to 20 carbon atoms, m is 1 or 2, and A is an N-containing heterocyclic group unsubstituted or substituted with an aryl group or a heterocyclic group, and herein, the N-containing heterocyclic group is a triazine group, a pyrimidine group, a pyridine group, a quinazoline group, a quinoline group, an isoquinoline group, a benzimidazole group, a carbazole group or a benzocarbazole group.

[0177] According to one embodiment of the present specification, in Chemical Formula 1, a is 1 or 2, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; or an arylene group having 6 to 20 carbon atoms, m is 1 or 2, and A is an aryl group having 6 to 20 carbon atoms; or an N-containing heterocyclic group unsubstituted or substituted with a heterocyclic group including N, O or S and having 2 to 20 carbon atoms, and herein, the N-containing heterocyclic group is a triazine group, a pyrimidine group, a pyridine group, a quinazoline group, a quinoline group, an isoquinoline group, a benzimidazole group, a carbazole group or a benzocarbazole group.

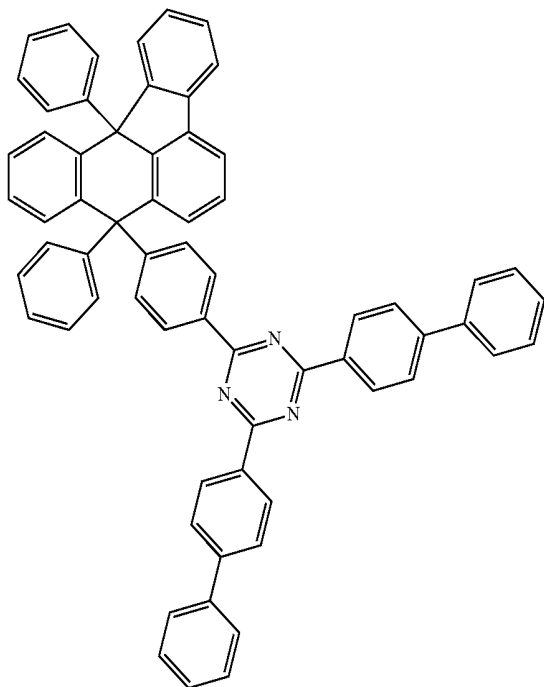
[0178] According to one embodiment of the present specification, in Chemical Formula 1, a is 1 or 2, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; a phenylene group; or a biphenylene group, m is 1 or 2, and A is a phenyl group, a naphthyl group, a biphenyl group, a carbazole group unsubstituted or substituted with a phenyl group or a naphthyl group, a benzocarbazole group unsubstituted or substituted with a phenyl group or a naphthyl group, a dibenzothiophene group, or an N-containing heterocyclic group unsubstituted or substituted with a dibenzofuran group, and herein, the N-containing heterocyclic group is a triazine group, a pyrimidine group, a pyridine group, a quinazoline group, a quinoline group, an isoquinoline group, a benzimidazole group, a carbazole group or a benzocarbazole group.

[0179] According to one embodiment of the present disclosure, the compound of Chemical Formula 1 may be any one selected from

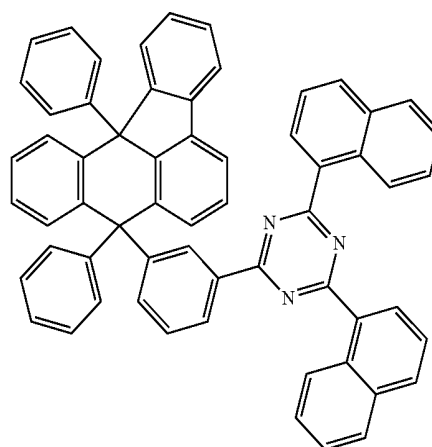
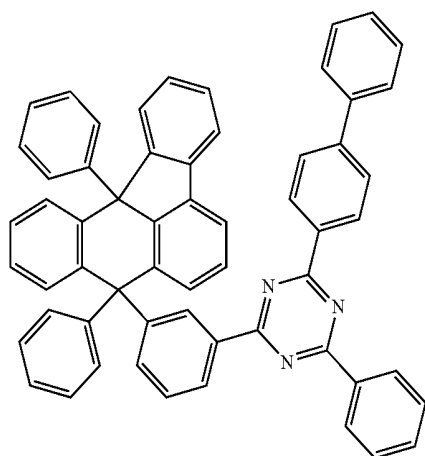
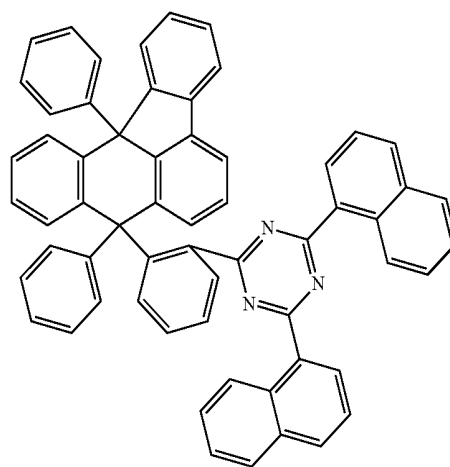
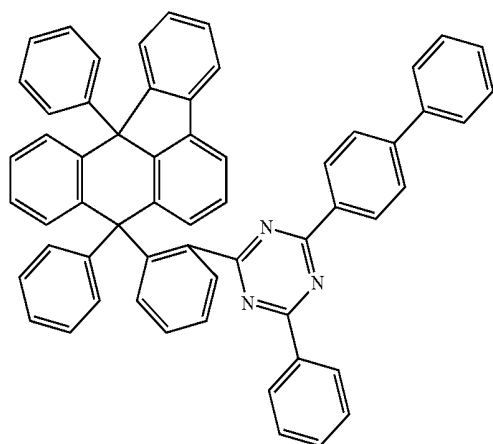
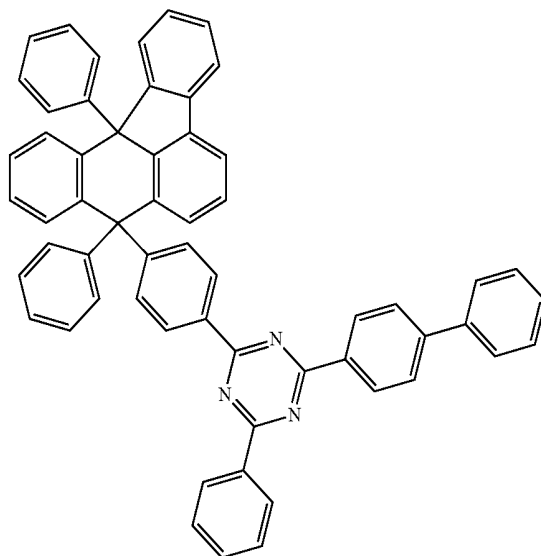
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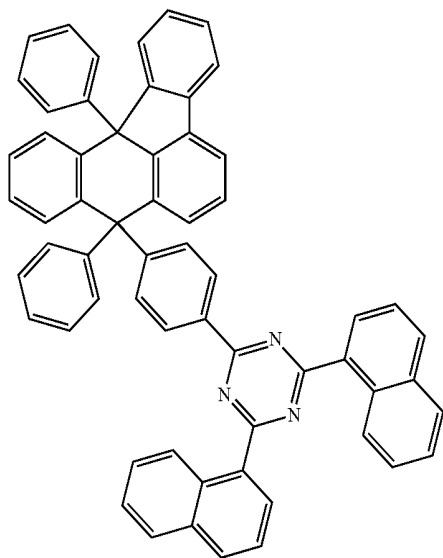
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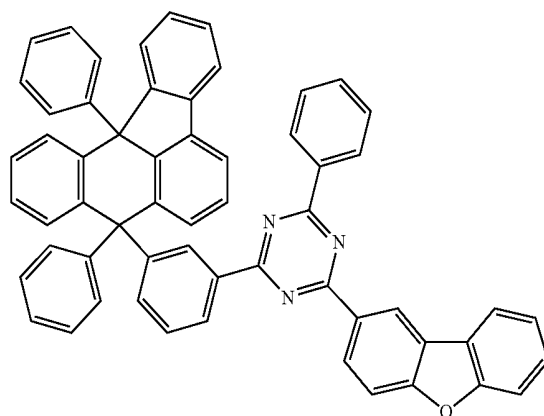
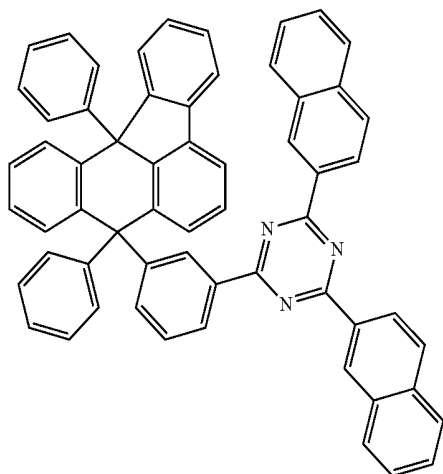
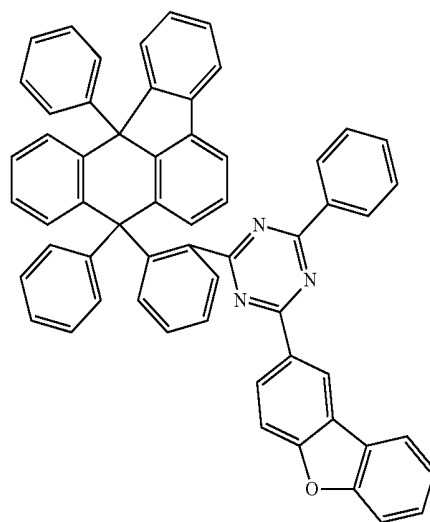
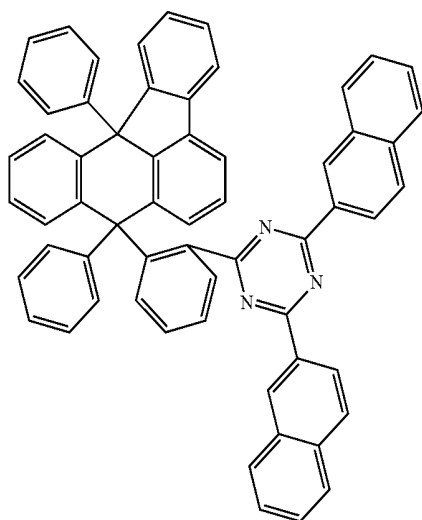
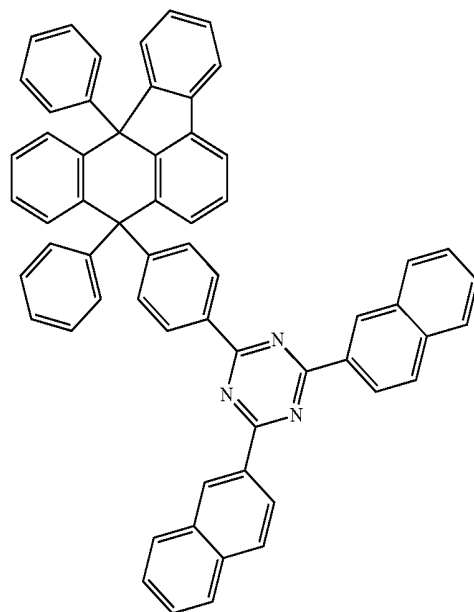
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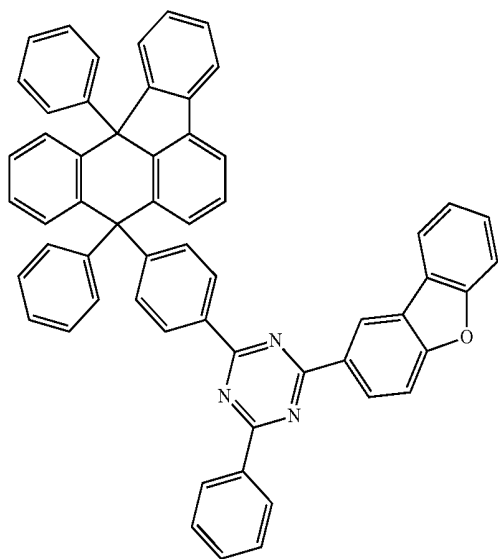
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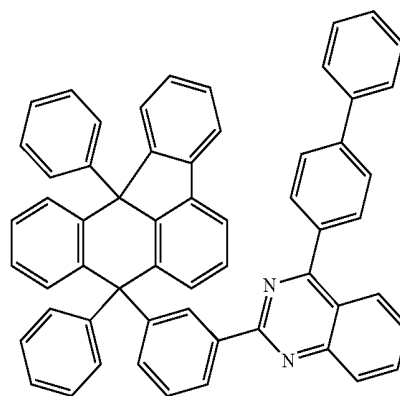
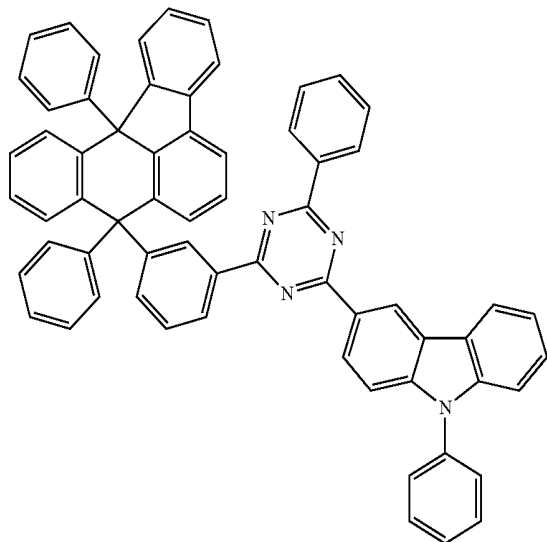
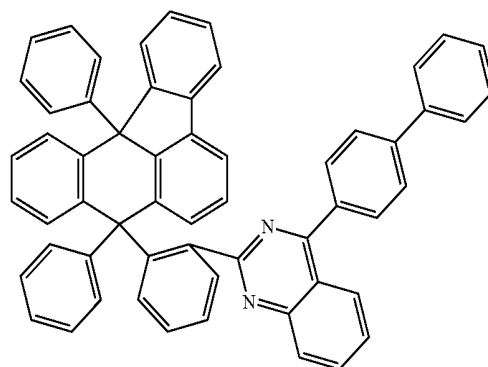
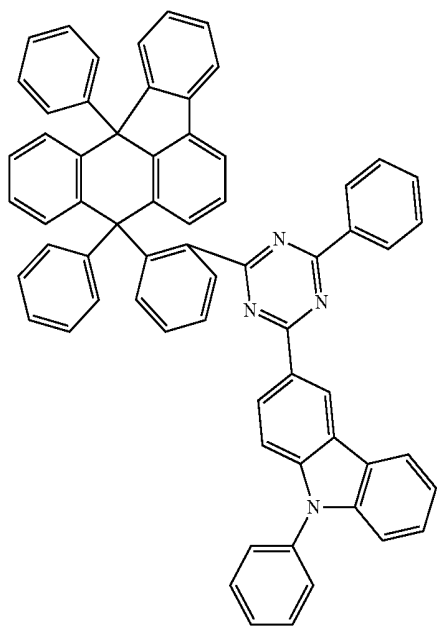
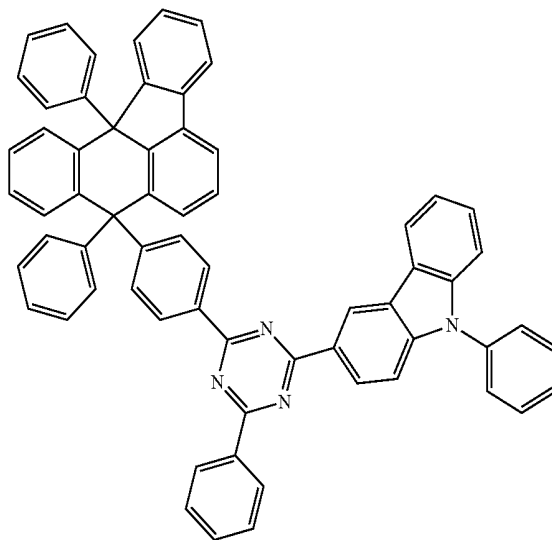
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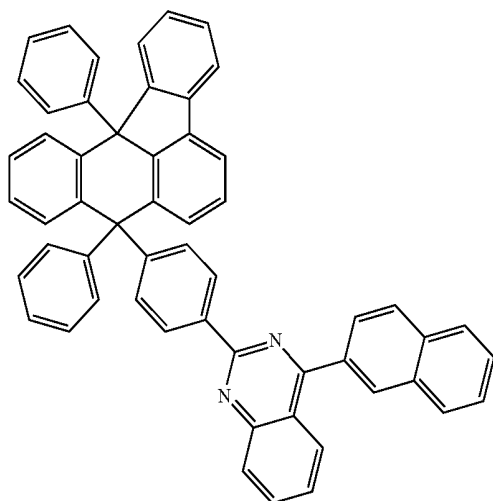
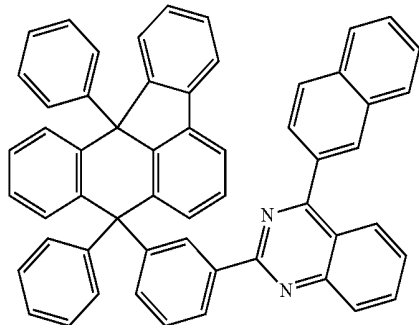
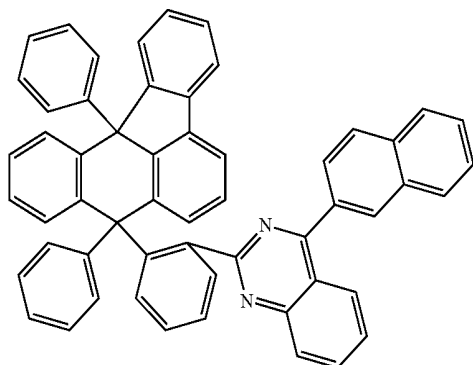
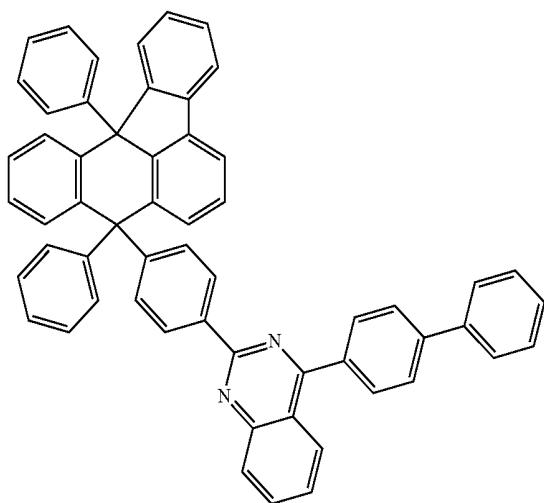
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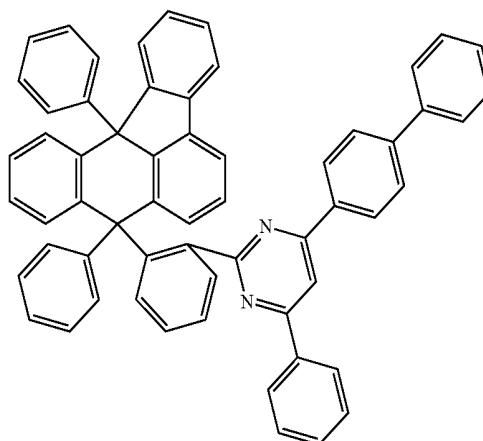
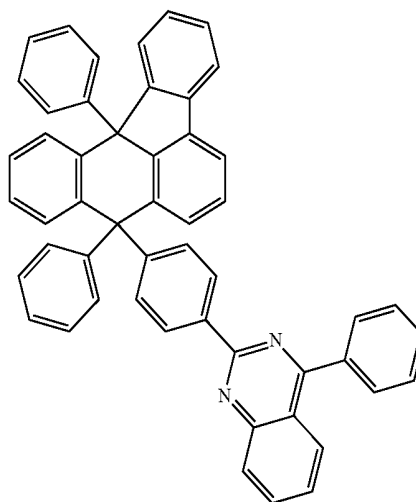
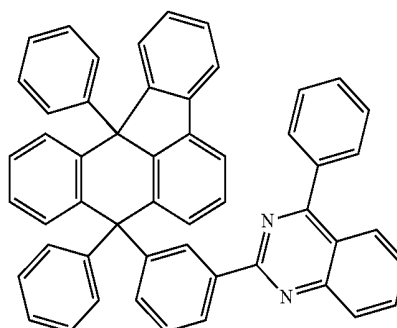
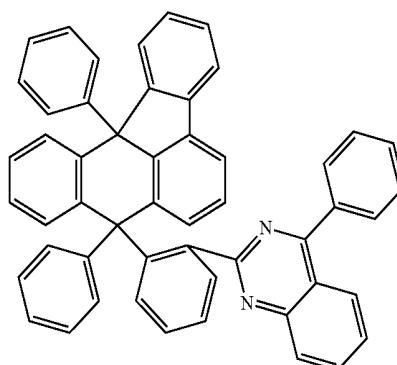
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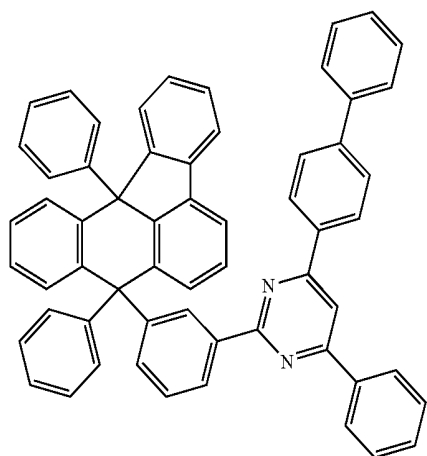
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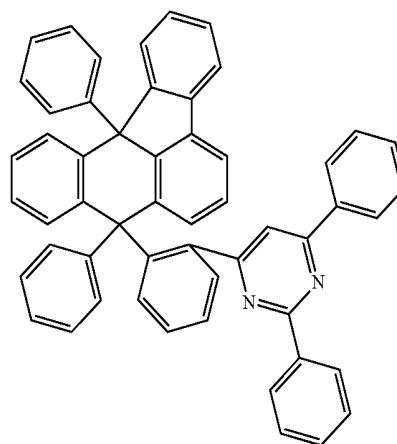
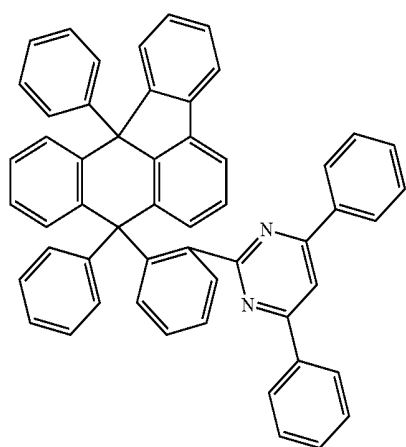
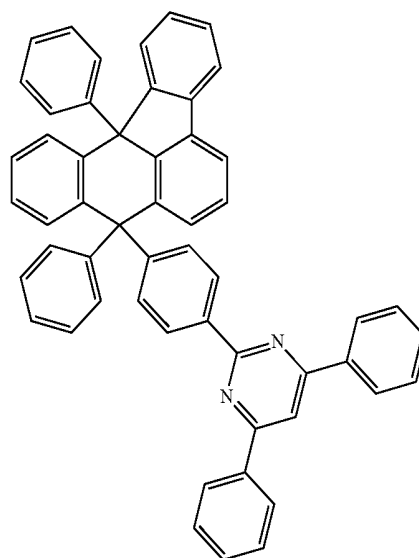
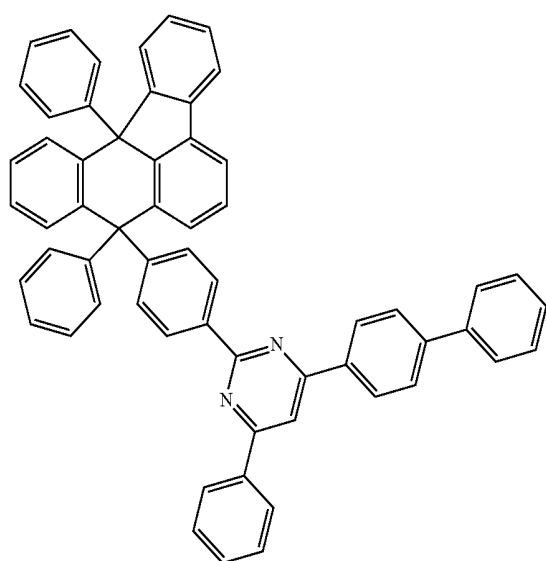
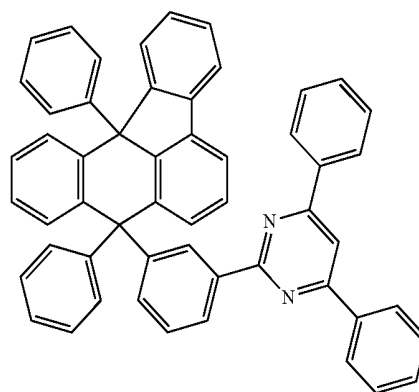
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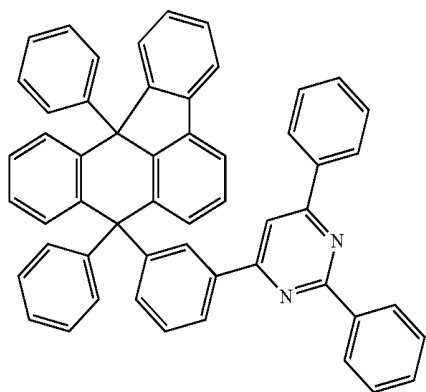
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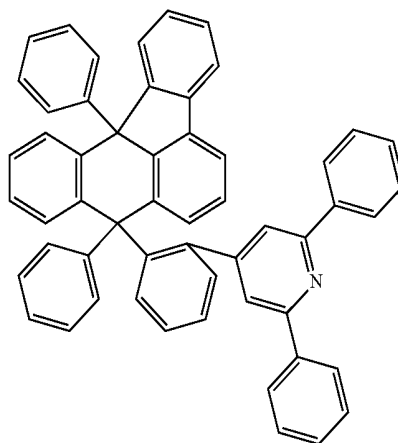
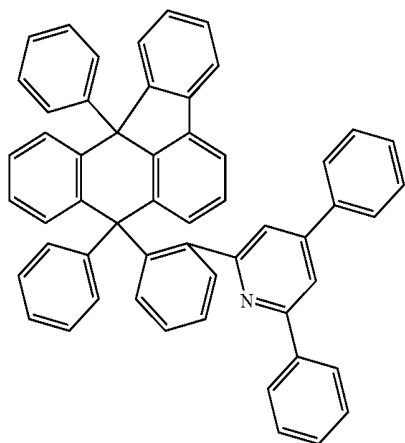
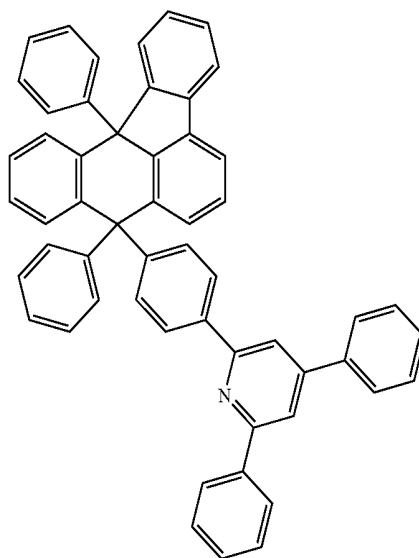
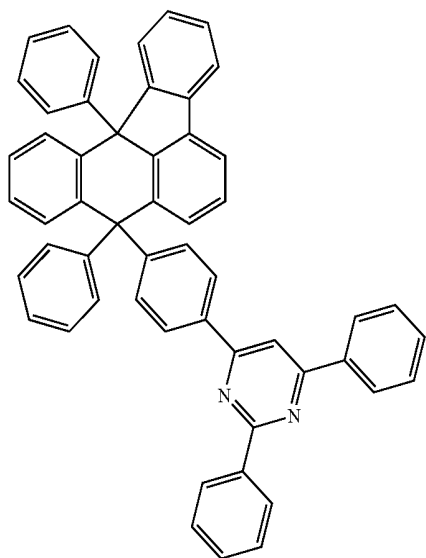
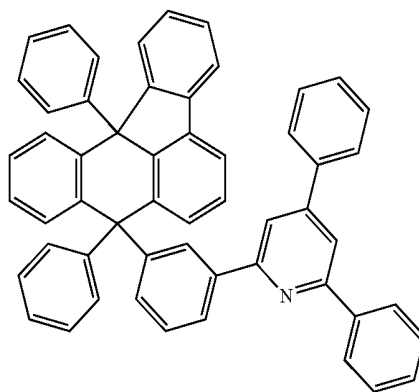
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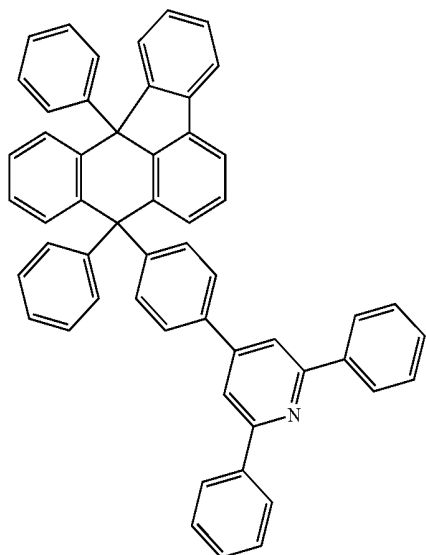
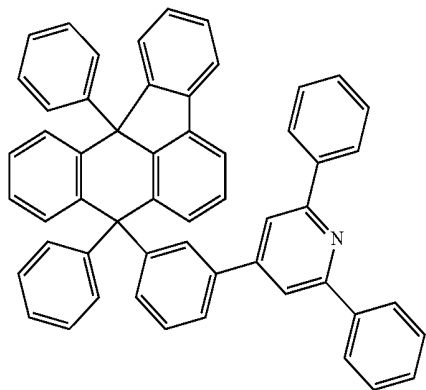
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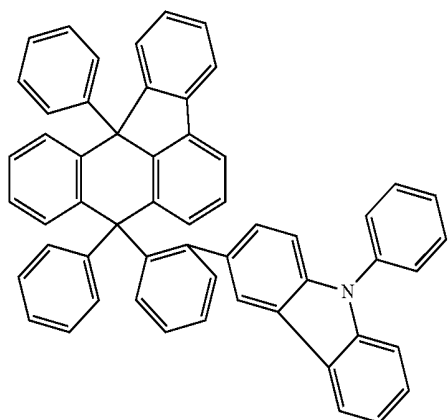
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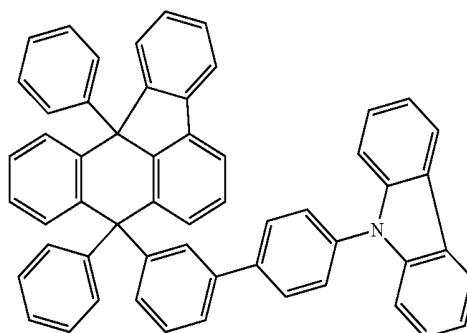
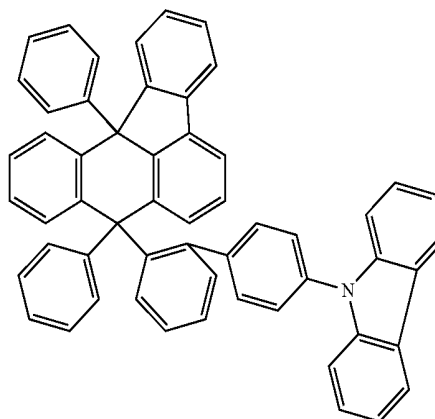
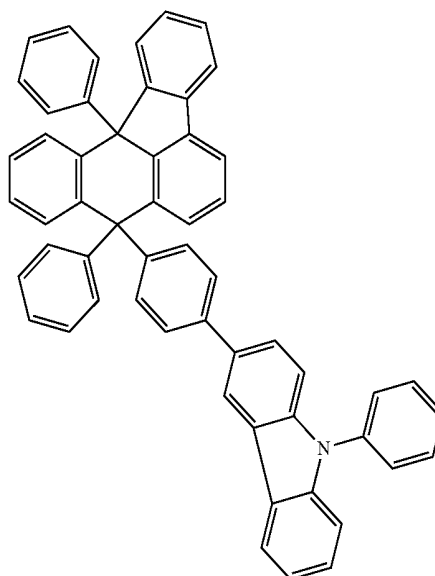
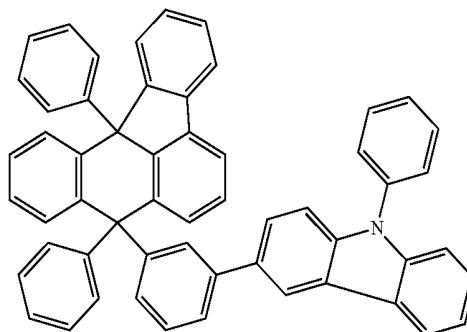
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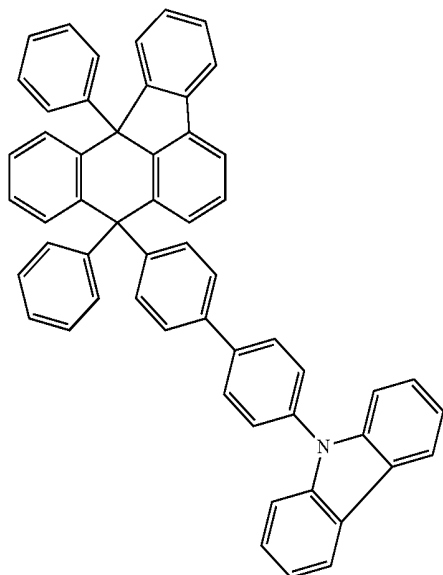
[0180] According to one embodiment of the present disclosure, the compound of Chemical Formula 1 may be any one selected from



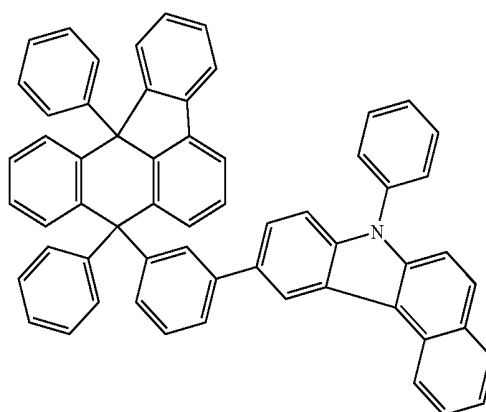
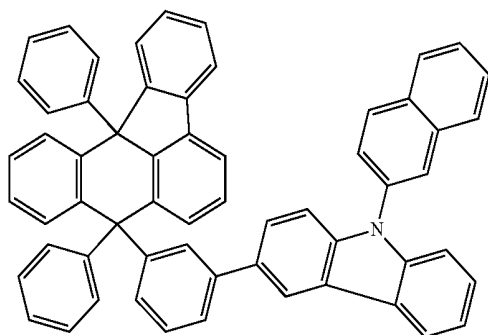
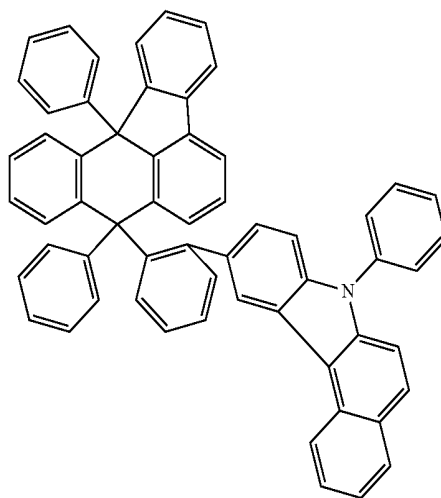
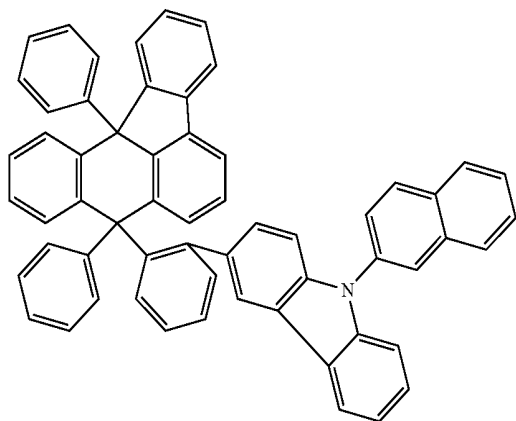
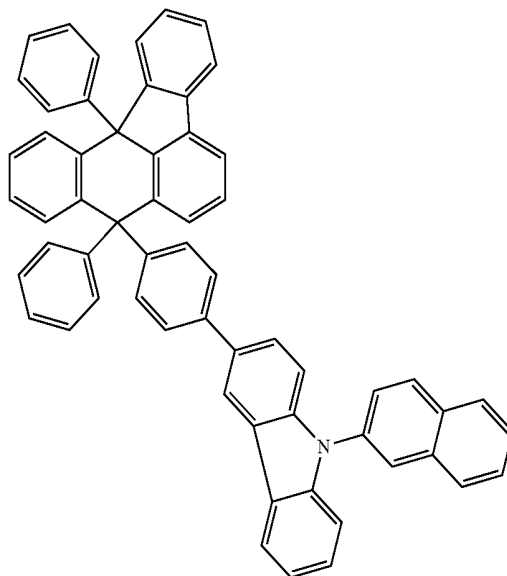
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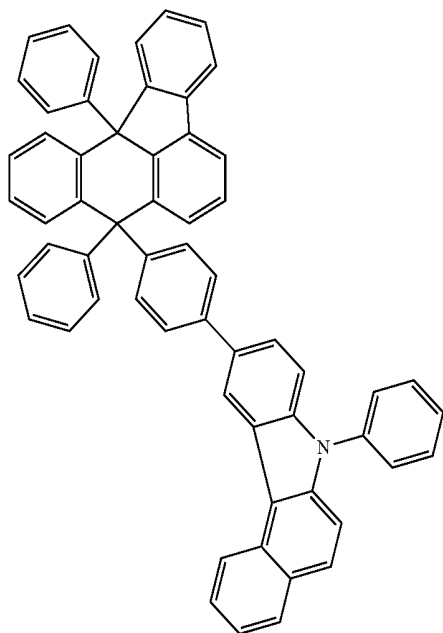
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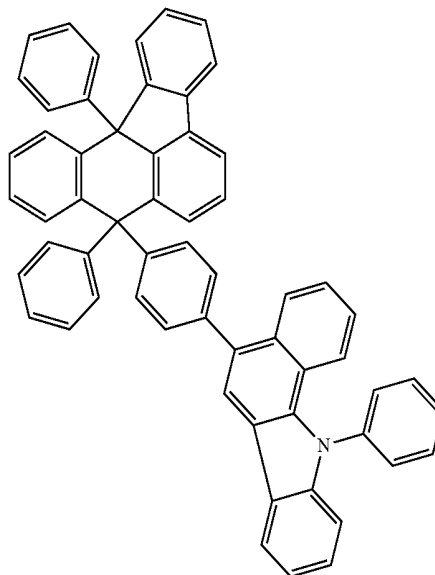
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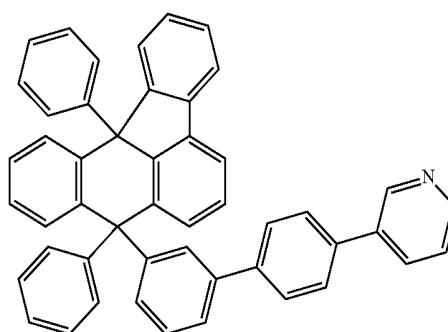
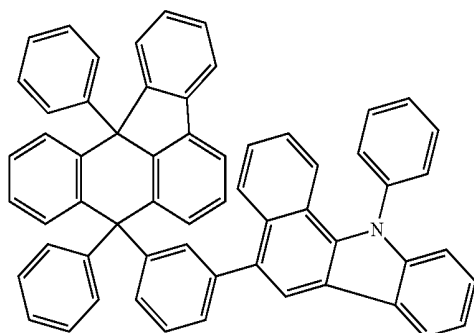
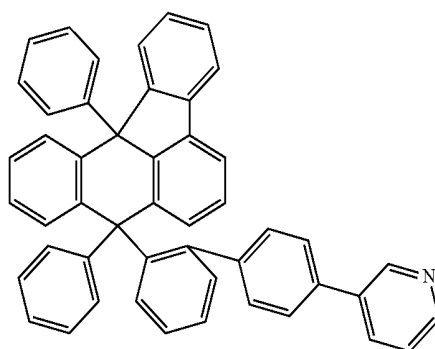
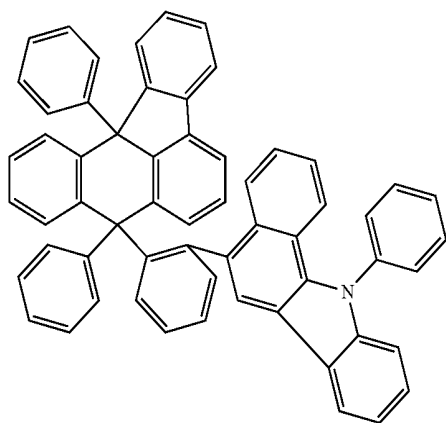
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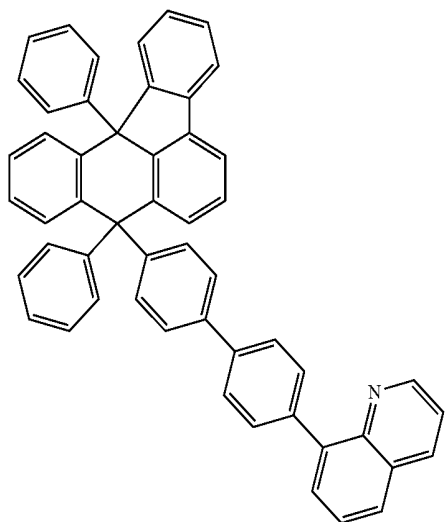
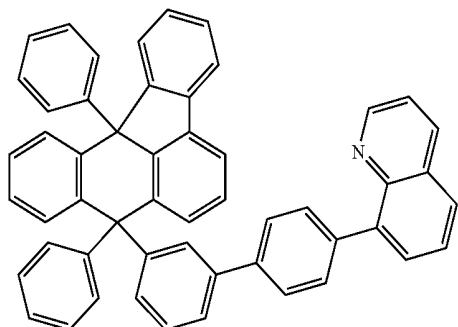
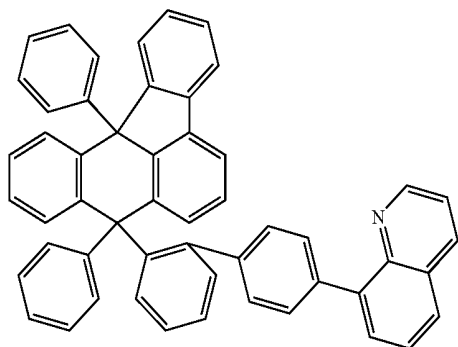
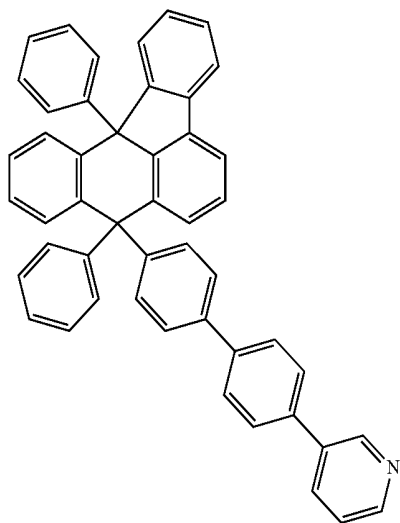
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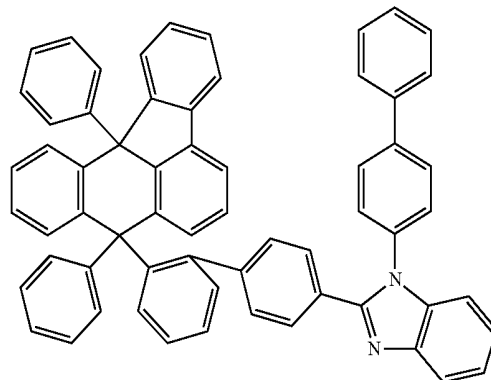
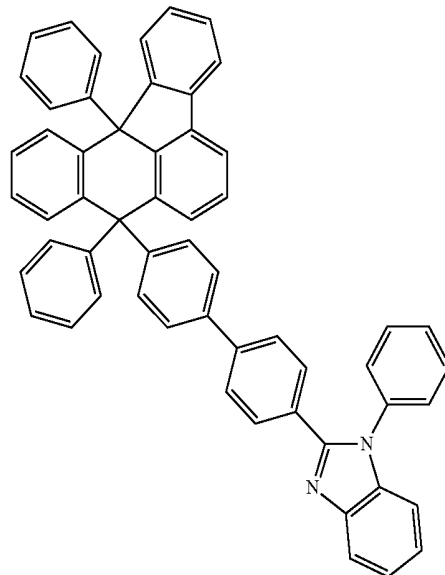
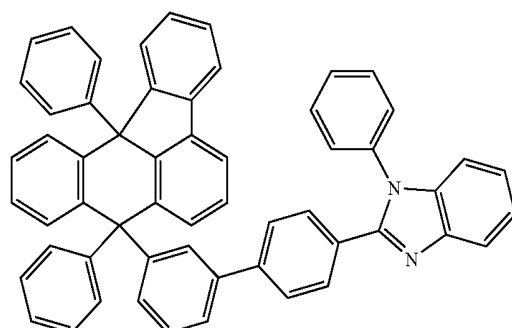
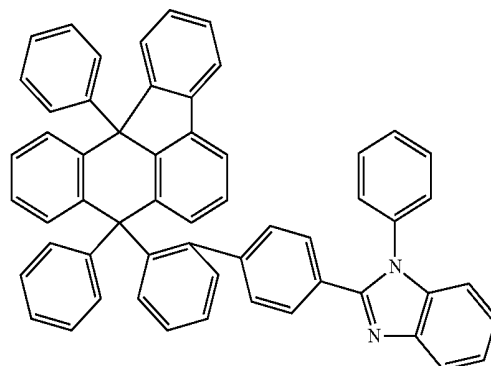
[0181] According to one embodiment of the present disclosure, the compound of Chemical Formula 1 may be any one selected from

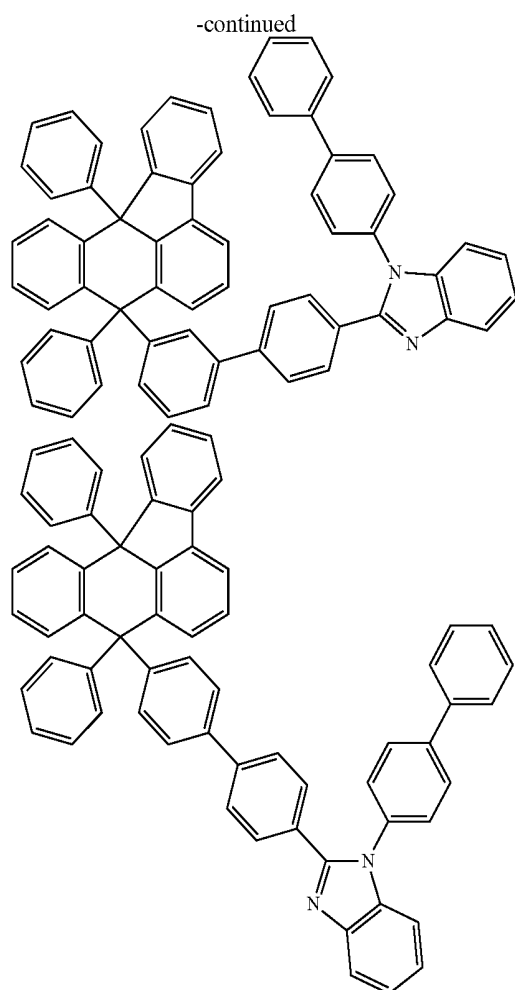


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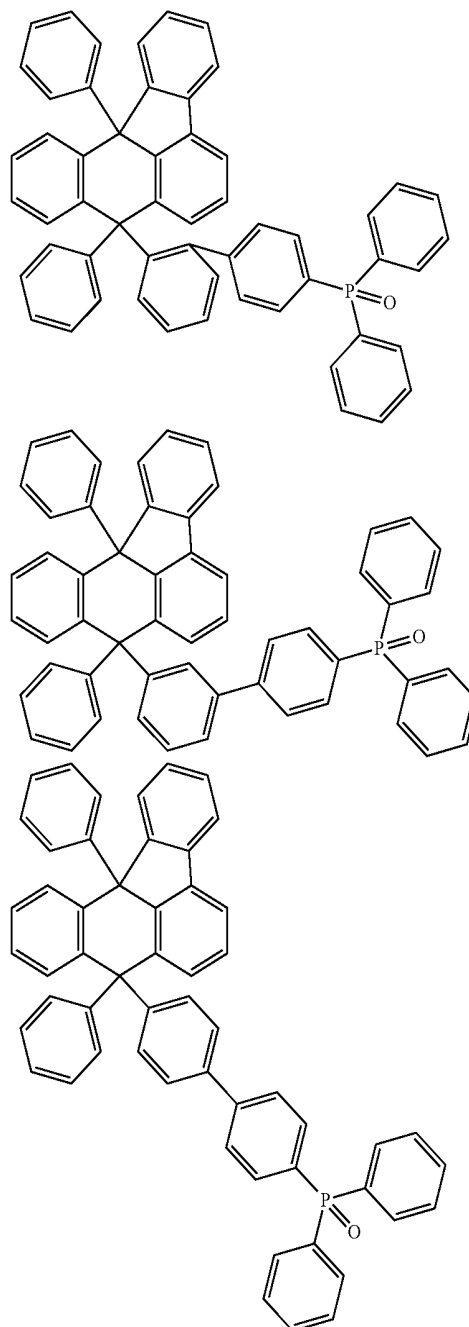
[0182] According to one embodiment of the present specification, in Chemical Formula 1, a is from 1 to 10, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; a substituted or unsubstituted arylene group or a substituted or unsubstituted heteroarylene group, m is an integer of 1 to 10, A is $-P(=O)R_5R_6$, and R5 and R6 are the same as or different from each other and each independently a substituted or unsubstituted aryl group.

[0183] According to one embodiment of the present specification, in Chemical Formula 1, a is 1 or 2, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; or a substituted or unsubstituted arylene group, m is 1 or 2, A is $-P(=O)R_5R_6$, and R5 and R6 are the same as or different from each other and each independently a substituted or unsubstituted aryl group.

[0184] According to one embodiment of the present specification, in Chemical Formula 1, a is 1 or 2, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; or an arylene group having 6 to 20 carbon atoms, m is 1 or 2, A is $-P(=O)R_5R_6$, and R5 and R6 are the same as or different from each other and each independently an aryl group having 6 to 20 carbon atoms.

[0185] According to one embodiment of the present specification, in Chemical Formula 1, a is 1 or 2, at least one of R1s is represented by $-(L)m-A$, L is a phenylene group, m is 1 or 2, A is $-P(=O)R_5R_6$, and R5 and R6 are each a phenyl group.

[0186] According to one embodiment of the present disclosure, the compound of Chemical Formula 1 may be any one selected from



[0187] According to one embodiment of the present specification, in Chemical Formula 1, a is from 1 to 10, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group, m is an integer of 1 to 10, and A is a substituted or unsubstituted anthracene group; or an aryl group substituted with a halogen group or a nitrile group.

[0188] According to one embodiment of the present specification, in Chemical Formula 1, a is 1 or 2, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; a

substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group, m is 1 or 2, and A is a substituted or unsubstituted anthracene group; or an aryl group substituted with a halogen group or a nitrile group.

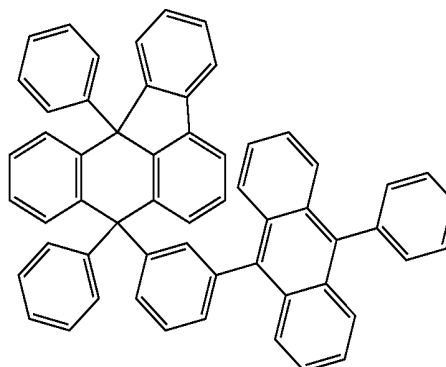
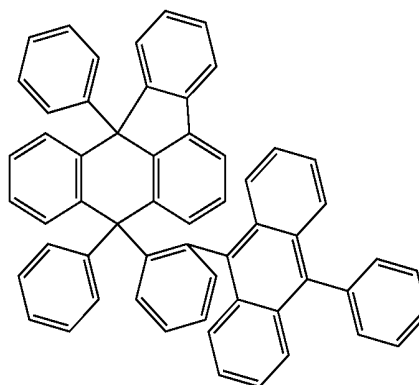
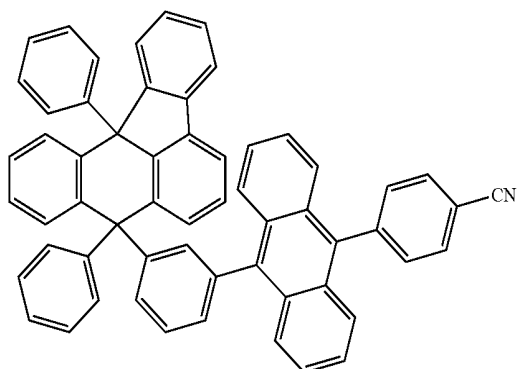
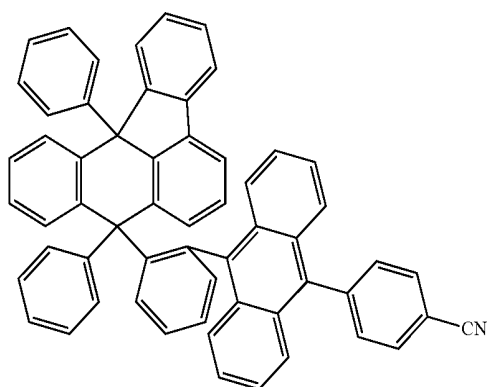
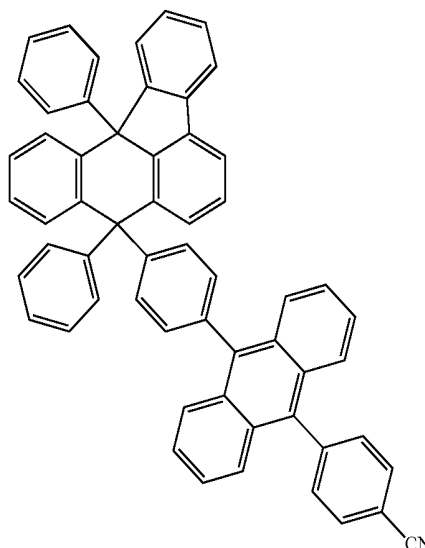
[0189] According to one embodiment of the present specification, in Chemical Formula 1, a is 1 or 2, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; an arylene group; or a heteroarylene group, m is 1 or 2, and A is an anthracene group substituted with an aryl group unsubstituted or substituted with a halogen group or a nitrile group; or an aryl group substituted with a halogen group or a nitrile group.

[0190] According to one embodiment of the present specification, in Chemical Formula 1, a is 1 or 2, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; or an arylene group; m is 1 or 2, and A is an anthracene group substituted with an aryl group unsubstituted or substituted with a fluorine group or a nitrile group; or an aryl group substituted with a fluorine group or a nitrile group.

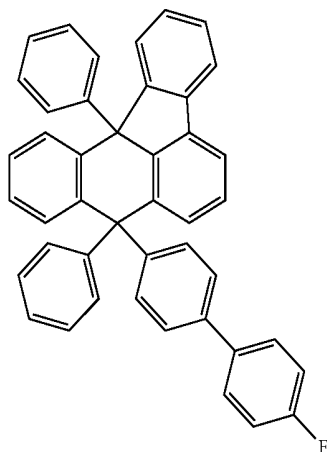
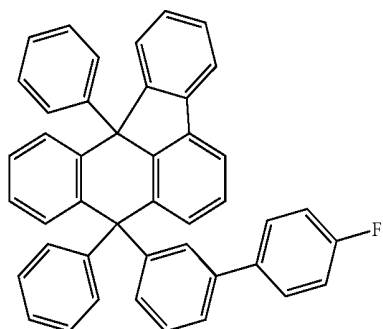
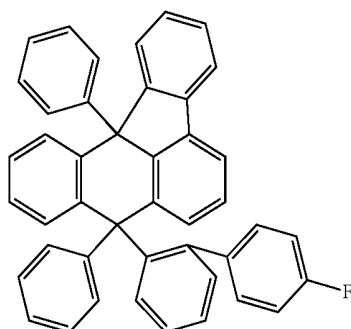
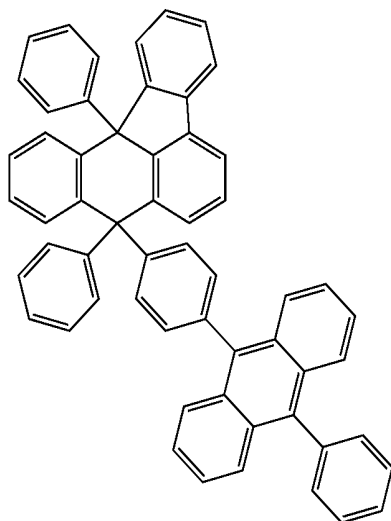
[0191] According to one embodiment of the present specification, in Chemical Formula 1, a is 1 or 2, at least one of R1s is represented by $-(L)m-A$, L is a direct bond; m is 1 or 2, and A is an anthracene group substituted with a phenyl group unsubstituted or substituted with a nitrile group; or a phenyl group substituted with a fluorine group or a nitrile group.

[0192] According to one embodiment of the present disclosure, the compound of Chemical Formula 1 may be any one selected from

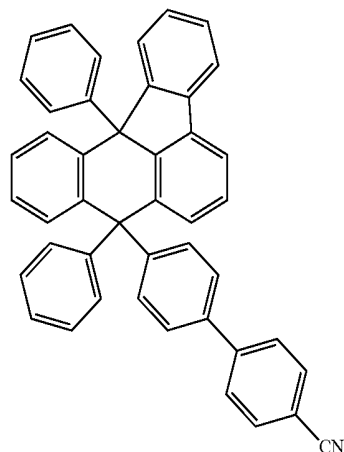
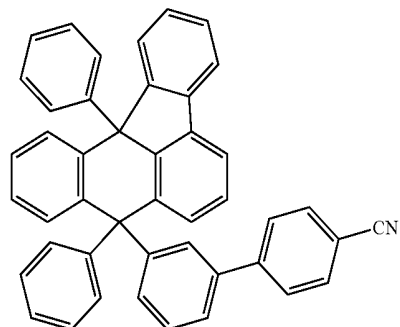
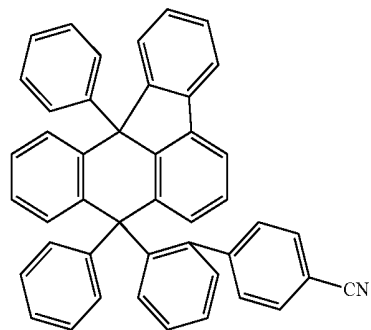
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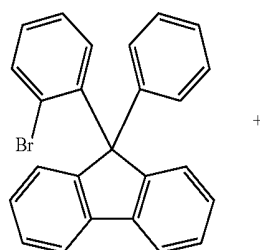
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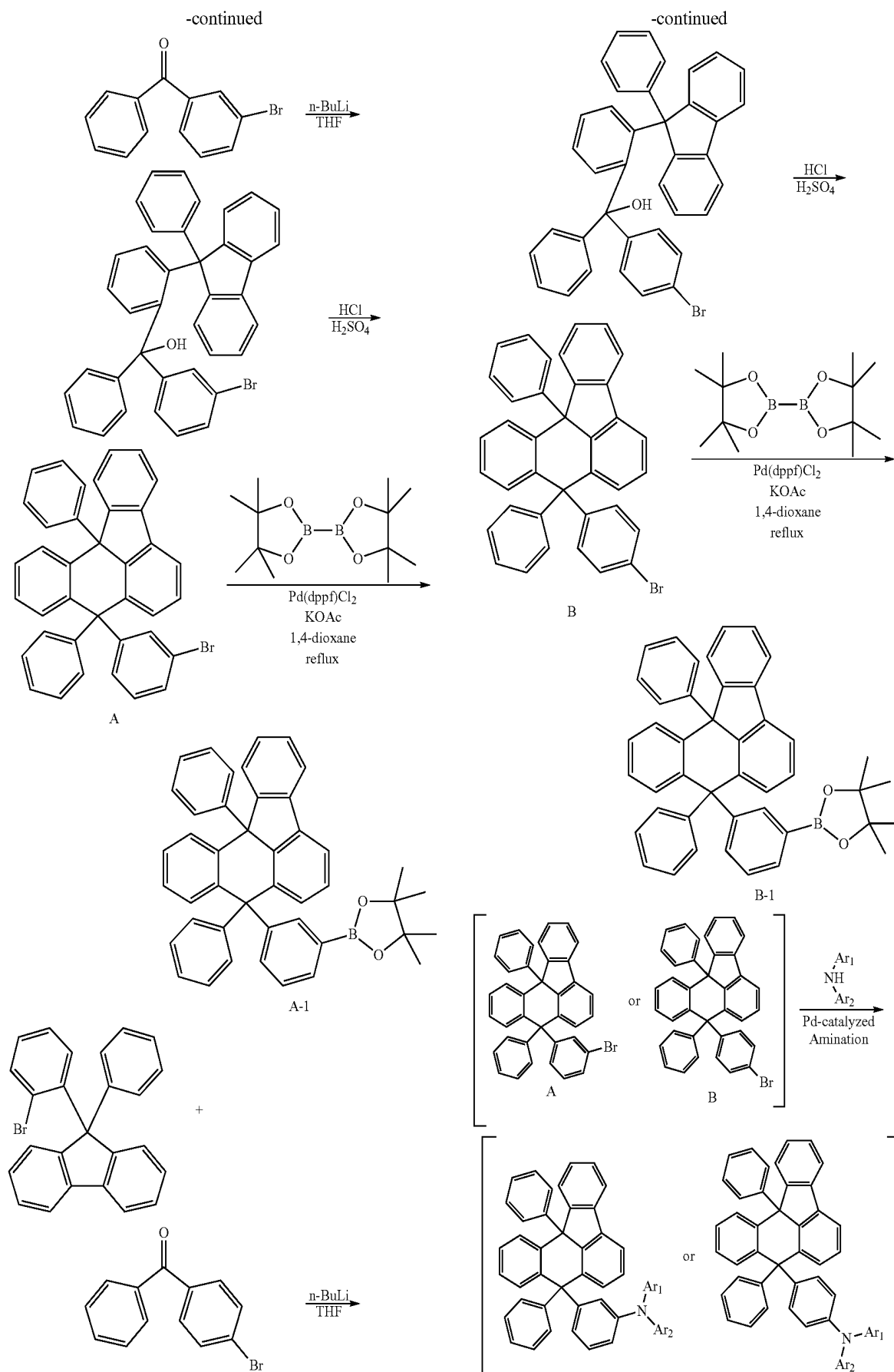


[0193] The compound represented by Chemical Formula 1 may be prepared based on preparation examples described below.

[0194] According to one embodiment, the compound represented by Chemical Formula 1 may be prepared through steps such as the following Reaction Formulae 1-1, 1-2 and 1-3.

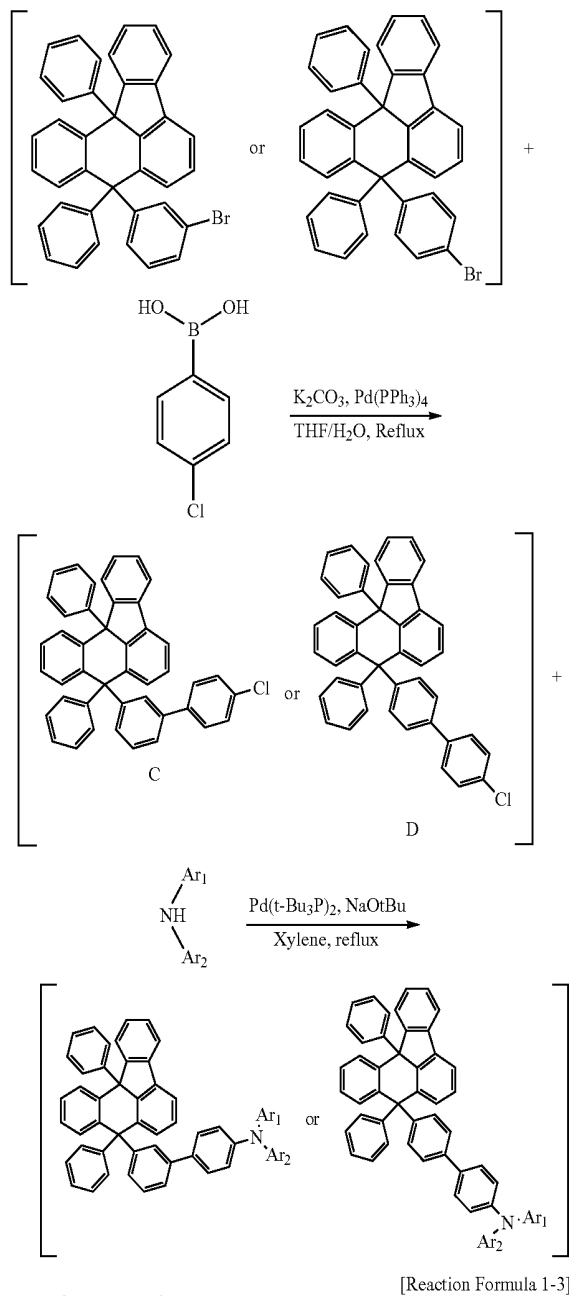
[Reaction Formula 1-1]



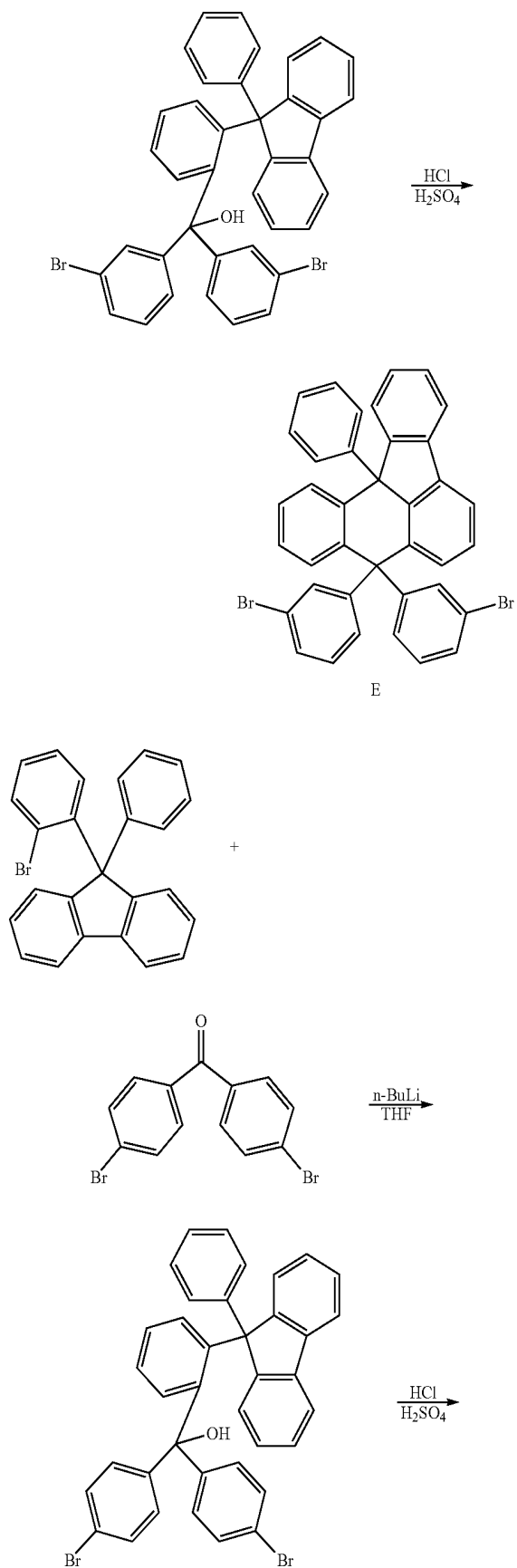


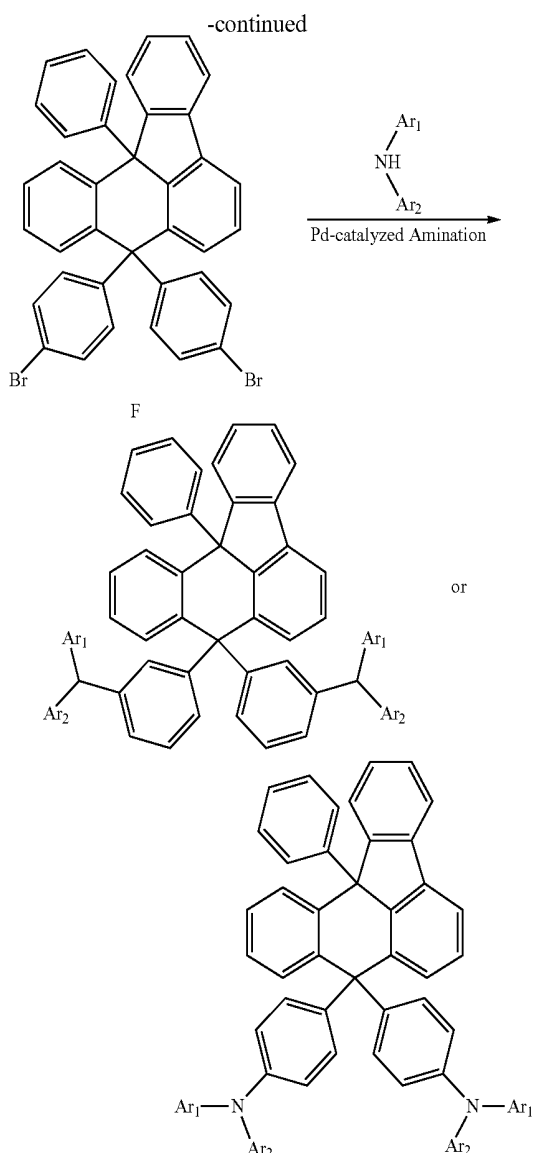
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[Reaction Formula 1-2]



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[0195] In the reaction formulae,

[0196] definitions of Ar₁, Ar₂, Ar₃ and Ar₄ are the same as in Chemical Formula 1.

[0197] Preparation examples of compounds having specific substituents at specific positions are described in Reaction Formulae 1-1, 1-2 and 1-3, however, those skilled in the art may modify the positions, the types and the numbers of the substituents with reference to the above-mentioned reaction formulae using materials known in the art.

[0198] In addition, the present specification provides an organic light emitting device including the compound represented by Chemical Formula 1.

[0199] One embodiment of the present specification provides an organic light emitting device including a first electrode; a second electrode provided opposite to the first electrode; and one or more organic material layers provided between the first electrode and the second electrode, wherein one or more layers of the organic material layers include the compound of Chemical Formula 1.

[0200] The organic material layer of the organic light emitting device of the present specification may be formed in a single layer structure, but may be formed in a multilayer

structure in which two or more organic material layers are laminated. For example, the organic light emitting device of the present disclosure may have a structure including a hole injection layer, a hole transfer layer, an electron suppression layer, a light emitting layer, a hole suppression layer, an electron transfer layer, an electron injection layer and the like as the organic material layer. However, the structure of the organic light emitting device is not limited thereto, and may include less numbers of organic material layers.

[0201] In one embodiment of the present specification, the organic material layer includes a hole injection layer, a hole transfer layer or a layer carrying out hole injection and transfer at the same time, and the hole injection layer, the hole transfer layer, or the layer carrying out hole injection and transfer at the same time includes the compound of Chemical Formula 1.

[0202] In one embodiment of the present specification, the organic material layer includes an electron suppression layer, and the electron suppression layer includes the compound of Chemical Formula 1.

[0203] In another embodiment, the organic material layer includes a light emitting layer, and the light emitting layer includes the compound of Chemical Formula 1.

[0204] In one embodiment of the present specification, the organic material layer includes a hole suppression layer, and the hole suppression layer includes the compound of Chemical Formula 1.

[0205] In one embodiment of the present specification, the electron transfer layer, the electron injection layer, or the layer carrying out electron transfer and electron injection at the same time includes the compound of Chemical Formula 1.

[0206] In another embodiment, the organic material layer includes a light emitting layer and an electron transfer layer, and the electron transfer layer includes the compound of Chemical Formula 1.

[0207] One embodiment of the present specification provides an organic light emitting device including a first electrode; a second electrode provided opposite to the first electrode; a light emitting layer provided between the first electrode and the second electrode; and two or more organic material layers provided between the light emitting layer and the first electrode, or between the light emitting layer and the second electrode, wherein at least one of the two or more organic material layers includes the compound. In one embodiment, as the two or more organic material layers, two or more may be selected from the group consisting of an electron transfer layer, an electron injection layer, a layer carrying out electron transfer and electron injection at the same time, and a hole suppression layer.

[0208] In one embodiment of the present specification, the organic material layer includes two or more electron transfer layers, and at least one of the two or more electron transfer layers includes the compound. Specifically, in one embodiment of the present specification, the compound may be included in one of the two or more electron transfer layers, or may be included in each of the two or more electron transfer layers.

[0209] In one embodiment of the present specification, when the compound is included in each of the two or more electron transfer layers, materials other than the compound may be the same as or different from each other.

[0210] In another embodiment, the organic light emitting device may be an organic light emitting device having a

structure of consecutively laminating an anode, one or more organic material layers and a cathode on a substrate (normal type).

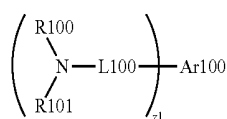
[0211] In another embodiment, the organic light emitting device may be an organic light emitting device having a reverse structure of consecutively laminating a cathode, one or more organic material layers and an anode on a substrate (inverted type).

[0212] For example, structures of an organic light emitting device according to one embodiment of the present specification are illustrated in FIG. 1 and FIG. 2.

[0213] FIG. 1 illustrates an organic light emitting device formed with a substrate (1), an anode (2), a light emitting layer (3) and a cathode (4). In such a structure, the compound may be included in the light emitting layer.

[0214] FIG. 2 illustrates an organic light emitting device formed with a substrate (1), an anode (2), a hole injection layer (5), a hole transfer layer (6), a light emitting layer (7), an electron transfer layer (8) and a cathode (4). In such a structure, the compound may be included in one or more layers of the hole injection layer, the hole transfer layer, the light emitting layer and the electron transfer layer.

[0215] According to one embodiment of the present specification, the organic material layer includes a light emitting layer, and the light emitting layer includes a compound represented by the following Chemical Formula 15.



[Chemical Formula 15]

[0216] In Chemical Formula 15,

[0217] $z1$ is an integer of 1 or greater, and when $z1$ is 2 or greater, structures in the parentheses are the same as or different from each other,

[0218] Ar100 is a substituted or unsubstituted monovalent or higher benzofluorene group; a substituted or unsubstituted monovalent or higher fluoranthene group; a substituted or unsubstituted monovalent or higher pyrene group; or a substituted or unsubstituted monovalent or higher chrysene group,

[0219] L100 is a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group,

[0220] R100 and R101 are the same as or different from each other, and each independently a substituted or unsubstituted aryl group; a substituted or unsubstituted alkyl group; a substituted or unsubstituted silyl group; a substituted or unsubstituted arylalkyl group; or a substituted or unsubstituted heterocyclic group, or may bond to each other to form a substituted or unsubstituted ring.

[0221] According to one embodiment of the present specification, the light emitting layer includes the compound represented by Chemical Formula 15 as a dopant of the light emitting layer.

[0222] According to one embodiment of the present specification, L100 is a direct bond.

[0223] According to one embodiment of the present specification, $z1$ is 2.

[0224] According to one embodiment of the present specification, Ar100 is a divalent pyrene group unsubstituted or

substituted with deuterium, a methyl group, an ethyl group, an iso-propyl group or a tert-butyl group; or a divalent chrysene group unsubstituted or substituted with deuterium, a methyl group, an ethyl group, an iso-propyl group or a tert-butyl group.

[0225] According to one embodiment of the present specification, Ar100 is a divalent pyrene group unsubstituted or substituted with deuterium, a methyl group, an ethyl group, an iso-propyl group or a tert-butyl group.

[0226] According to one embodiment of the present specification, Ar100 is a divalent pyrene group.

[0227] According to one embodiment of the present specification, R100 and R101 are the same as or different from each other, and each independently a substituted or unsubstituted aryl group having 6 to 60 carbon atoms; or a substituted or unsubstituted heterocyclic group having 2 to 60 carbon atoms.

[0228] According to one embodiment of the present specification, R100 and R101 are the same as or different from each other, and each independently an aryl group having 6 to 60 carbon atoms unsubstituted or substituted with deuterium, an alkyl group, a nitrile group, an aryl group, an alkylsilyl group or an alkylgermanium group; or a heterocyclic group having 2 to 60 carbon atoms unsubstituted or substituted with deuterium, an alkyl group, a nitrile group, an aryl group, an alkylsilyl group or an alkylgermanium group.

[0229] According to one embodiment of the present specification, R100 and R101 are the same as or different from each other, and each independently an aryl group having 6 to 60 carbon atoms unsubstituted or substituted with deuterium, a methyl group, an ethyl group, an iso-propyl group, a tert-butyl group, a nitrile group, a phenyl group, a trimethylsilyl group or a trimethylgermanium group; or a heterocyclic group having 2 to 60 carbon atoms unsubstituted or substituted with deuterium, a methyl group, an ethyl group, an iso-propyl group, a tert-butyl group, a nitrile group, a phenyl group, a trimethylsilyl group or a trimethylgermanium group.

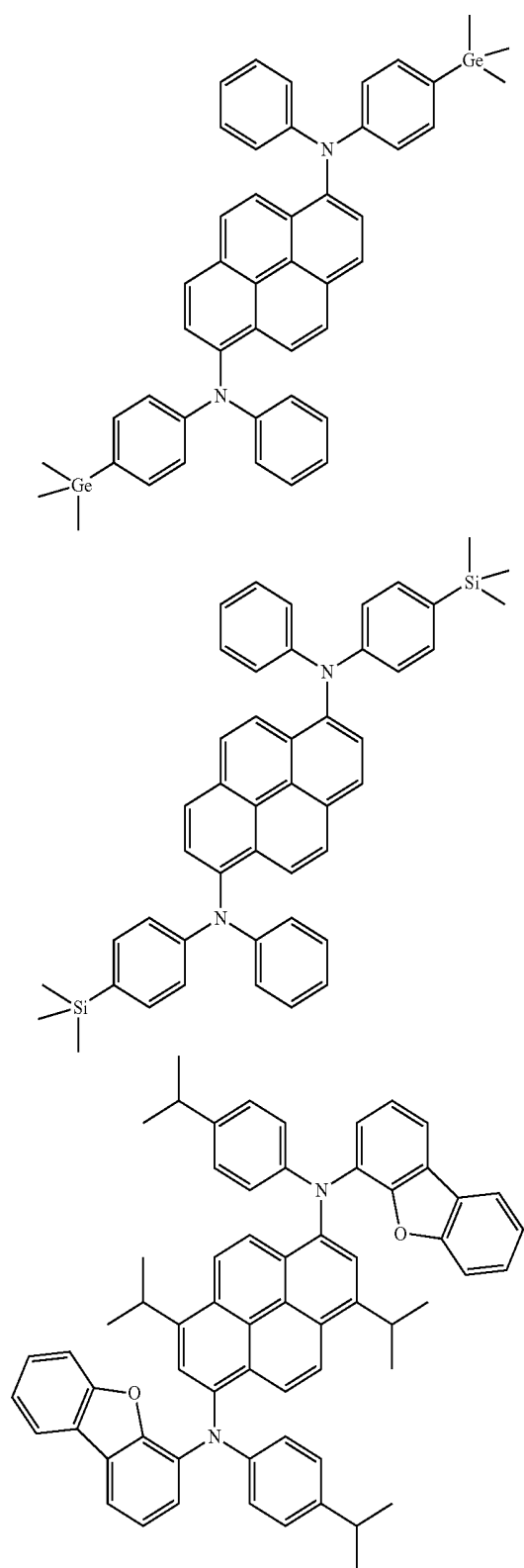
[0230] According to one embodiment of the present specification, R100 and R101 are the same as or different from each other, and each independently a phenyl group unsubstituted or substituted with deuterium, a methyl group, an ethyl group, an iso-propyl group, a tert-butyl group, a nitrile group, a phenyl group, a trimethylsilyl group or a trimethylgermanium group; a biphenyl group unsubstituted or substituted with deuterium, a methyl group, an ethyl group, an iso-propyl group, a tert-butyl group, a nitrile group, a phenyl group, a trimethylsilyl group or a trimethylgermanium group; a terphenyl group unsubstituted or substituted with deuterium, a methyl group, an ethyl group, an iso-propyl group, a tert-butyl group, a nitrile group, a phenyl group, a trimethylsilyl group or a trimethylgermanium group; or a dibenzofuran group unsubstituted or substituted with deuterium, a methyl group, an ethyl group, an iso-propyl group, a tert-butyl group, a nitrile group, a phenyl group, a trimethylsilyl group or a trimethylgermanium group.

[0231] According to one embodiment of the present specification, R100 and R101 are the same as or different from each other, and each independently a phenyl group unsubstituted or substituted with a trimethylgermanium group.

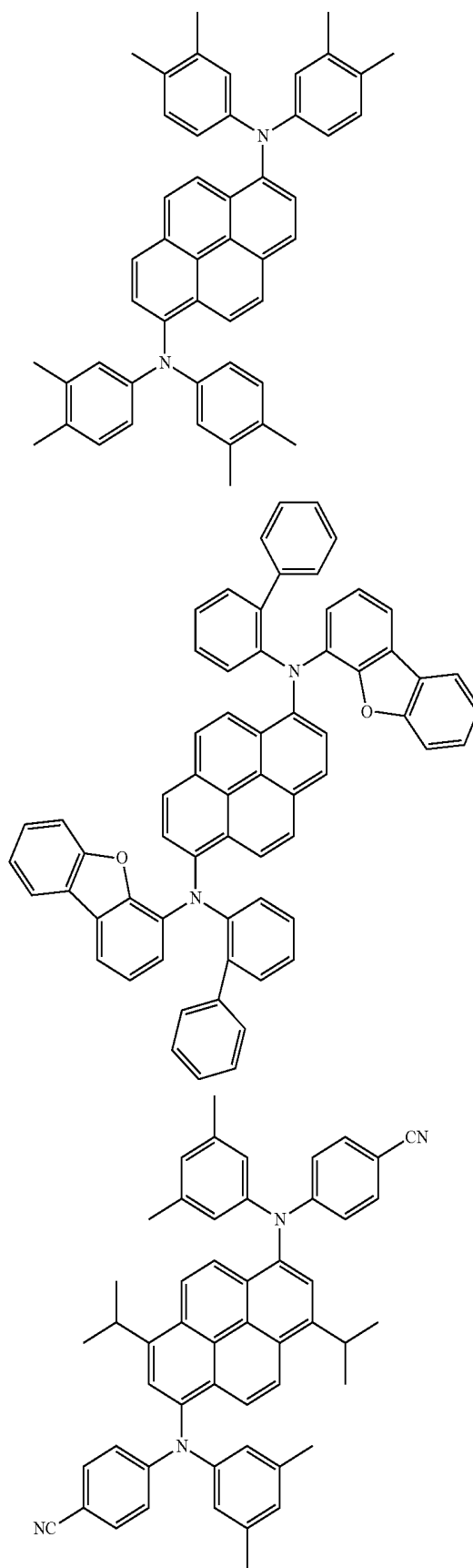
[0232] According to one embodiment of the present specification, R100 is a phenyl group.

[0233] According to one embodiment of the present specification, R101 is a phenyl group substituted with a trimethylgermanium group.

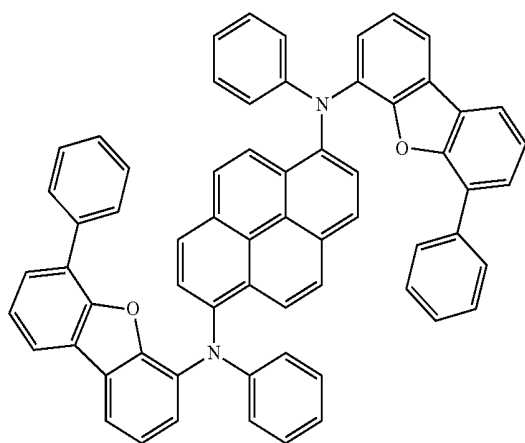
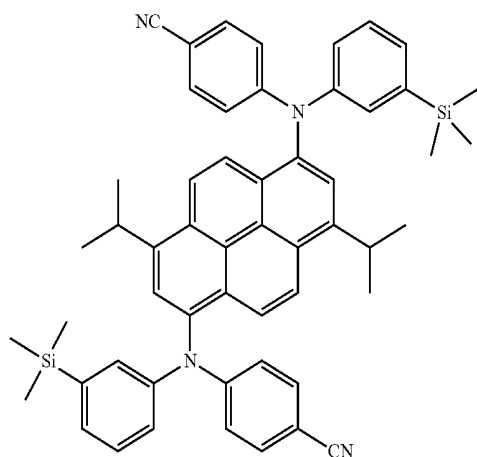
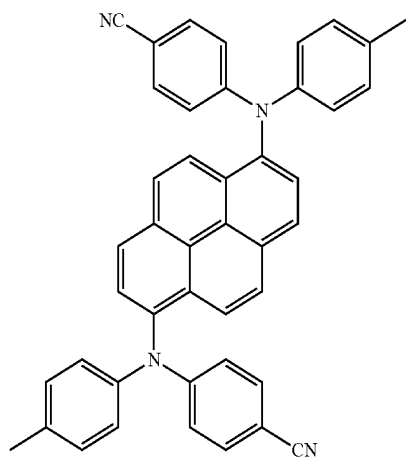
[0234] According to one embodiment of the present specification, Chemical Formula 15 may be selected from among the following compounds.



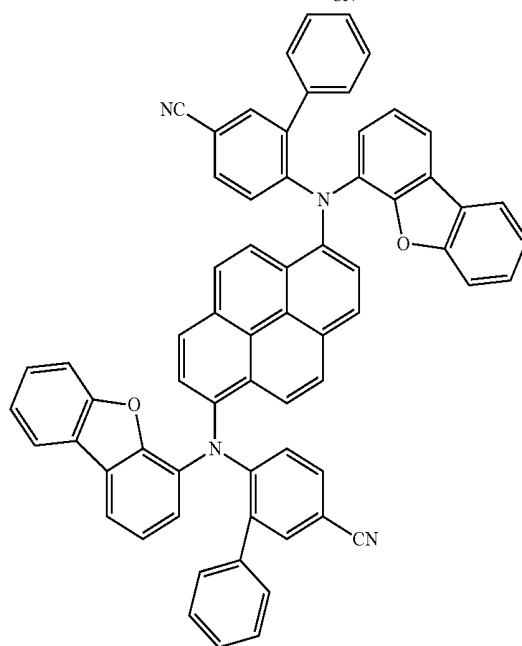
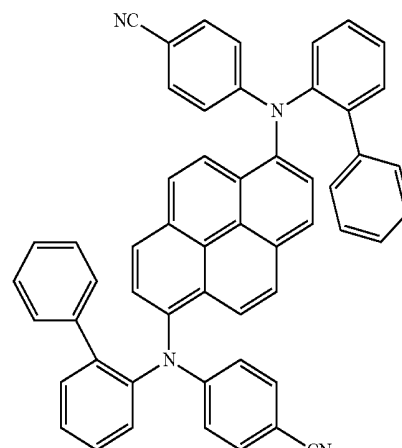
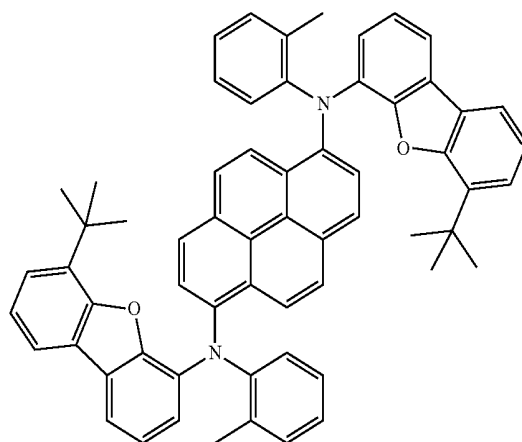
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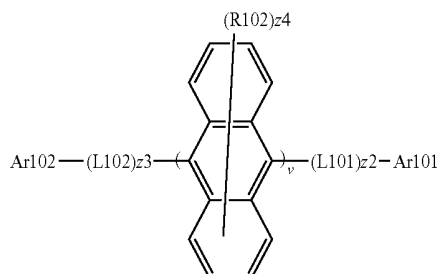


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[0235] According to one embodiment of the present specification, the organic material layer includes a light emitting layer, and the light emitting layer may include a compound represented by the following Chemical Formula 16.

[Chemical Formula 16]



[0236] In Chemical Formula 16,

[0237] Ar101 and Ar102 are the same as or different from each other, and each independently a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group,

[0238] L101 and L102 are the same as or different from each other, and each independently a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group,

[0239] R102 is hydrogen; deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a substituted or unsubstituted silyl group; a substituted or unsubstituted boron group; a substituted or unsubstituted alkyl group; a substituted or unsubstituted cycloalkyl group; a substituted or unsubstituted alkoxy group; a substituted or unsubstituted aryloxy group; a substituted or unsubstituted alkylthio group; a substituted or unsubstituted arylthio group; a substituted or unsubstituted alkylsulfoxy group; a substituted or unsubstituted arylsulfoxy group; a substituted or unsubstituted alkenyl group; a substituted or unsubstituted aralkyl group; a substituted or unsubstituted aralkenyl group; a substituted or unsubstituted alkylaryl group; a substituted or unsubstituted alkylamine group; a substituted or unsubstituted aralkylamine group; a substituted or unsubstituted heteroarylamine group; a substituted or unsubstituted arylamine group; a substituted or unsubstituted arylheteroarylamine group; a substituted or unsubstituted arylphosphine group; a substituted or unsubstituted phosphine oxide group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group,

[0240] z2 and z3 are the same as or different from each other and each independently an integer of 1 or 2, z4 is an integer of 0 to 8, and when z2 to z4 are 2 or greater, substituents in the parentheses are the same as or different from each other,

[0241] v is an integer of 1 or greater, and when v is an integer of 2 or greater, substituents in the parentheses are the same as or different from each other.

[0242] According to one embodiment of the present specification, the light emitting layer includes the compound represented by Chemical Formula 16 as a host of the light emitting layer.

[0243] According to one embodiment of the present specification, Ar101 and Ar102 are the same as or different from each other, and each independently a substituted or unsubstituted aryl group having 6 to 60 carbon atoms; or a substituted or unsubstituted heterocyclic group having 2 to 60 carbon atoms.

[0244] According to one embodiment of the present specification, Ar101 and Ar102 are the same as or different from each other, and each independently an aryl group having 6 to 60 carbon atoms unsubstituted or substituted with an alkyl group, an aryl group or a heterocyclic group; or a heterocyclic group having 2 to 60 carbon atoms unsubstituted or substituted with an alkyl group, an aryl group or a heterocyclic group.

[0245] According to one embodiment of the present specification, Ar101 and Ar102 are the same as or different from each other, and each independently a phenyl group unsubstituted or substituted with an aryl group or a heterocyclic group; a biphenyl group unsubstituted or substituted with an aryl group or a heterocyclic group; a terphenyl group unsubstituted or substituted with an aryl group or a heterocyclic group; a naphthyl group unsubstituted or substituted with an aryl group or a heterocyclic group; a fluorene group unsubstituted or substituted with an alkyl group, an aryl group or a heterocyclic group; a phenanthrene group unsubstituted or substituted with an aryl group or a heterocyclic group; or a triphenylene group unsubstituted or substituted with an aryl group or a heterocyclic group.

[0246] According to one embodiment of the present specification, Ar101 and Ar102 are the same as or different from each other, and each independently a phenyl group; a biphenyl group; a terphenyl group; a naphthyl group; a fluorene group unsubstituted or substituted with a methyl group or a phenyl group; a phenanthrene group; or a triphenylene group.

[0247] According to one embodiment of the present specification, Ar101 is a 2-naphthyl group.

[0248] According to one embodiment of the present specification, Ar102 is a 1-naphthyl group.

[0249] According to one embodiment of the present specification, L101 and L102 are the same as or different from each other, and each independently a direct bond; a phenylene group; or a naphthylene group.

[0250] According to one embodiment of the present specification, L101 is a phenylene group.

[0251] According to one embodiment of the present specification,

[0252] L102 is a direct bond.

[0253] According to one embodiment of the present specification, R102 is hydrogen.

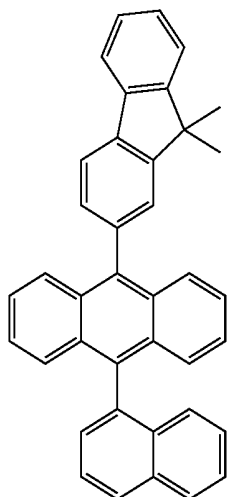
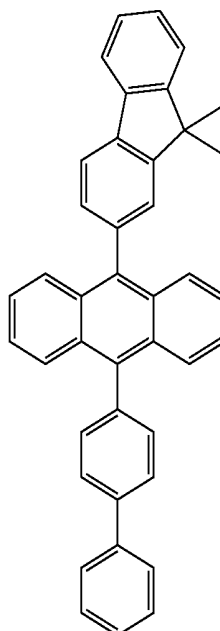
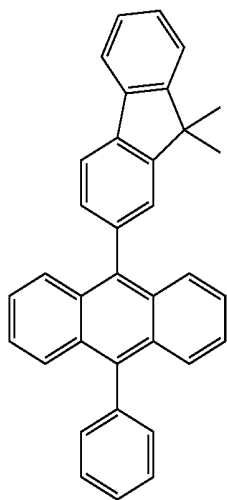
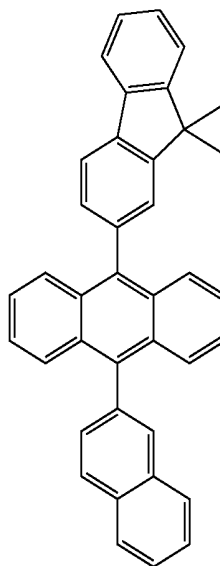
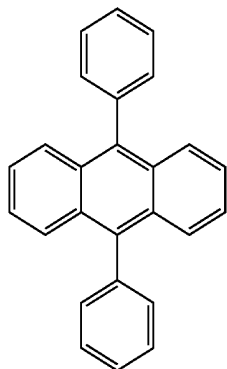
[0254] According to one embodiment of the present specification, z2 is 1.

[0255] According to one embodiment of the present specification, v is 1.

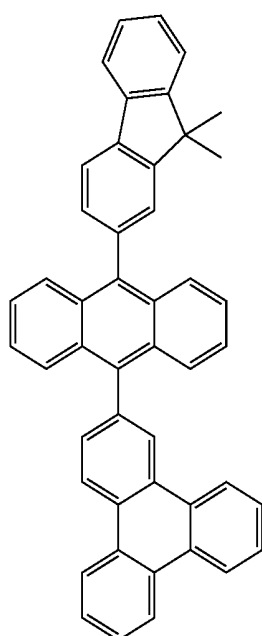
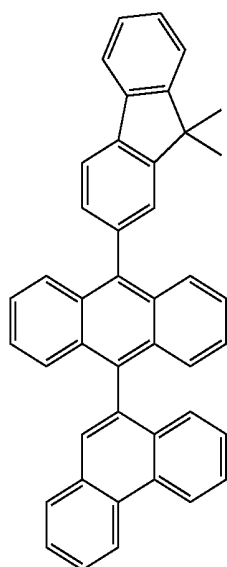
[0256] According to one embodiment of the present specification, v is 2.

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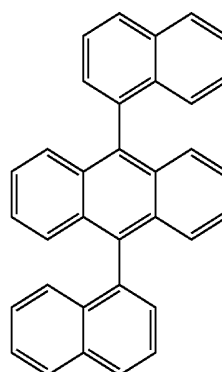
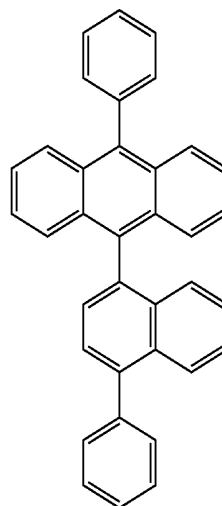
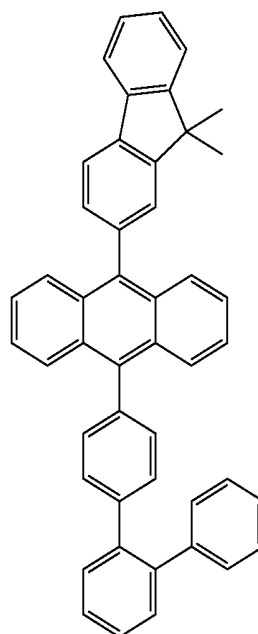
[0257] According to one embodiment of the present specification, Chemical Formula 16 may be selected from among the following compounds.



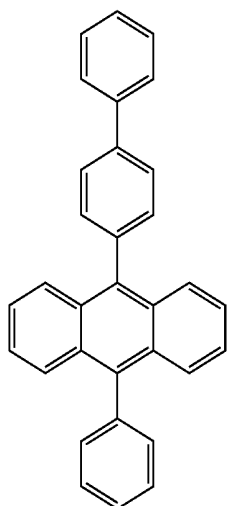
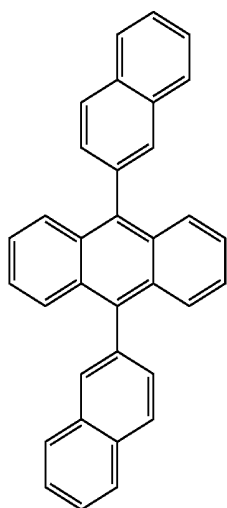
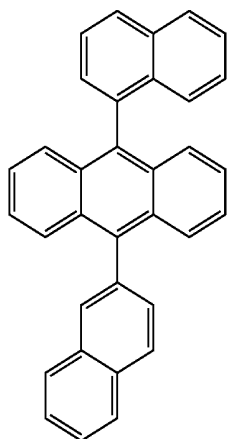
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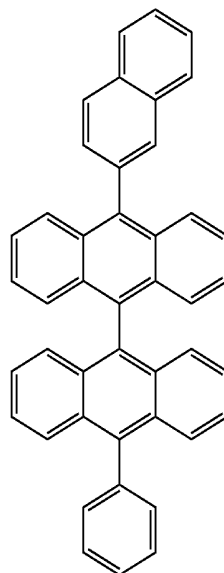
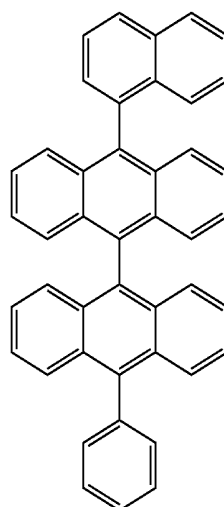
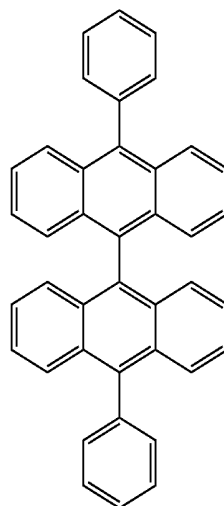
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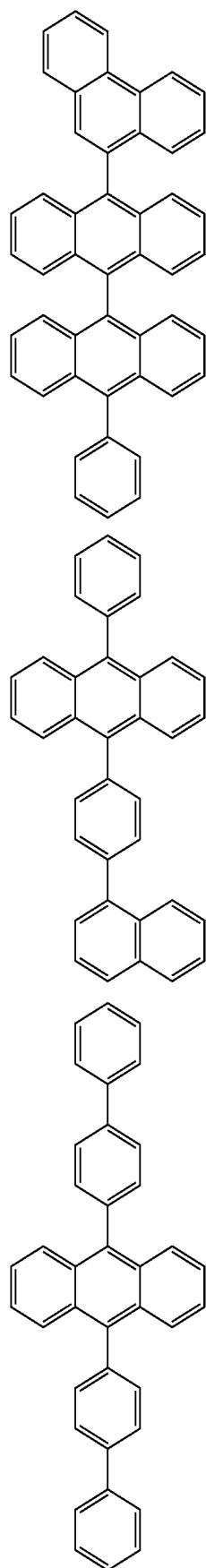
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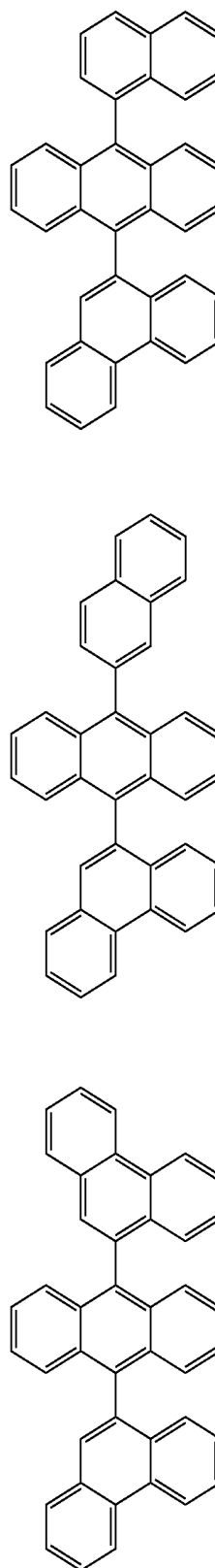
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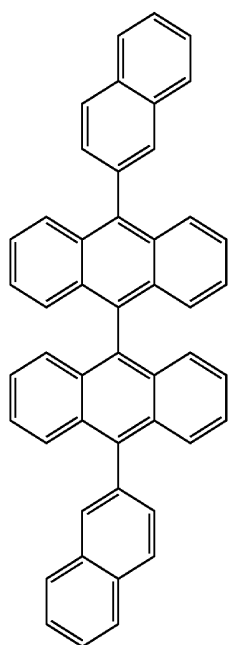
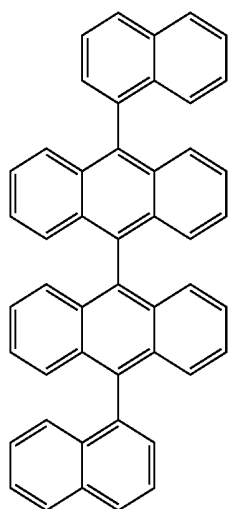
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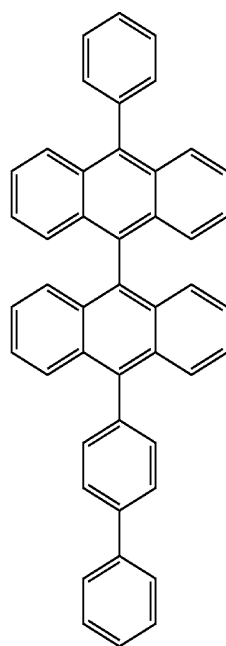
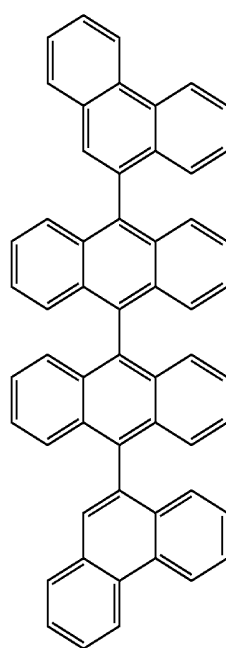
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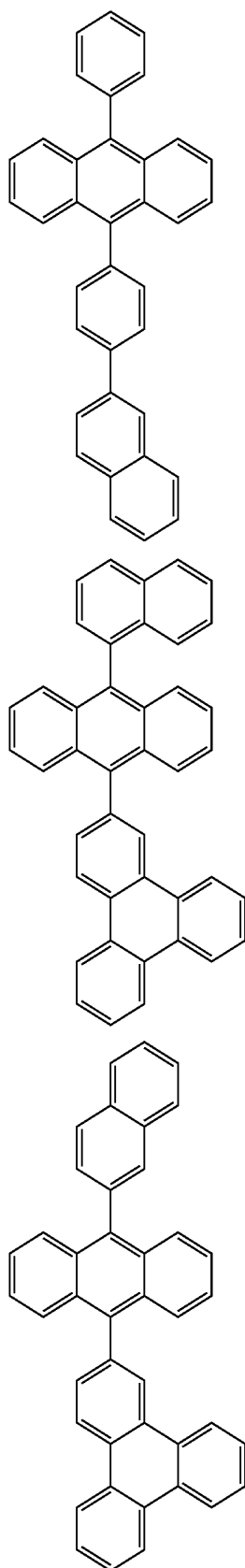
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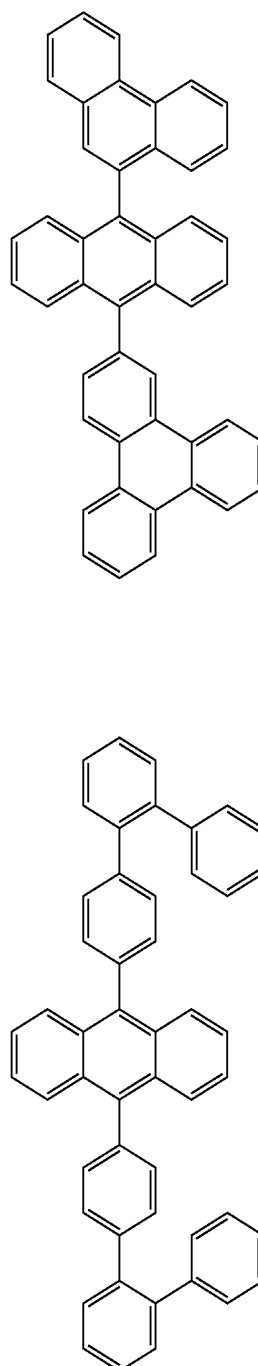
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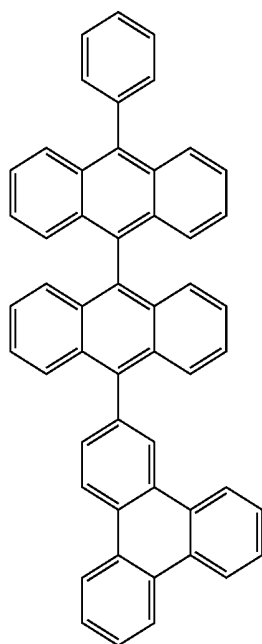
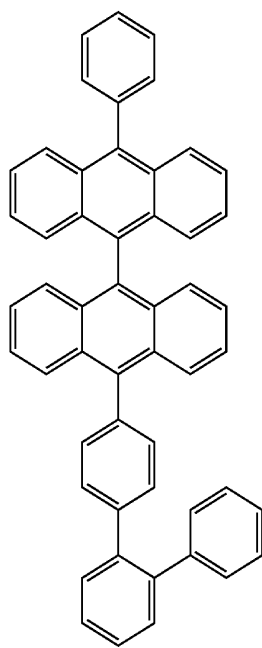
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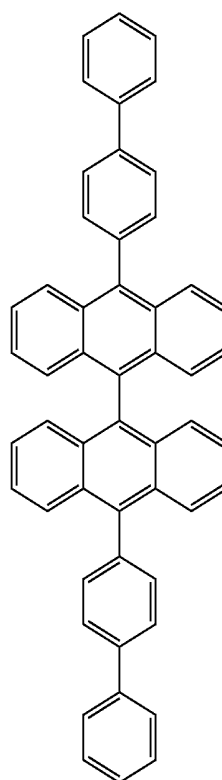
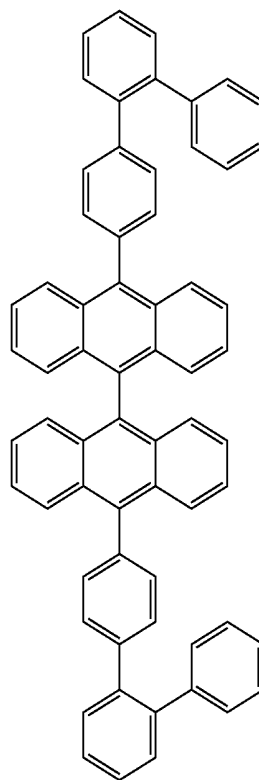
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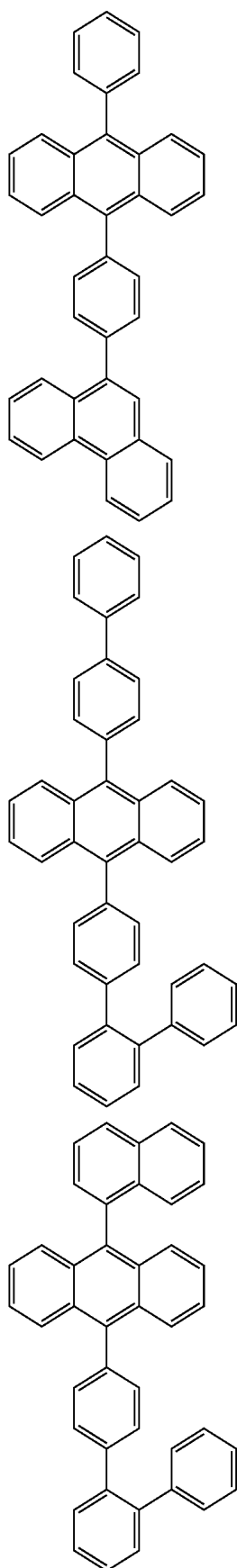
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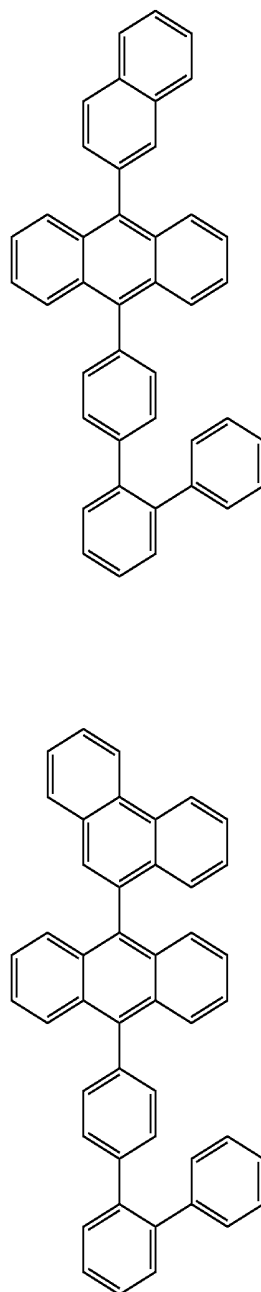
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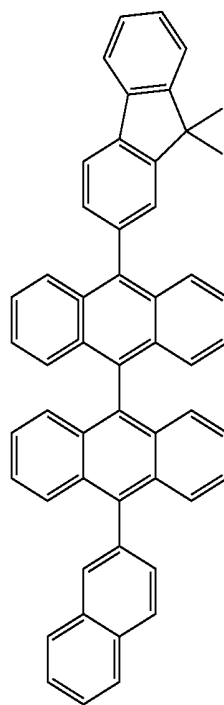
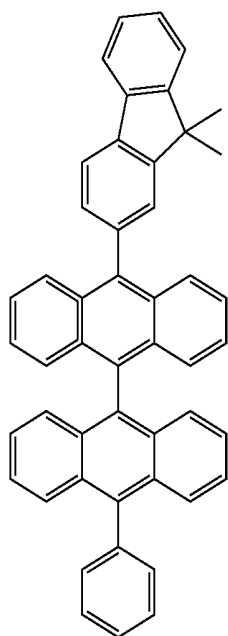
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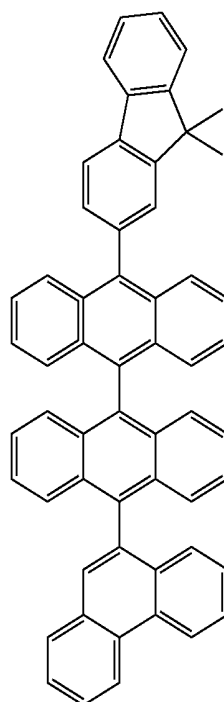
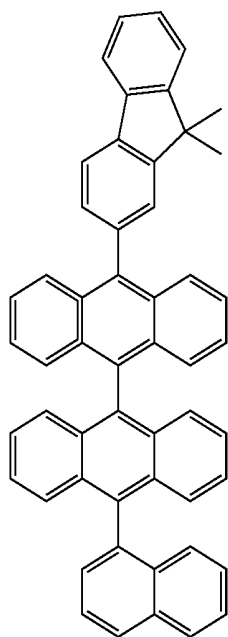
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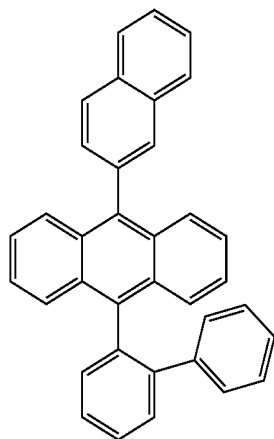
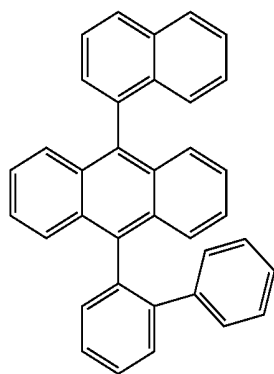
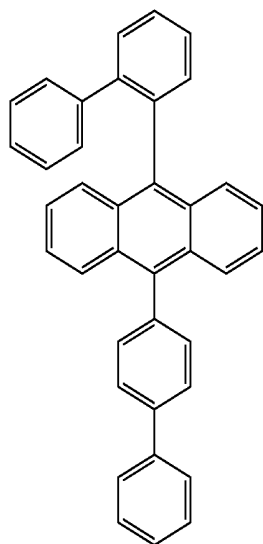
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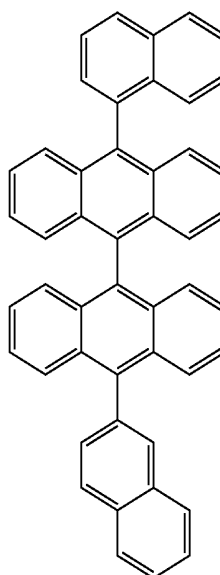
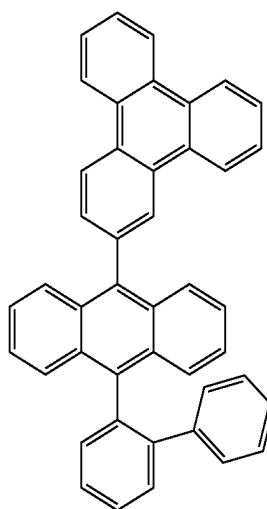
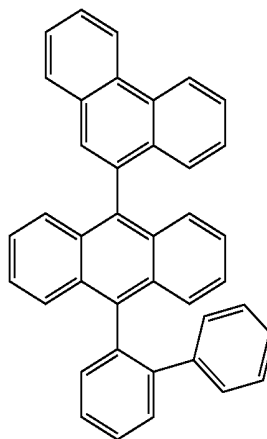
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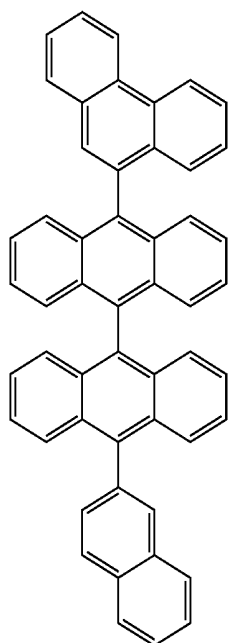
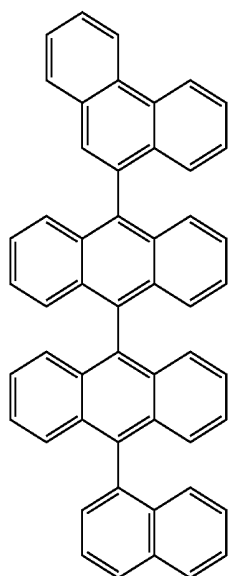
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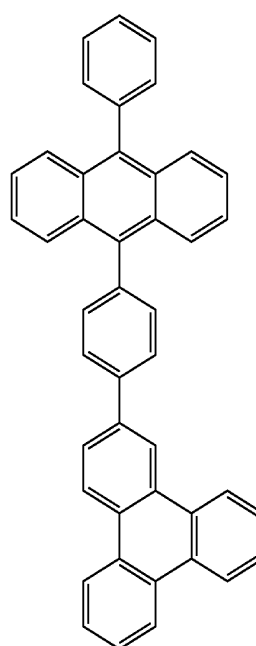
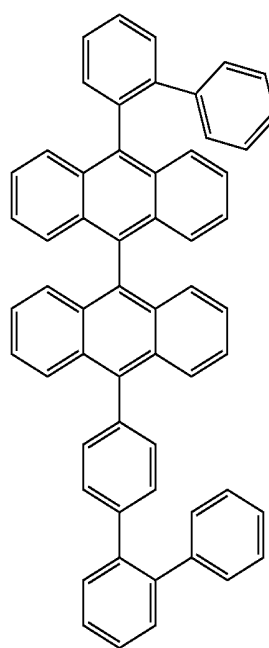
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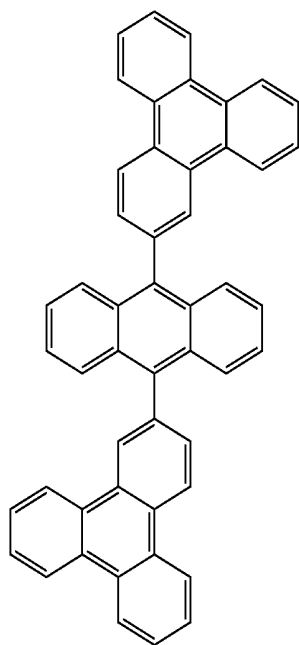
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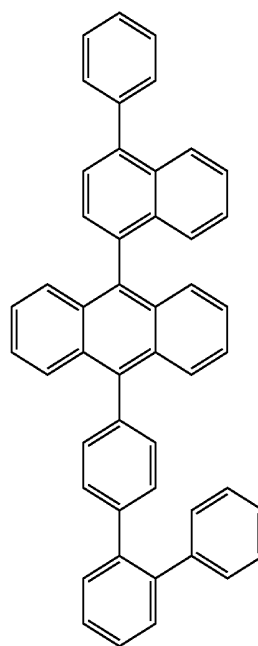
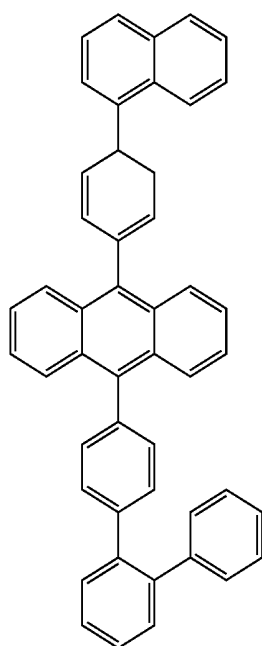
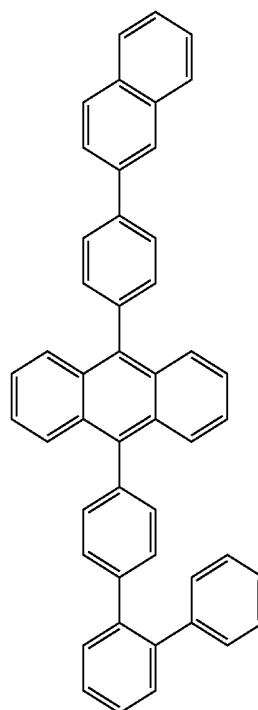
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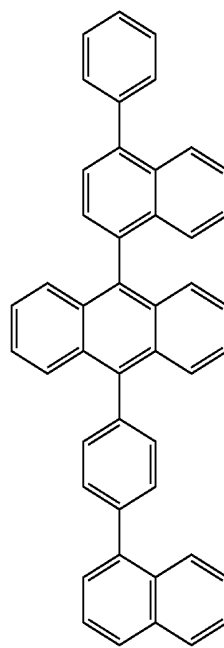
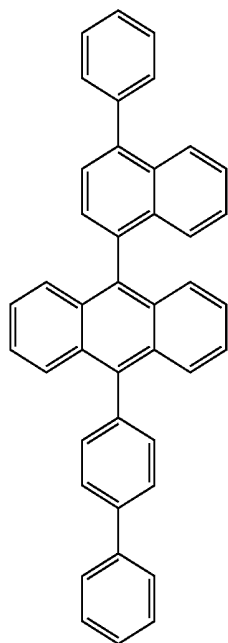
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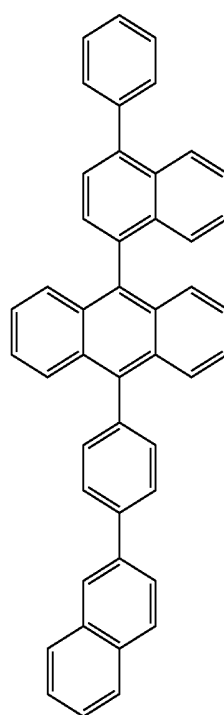
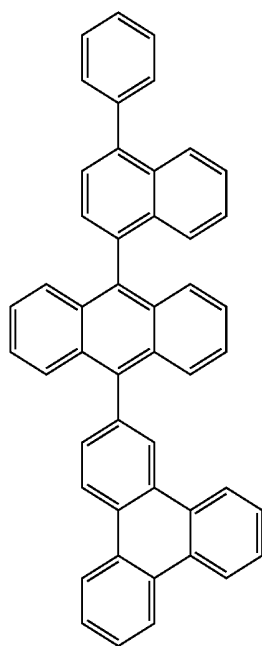
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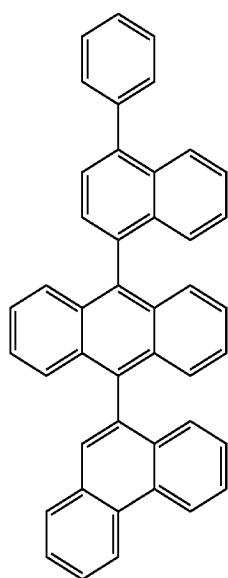
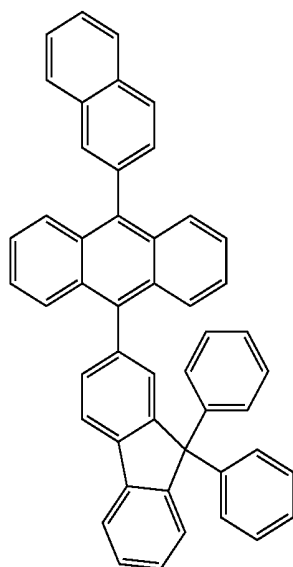
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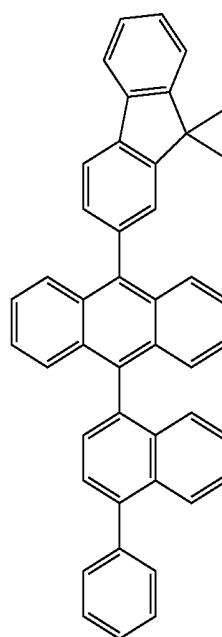
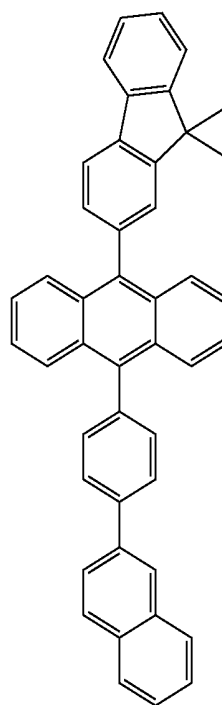
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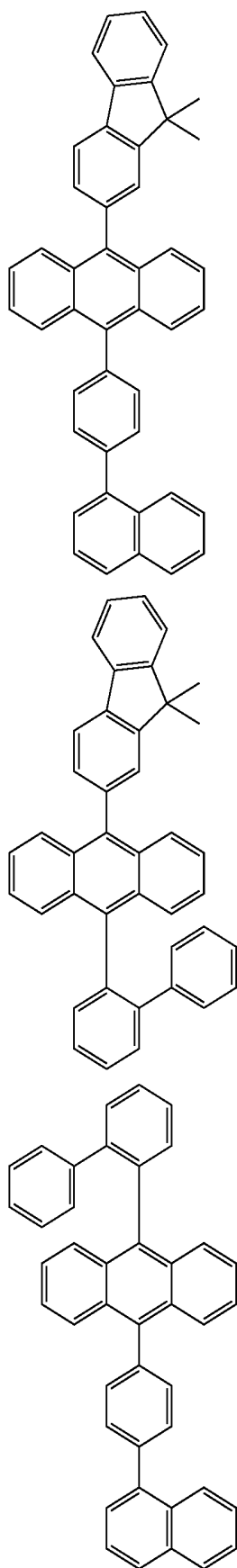
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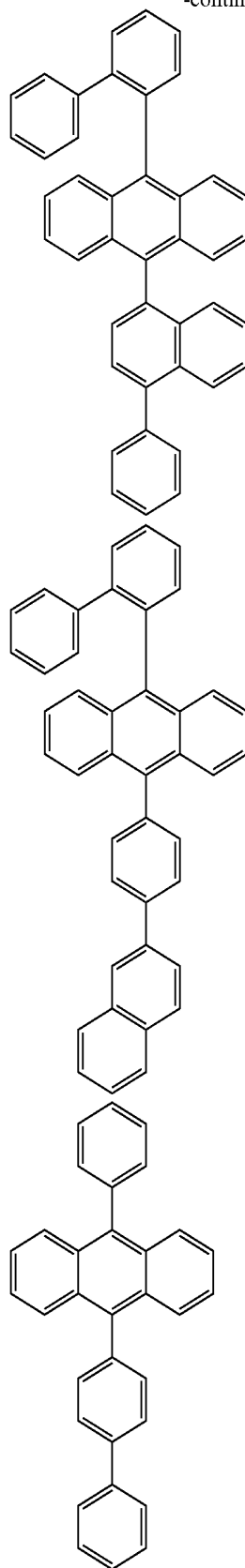
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[0258] According to one embodiment of the present specification, the organic material layer includes a light emitting layer, and the light emitting layer includes the compound

represented by Chemical Formula 15 as a dopant of the light emitting layer and includes the compound represented by Chemical Formula 16 as a host of the light emitting layer.

[0259] The organic light emitting device of the present specification may be manufactured using materials and methods known in the art, except that one or more layers of the organic material layers include the compound of the present specification, that is, the compound of Chemical Formula 1.

[0260] When the organic light emitting device includes a plurality of organic material layers, the organic material layers may be formed with materials the same as or different from each other.

[0261] The organic light emitting device of the present specification may be manufactured using materials and methods known in the art, except that one or more layers of the organic material layers include the compound of Chemical Formula 1, that is, the compound represented by Chemical Formula 1.

[0262] For example, the organic light emitting device of the present specification may be manufactured by consecutively laminating a first electrode, an organic material layer and a second electrode on a substrate. Herein, the organic light emitting device may be manufactured by forming an anode on a substrate by depositing a metal, a metal oxide having conductivity, or an alloy thereof using a physical vapor deposition (PVD) method such as sputtering or e-beam evaporation, and forming an organic material layer including a hole injection layer, a hole transfer layer, a light emitting layer and an electron transfer layer thereon, and then depositing a material capable of being used as a cathode thereon. In addition to such a method, the organic light emitting device may also be manufactured by consecutively depositing a cathode material, an organic material layer and an anode material on a substrate.

[0263] In addition, the compound of Chemical Formula 1 may be formed into the organic material layer using a solution coating method as well as a vacuum deposition method when manufacturing the organic light emitting device. Herein, the solution coating method means spin coating, dip coating, doctor blading, inkjet printing, screen printing, a spray method, roll coating and the like, but is not limited thereto.

[0264] In addition to such a method, the organic light emitting device may be manufactured by consecutively depositing a cathode material, an organic material layer and an anode material on a substrate (International Patent Application Laid-Open Publication No. 2003/012890). However, the manufacturing method is not limited thereto.

[0265] In one embodiment of the present specification, the first electrode is an anode, and the second electrode is a cathode.

[0266] In another embodiment, the first electrode is a cathode, and the second electrode is an anode.

[0267] As the anode material, materials having large work function are normally preferable so that hole injection to an organic material layer is smooth. Specific examples of the anode material capable of being used in the present disclosure include metals such as vanadium, chromium, copper, zinc and gold, or alloys thereof; metal oxides such as zinc oxide, indium oxide, indium tin oxide (ITO) and indium zinc oxide (IZO); combinations of metals and oxides such as ZnO:Al or SnO₂:Sb; conductive polymers such as poly(3-

methylthiophene), poly[3,4-(ethylene-1,2-dioxy)thiophene] (PEDOT), polypyrrole and polyaniline, but are not limited thereto.

[0268] As the cathode material, materials having small work function are normally preferable so that electron injection to an organic material layer is smooth. Specific examples of the cathode material capable of being used in the present disclosure include metals such as magnesium, calcium, sodium, potassium, titanium, indium, yttrium, lithium, gadolinium, aluminum, silver, tin and lead, or alloys thereof; multilayer structure materials such as LiF/Al or LiO₂/Al, and the like, but are not limited thereto.

[0269] The hole injection layer is a layer that injects holes from an electrode, and the hole injection material is preferably a compound that has an ability to transfer holes, therefore, has a hole injection effect in an anode, has an excellent hole injection effect for a light emitting layer or a light emitting material, prevents excitons generated in the light emitting layer from moving to an electron injection layer or an electron injection material, and in addition, has an excellent thin film forming ability. The highest occupied molecular orbital (HOMO) of the hole injection material is preferably in between the work function of an anode material and the HOMO of surrounding organic material layers. Specific examples of the hole injection material include metal porphyrins, oligothiophene, arylamine-based organic materials, hexanitrile hexaazatriphenylene-based organic materials, quinacridone-based organic materials, perylene-based organic materials, anthraquinone, and polyaniline- and polythiophene-based conductive polymers, and the like, but are not limited thereto.

[0270] The hole transfer layer is a layer that receives holes from a hole injection layer and transfers the holes to a light emitting layer, and as the hole transfer material, materials capable of receiving holes from an anode or a hole injection layer, moving the holes to a light emitting layer, and having high mobility for the holes are suitable. Specific examples thereof include arylamine-based organic materials, conductive polymers, block copolymers having conjugated parts and non-conjugated parts together, and the like, but are not limited thereto.

[0271] The light emitting material is a material capable of emitting light in a visible light region by receiving holes and electrons from a hole transfer layer and an electron transfer layer, respectively, and binding the holes and the electrons, and is preferably a material having favorable quantum efficiency for fluorescence or phosphorescence. Specific examples thereof include 8-hydroxyquinoline aluminum complexes (Alq₃); carbazole-based compounds; dimerized styryl compounds; BAlq; 10-hydroxybenzo quinoline-metal compounds; benzoxazole-, benzthiazole- and benzimidazole-based compounds; poly(p-phenylenevinylene) (PPV)-based polymers; spiro compounds; polyfluorene, rubrene, and the like, but are not limited thereto.

[0272] The light emitting layer may include a host material and a dopant material. The host material includes fused aromatic ring derivatives, heteroring-containing compounds or the like. Specifically, the fused aromatic ring derivative includes anthracene derivatives, pyrene derivatives, naphthalene derivatives, pentacene derivatives, phenanthrene compounds, fluoranthene compounds and the like, and the heteroring-containing compound includes carbazole deriva-

tives, dibenzofuran derivatives, ladder-type furan compounds, pyrimidine derivatives and the like, but the material is not limited thereto.

[0273] The dopant material includes aromatic amine derivatives, styrylamine compounds, boron complexes, fluoranthene compounds, metal complexes and the like. Specifically, the aromatic amine derivative is a fused aromatic ring derivative having a substituted or unsubstituted arylamine group and includes arylamine group-including pyrene, anthracene, chrysene, perylanthene and the like, and the styrylamine compound is a compound in which substituted or unsubstituted arylamine is substituted with at least one arylvinyl group, and one, two or more substituents selected from the group consisting of an aryl group, a silyl group, an alkyl group, a cycloalkyl group and an arylamine group are substituted or unsubstituted. Specifically, styrylamine, styryldiamine, styryltri-amine, styryltetramine or the like is included, but the styrylamine compound is not limited thereto. In addition, the metal complex includes iridium complexes, platinum complexes or the like, but is not limited thereto.

[0274] The electron transfer layer is a layer that receives electrons from an electron injection layer and transfers the electrons to a light emitting layer, and as the electron transfer material, materials capable of favorably receiving electrons from a cathode, moving the electrons to a light emitting layer, and having high mobility for the electrons are suitable. Specific examples thereof include Al complexes of 8-hydroxyquinoline; complexes including Alq_3 ; organic radical compounds; hydroxyflavon-metal complexes, and the like, but are not limited thereto. The electron transfer layer may be used together with any desired cathode material as used in the art. Particularly, examples of the suitable cathode material include common materials that have small work function, and in which an aluminum layer or a silver layer follows. Specifically, the cathode material includes cesium, barium, calcium, ytterbium and samarium, and in each case, an aluminum layer or a silver layer follows.

[0275] The electron injection layer is a layer that injects electrons from an electrode, and the electron injection material is preferably a compound that has an ability to transfer electrons, has an electron injection effect from a cathode, has an excellent electron injection effect for a light emitting layer or a light emitting material, prevents excitons generated in the light emitting layer from moving to a hole injection layer, and in addition, has an excellent thin film forming ability. Specific examples thereof include fluorenone, anthraquinodimethane, diphenylquinone, thiopyran dioxide, oxazole, oxadiazole, triazole, imidazole, perylene tetracarboxylic acid, fluorenylidene methane, anthrone or the like, and derivatives thereof, metal complex compounds, nitrogen-containing 5-membered ring derivatives, and the like, but are not limited thereto.

[0276] The metal complex compound includes 8-hydroxyquinolinato lithium, bis(8-hydroxyquinolinato)zinc, bis(8-hydroxyquinolinato)copper, bis(8-hydroxyquinolinato)manganese, tris(8-hydroxyquinolinato)aluminum, tris(2-methyl-8-hydroxyquinolinato)aluminum, tris(8-hydroxyquinolinato)gallium, bis(10-hydroxybenzo[h]quinolinato)beryllium, bis(10-hydroxybenzo[h]quinolinato)zinc, bis(2-methyl-8-quinolinato)chlorogallium, bis(2-methyl-8-quinolinato) (0-cresolato)gallium, bis(2-methyl-8-

quinolinato) (1-naphtholato)aluminum, bis(2-methyl-8-quinolinato) (2-naphtholato)gallium and the like, but is not limited thereto.

[0277] The organic light emitting device according to the present specification may be a top-emission type, a bottom-emission type or a dual-emission type depending on the materials used.

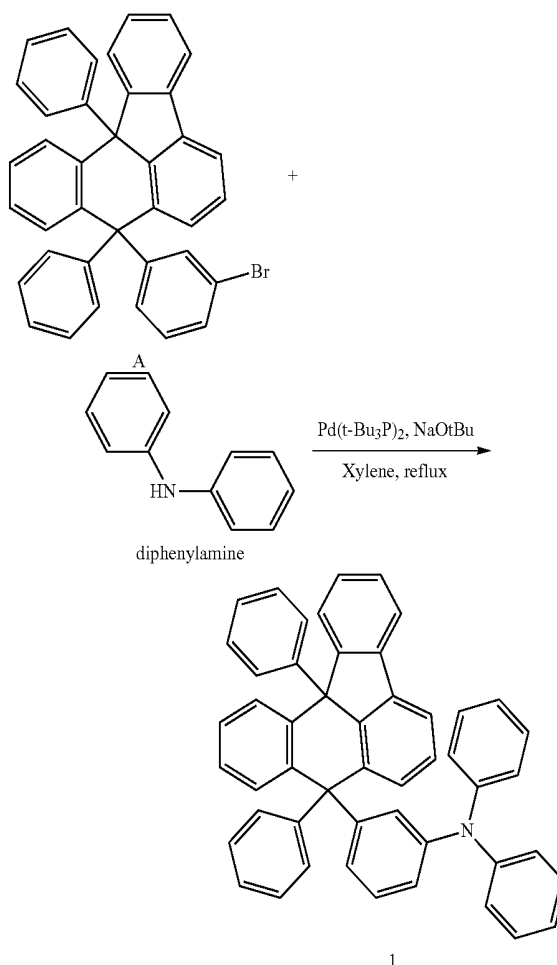
[0278] In one embodiment of the present specification, the compound of Chemical Formula 1 may be included in an organic solar cell or an organic transistor in addition to an organic light emitting device.

[0279] Preparation of the compound represented by Chemical Formula 1, and manufacture of the organic light emitting device including the same will be specifically described with reference to the following examples. However, the following examples are for illustrative purposes only, and the scope of the present specification is not limited thereto.

Synthesis Example 1

Preparation Example 1

[0280] Compound Synthesis of the Following Compound 1



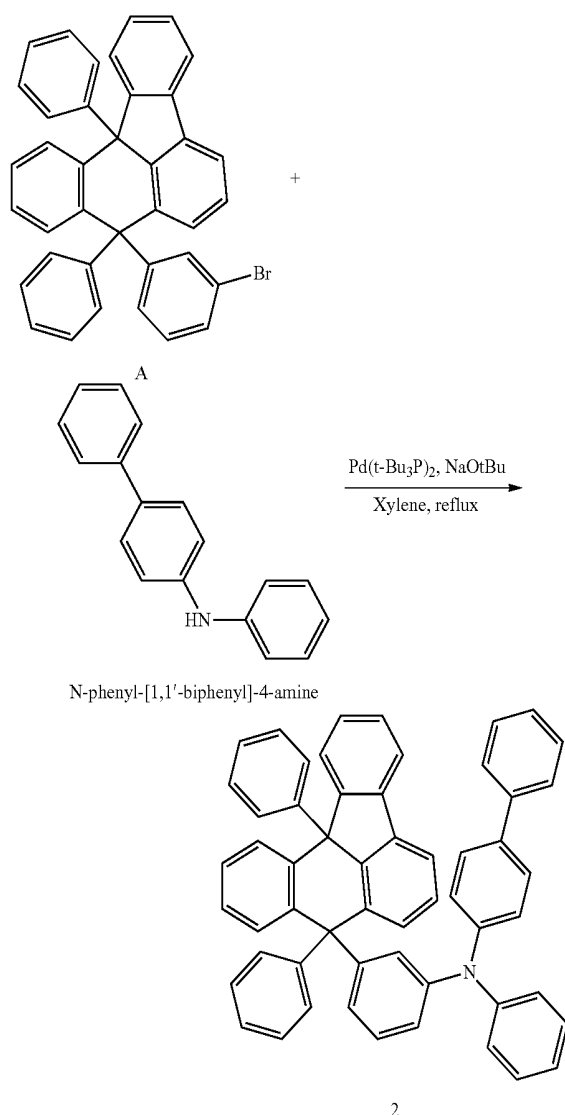
[0281] After completely dissolving Compound A (10.0 g, 17.83 mmol) and diphenylamine (3.31 g, 19.61 mmol) in

180 ml of xylene in a 500 ml round bottom flask under nitrogen atmosphere, sodium tert-butoxide (2.05 g, 21.39 mol) and then bis(tri-tert-butylphosphine)palladium(0) (0.09 g, 0.18 mmol) were added thereto, and the result was heated and stirred for 2 hours. The result was cooled to room temperature, filtered to remove the base, and then xylene was vacuum concentrated. The result was recrystallized with 150 ml of ethyl acetate to prepare Compound 1 (8.85 g, yield: 77%).

[0282] $MS[M+H]^+=650$

Preparation Example 2

[0283] Compound Synthesis of the Following Compound 2



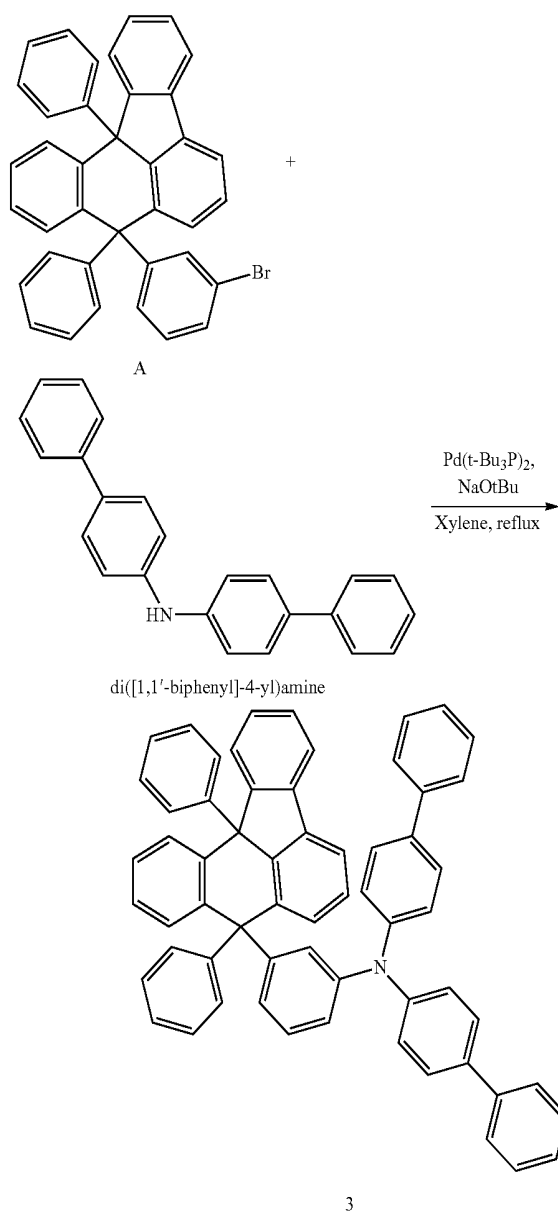
[0284] After completely dissolving Compound A (10.0 g, 17.83 mmol) and N-phenyl-[1,1'-biphenyl]-4-amine (4.80 g, 19.61 mmol) in 200 ml of xylene in a 500 ml round bottom flask under nitrogen atmosphere, sodium tert-butoxide (2.05 g, 21.39 mol) and then bis(tri-tert-butylphosphine)palladium (0) (0.09 g, 0.18 mmol) were added thereto, and the result was heated and stirred for 3 hours. The result was cooled to

room temperature, filtered to remove the base, and then xylene was vacuum concentrated. The result was recrystallized with 200 ml of ethyl acetate to prepare Compound 2 (9.42 g, yield: 73%).

[0285] $MS[M+H]^+=726$

Preparation Example 3

[0286] Compound Synthesis of the Following Compound 3



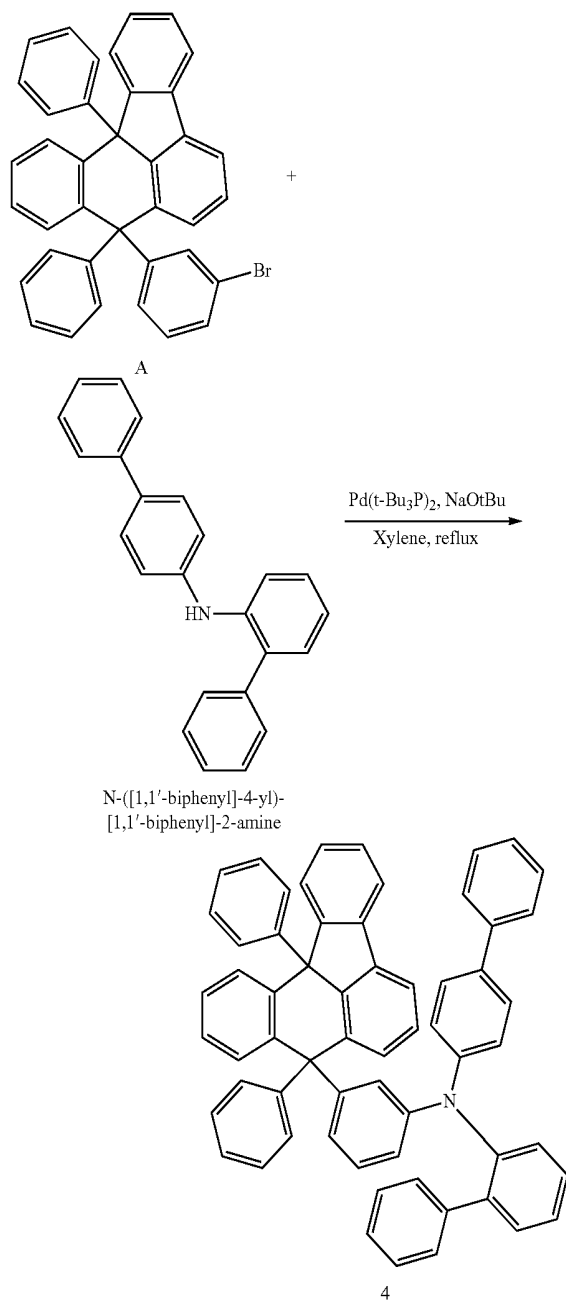
[0287] After completely dissolving Compound A (10.0 g, 17.83 mmol) and di([1,1'-biphenyl]-4-yl)amine (6.29 g, 19.61 mmol) in 220 ml of xylene in a 500 ml round bottom flask under nitrogen atmosphere, sodium tert-butoxide (2.05 g, 21.39 mol) and then bis(tri-tert-butylphosphine)palladium (0) (0.09 g, 0.18 mmol) were added thereto, and the result was heated and stirred for 4 hours. The result was cooled to room temperature, filtered to remove the base, and then

xylene was vacuum concentrated. The result was recrystallized with 250 ml of ethyl acetate to prepare Compound 3 (12.22 g, yield: 86%).

[0288] MS[M+H]⁺=803

Preparation Example 4

[0289] Compound Synthesis of the Following Compound 4



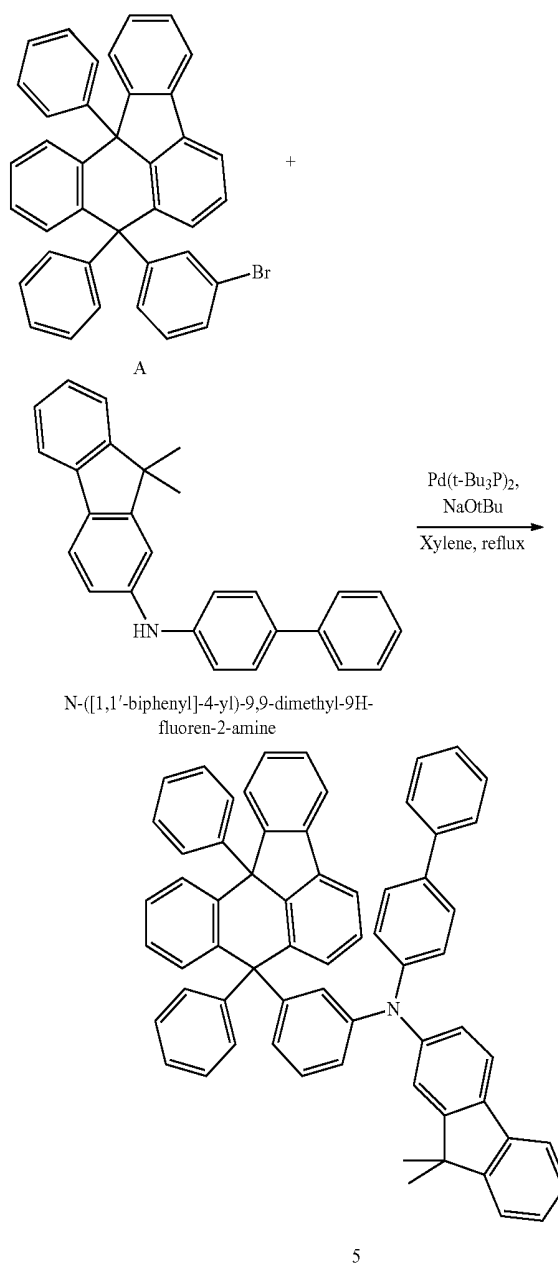
[0290] After completely dissolving Compound A (10.0 g, 17.83 mmol) and N-([1,1'-biphenyl]-4-yl)-[1,1'-biphenyl]-2-amine (6.29 g, 19.61 mmol) in 220 ml of xylene in a 500 ml round bottom flask under nitrogen atmosphere, sodium tert-butoxide (2.05 g, 21.39 mol) and then bis(tri-tert-butylphosphine)palladium(0) (0.09 g, 0.18 mmol) were added

thereto, and the result was heated and stirred for 3 hours. The result was cooled to room temperature, filtered to remove the base, and then xylene was vacuum concentrated. The result was recrystallized with 230 ml of ethyl acetate to prepare Compound 4 (11.01 g, yield: 77%).

[0291] MS[M+H]⁺=803

Preparation Example 5

[0292] Compound Synthesis of the Following Compound 5



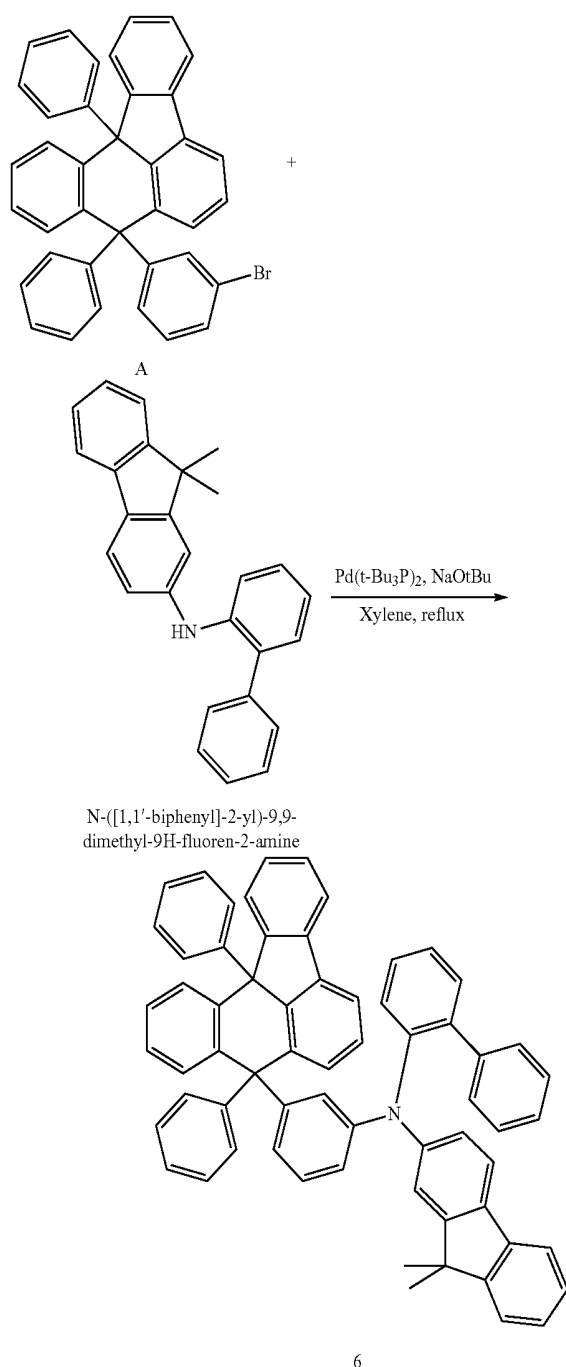
[0293] After completely dissolving Compound A (10.0 g, 17.83 mmol) and N-([1,1'-biphenyl]-4-yl)-9,9-dimethyl-9H-fluorene-2-amine (7.08 g, 19.61 mmol) in 240 ml of xylene in a 500 ml round bottom flask under nitrogen atmosphere, sodium tert-butoxide (2.05 g, 21.39 mol) and then bis(tri-tert-butylphosphine)palladium(0) (0.09 g, 0.18 mmol) were

added thereto, and the result was heated and stirred for 5 hours. The result was cooled to room temperature, filtered to remove the base, and then xylene was vacuum concentrated. The result was recrystallized with 280 ml of ethyl acetate to prepare Compound 5 (11.32 g, yield: 76%).

[0294] MS[M+H]⁺=843

Preparation Example 6

[0295] Compound Synthesis of the Following Compound 6



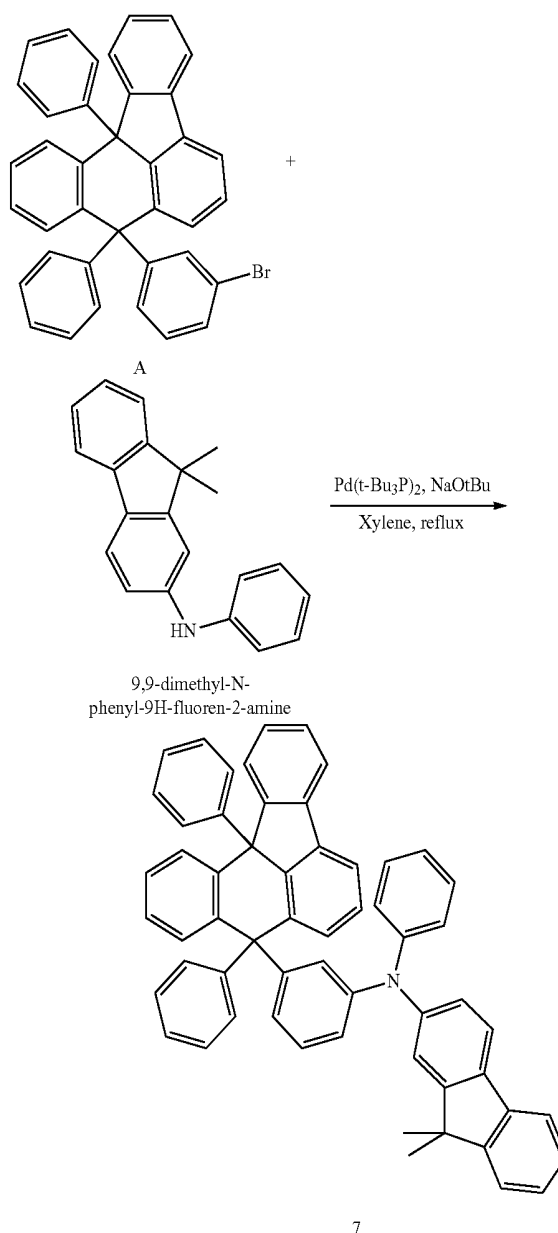
[0296] After completely dissolving Compound A (10.0 g, 17.83 mmol) and N-([1,1'-biphenyl]-2-yl)-9,9-dimethyl-9H-

fluorene-2-amine (7.08 g, 19.61 mmol) in 220 ml of xylene in a 500 ml round bottom flask under nitrogen atmosphere, sodium tert-butoxide (2.05 g, 21.39 mol) and then bis(tri-tert-butylphosphine)palladium(0) (0.09 g, 0.18 mmol) were added thereto, and the result was heated and stirred for 3 hours. The result was cooled to room temperature, filtered to remove the base, and then xylene was vacuum concentrated. The result was recrystallized with 240 ml of ethyl acetate to prepare Compound 6 (10.19 g, yield: 68%).

[0297] MS[M+H]⁺=843

Preparation Example 7

[0298] Compound Synthesis of the Following Compound 7



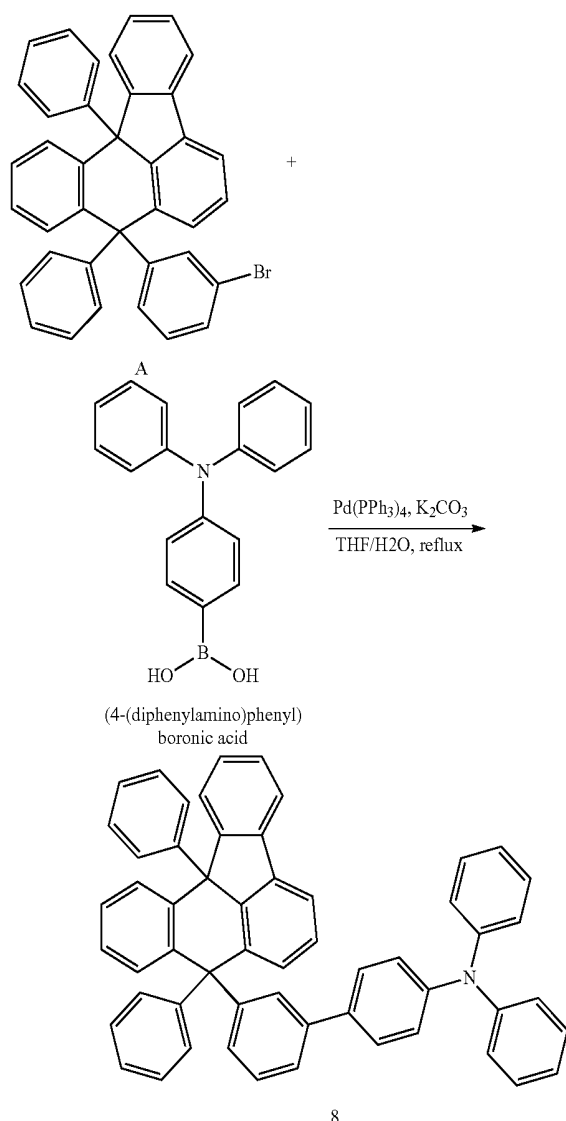
[0299] After completely dissolving Compound A (10.0 g, 17.83 mmol) and 9,9-dimethyl-N-phenyl-9H-fluorene-2-amine (5.59 g, 19.61 mmol) in 220 ml of xylene in a 500 ml

round bottom flask under nitrogen atmosphere, sodium tert-butoxide (2.05 g, 21.39 mol) and then bis(tri-tert-butylphosphine)palladium(0) (0.09 g, 0.18 mmol) were added thereto, and the result was heated and stirred for 3 hours. The result was cooled to room temperature, filtered to remove the base, and then xylene was vacuum concentrated. The result was recrystallized with 240 ml of ethyl acetate to prepare Compound 7 (10.02 g, yield: 75%).

[0300] MS[M+H]⁺=767

Preparation Example 8

[0301] Compound Synthesis of the Following Compound 8



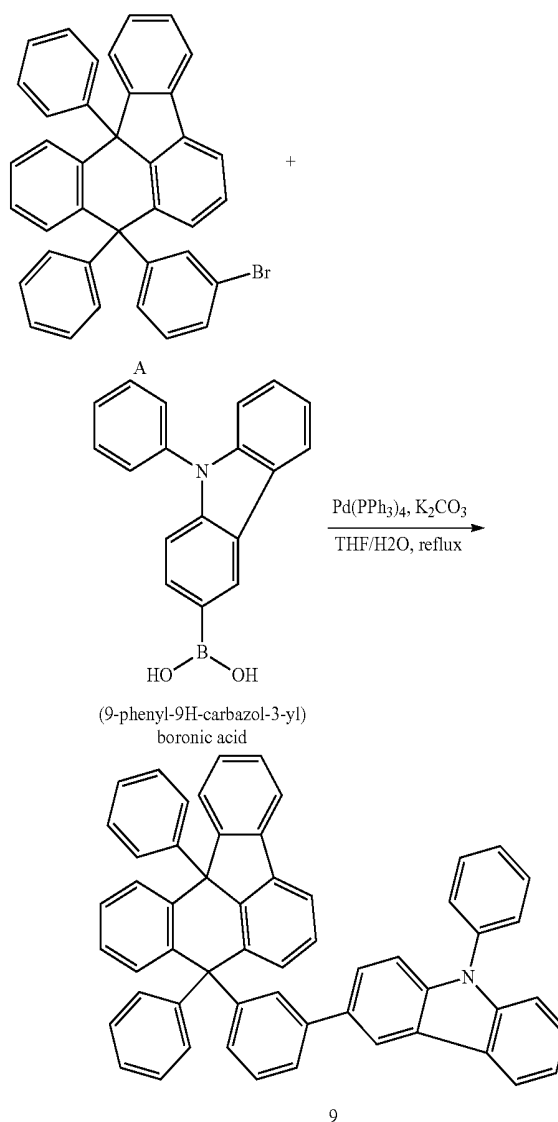
[0302] After completely dissolving Compound A (10.0 g, 17.83 mmol) and (4-(diphenylamino)phenyl)boronic acid (5.92 g, 20.50 mmol) in 220 ml of tetrahydrofuran in a 500 ml round bottom flask under nitrogen atmosphere, an aqueous 2 M potassium carbonate solution (110 ml) and then tetrakis-(triphenylphosphine)palladium (0.21 g, 0.18 mmol) were added thereto, and the result was heated and stirred for 3 hours. The temperature was lowered to room temperature,

the water layer was removed, and the result was dried with anhydrous magnesium sulfate, vacuum concentrated, and then recrystallized with 210 ml of ethyl acetate to prepare Compound 8 (9.97 g, 77%).

[0303] MS[M+H]⁺=726

Preparation Example 9

[0304] Compound Synthesis of the Following Compound 9



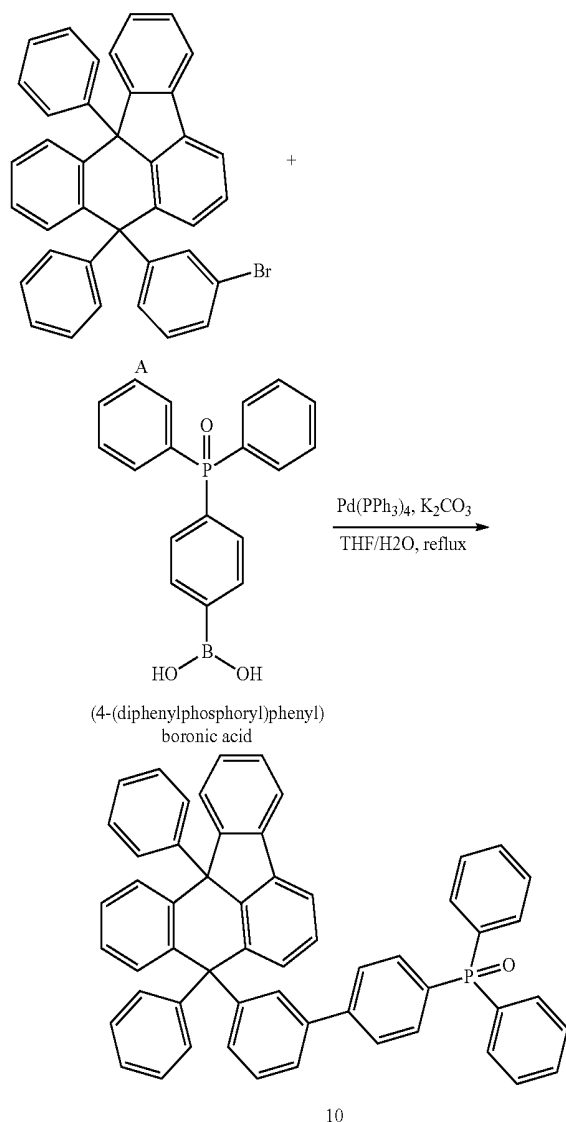
[0305] After completely dissolving Compound A (10.0 g, 17.83 mmol) and (9-phenyl-9H-carbazol-3-yl)boronic acid (5.92 g, 20.50 mmol) in 260 ml of tetrahydrofuran in a 500 ml round bottom flask under nitrogen atmosphere, an aqueous 2 M potassium carbonate solution (130 ml) and then tetrakis-(triphenylphosphine)palladium (0.21 g, 0.18 mmol) were added thereto, and the result was heated and stirred for 5 hours. The temperature was lowered to room temperature, the water layer was removed, and the result was dried with anhydrous magnesium sulfate, vacuum concentrated, and

then recrystallized with 280 ml of ethyl acetate to prepare Compound 9 (10.47 g, 81%).

[0306] MS[M+H]⁺=724

Preparation Example 10

[0307] Compound Synthesis of the Following Compound 10

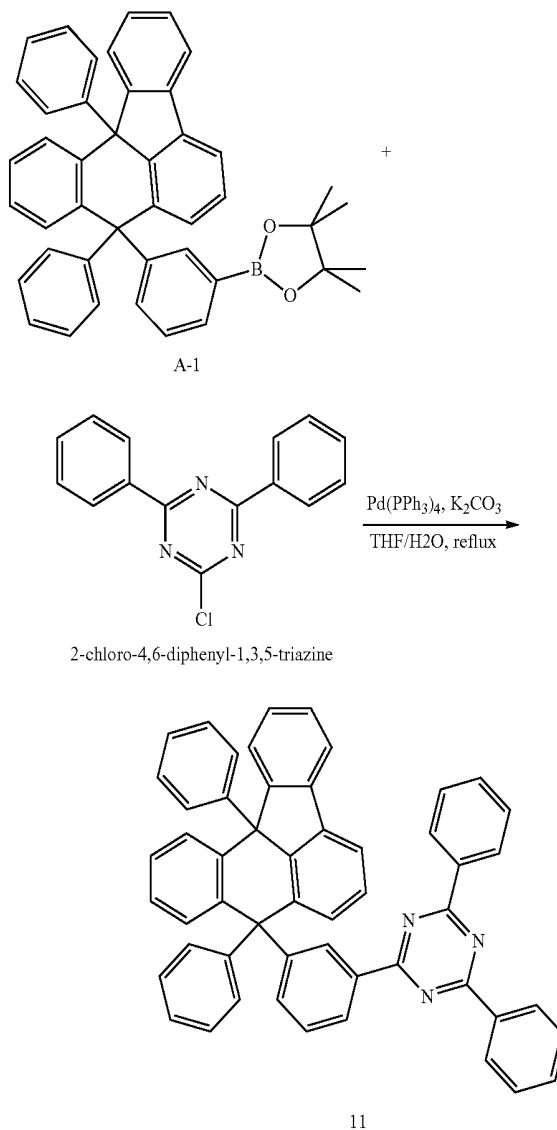


[0308] After completely dissolving Compound A (10.0 g, 17.83 mmol) and (4-(diphenylphosphoryl)phenyl)boronic acid (6.60 g, 20.50 mmol) in 220 ml of tetrahydrofuran in a 500 ml round bottom flask under nitrogen atmosphere, an aqueous 2 M potassium carbonate solution (110 ml) and then tetrakis-(triphenylphosphine)palladium (0.21 g, 0.18 mmol) were added thereto, and the result was heated and stirred for 3 hours. The temperature was lowered to room temperature, the water layer was removed, and the result was dried with anhydrous magnesium sulfate, vacuum concentrated, and then recrystallized with 210 ml of ethyl acetate to prepare Compound 10 (11.46 g, 85%).

[0309] MS [M+H]⁺=759

Preparation Example 11

[0310] Compound Synthesis of the Following Compound 11

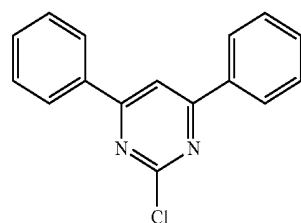
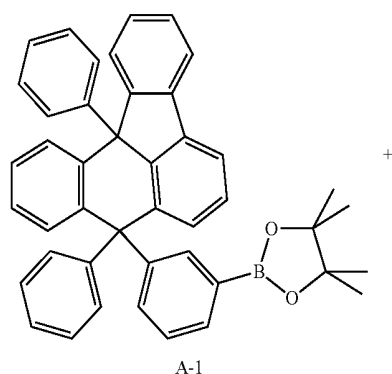


[0311] After completely dissolving Compound A-1 (10.0 g, 16.50 mmol) and 2-chloro-4,6-diphenyl-1,3,5-triazine (3.83 g, 14.34 mmol) in 240 ml of tetrahydrofuran in a 500 ml round bottom flask under nitrogen atmosphere, an aqueous 2 M potassium carbonate solution (120 ml) and then tetrakis-(triphenylphosphine)palladium (0.17 g, 0.14 mmol) were added thereto, and the result was heated and stirred for 3 hours. The temperature was lowered to room temperature, the water layer was removed, and the result was dried with anhydrous magnesium sulfate, vacuum concentrated, and then recrystallized with 210 ml of ethyl acetate to prepare Compound 11 (9.44 g, 80%).

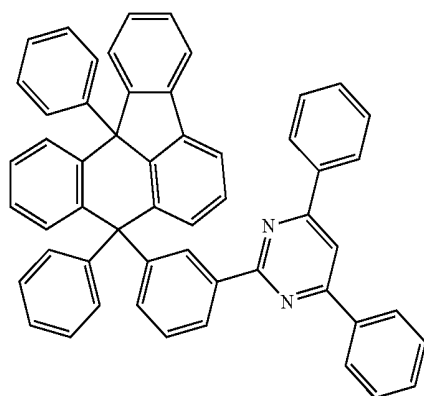
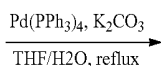
[0312] MS[M+H]⁺=714

Preparation Example 12

[0313] Compound Synthesis of the Following Compound 12



2-chloro-4,6-diphenylpyrimidine



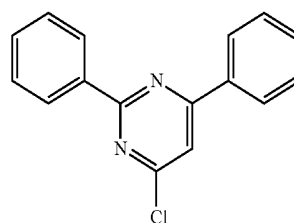
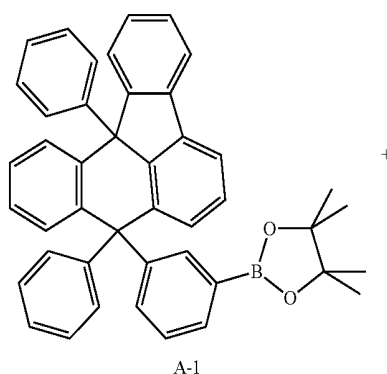
12

[0314] After completely dissolving Compound A-1 (10.0 g, 16.50 mmol) and 2-chloro-4,6-diphenylpyrimidine (3.83 g, 14.34 mmol) in 280 ml of tetrahydrofuran in a 500 ml round bottom flask under nitrogen atmosphere, an aqueous 2 M potassium carbonate solution (140 ml) and then tetrakis-(triphenylphosphine)palladium (0.17 g, 0.14 mmol) were added thereto, and the result was heated and stirred for 5 hours. The temperature was lowered to room temperature, the water layer was removed, and the result was dried with anhydrous magnesium sulfate, vacuum concentrated, and then recrystallized with 230 ml of ethyl acetate to prepare Compound 12 (8.49, 71%).

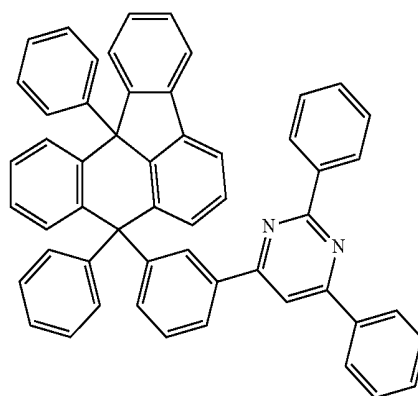
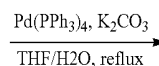
[0315] MS[M+H]⁺=713

Preparation Example 13

[0316] Compound Synthesis of the Following Compound 13



4-chloro-2,6-diphenylpyrimidine



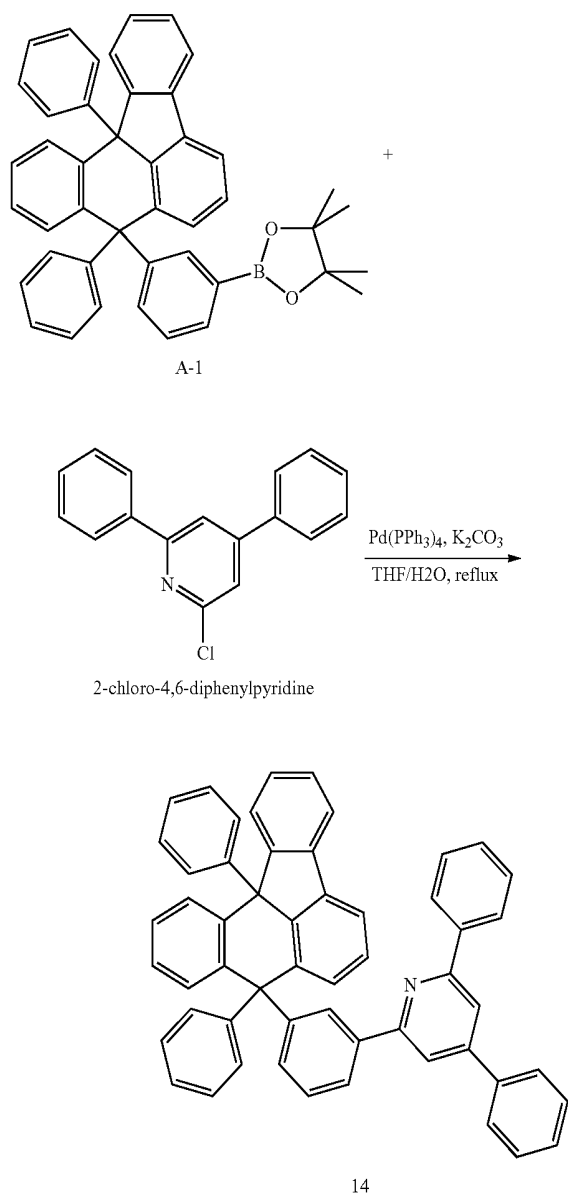
13

[0317] After completely dissolving Compound A-1 (10.0 g, 16.50 mmol) and 4-chloro-2,6-diphenylpyrimidine (3.83 g, 14.34 mmol) in 240 ml of tetrahydrofuran in a 500 ml round bottom flask under nitrogen atmosphere, an aqueous 2 M potassium carbonate solution (120 ml) and then tetrakis-(triphenylphosphine)palladium (0.17 g, 0.14 mmol) were added thereto, and the result was heated and stirred for 3 hours. The temperature was lowered to room temperature, the water layer was removed, and the result was dried with anhydrous magnesium sulfate, vacuum concentrated, and then recrystallized with 260 ml of ethyl acetate to prepare Compound 13 (7.92 g, 67%).

[0318] MS[M+H]⁺=713

Preparation Example 14

[0319] Compound Synthesis of the Following Compound 14

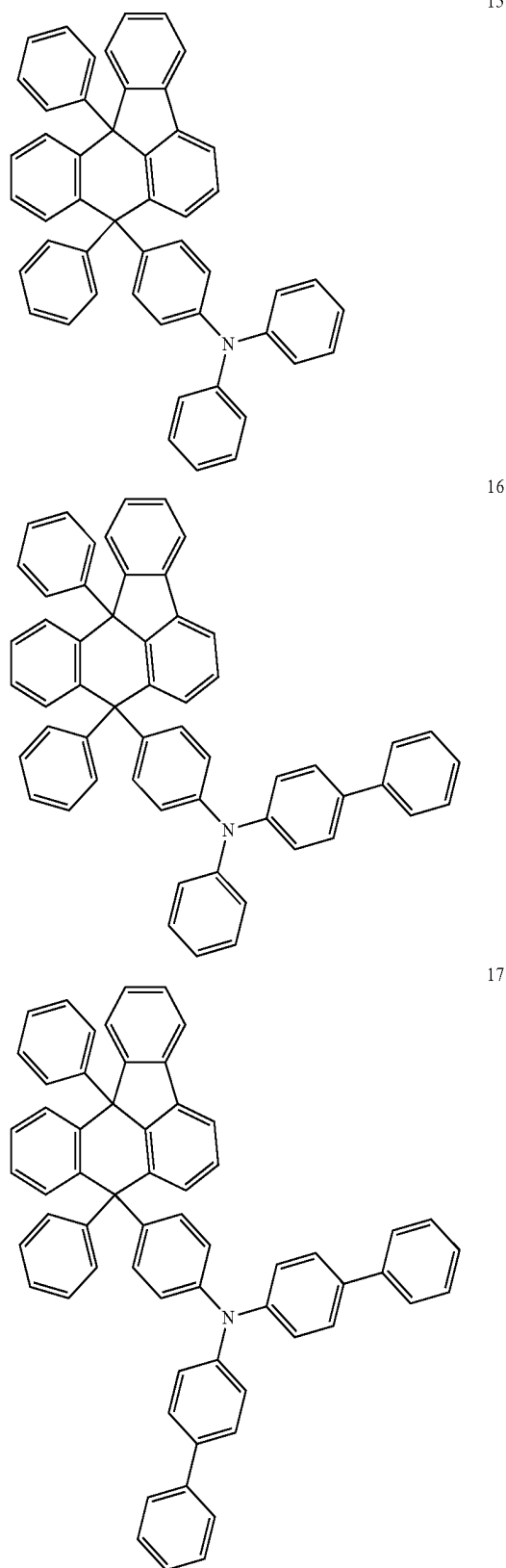


[0320] After completely dissolving Compound A-1 (10.0 g, 16.50 mmol) and 2-chloro-4,6-diphenylpyridine (3.83 g, 14.34 mmol) in 240 ml of tetrahydrofuran in a 500 ml round bottom flask under nitrogen atmosphere, an aqueous 2 M potassium carbonate solution (120 ml) and then tetrakis-(triphenylphosphine)palladium (0.17 g, 0.14 mmol) were added thereto, and the result was heated and stirred for 3 hours. The temperature was lowered to room temperature, the water layer was removed, and the result was dried with anhydrous magnesium sulfate, vacuum concentrated, and then recrystallized with 210 ml of ethyl acetate to prepare Compound 14 (8.23 g, 70%).

[0321] MS[M+H]⁺=712

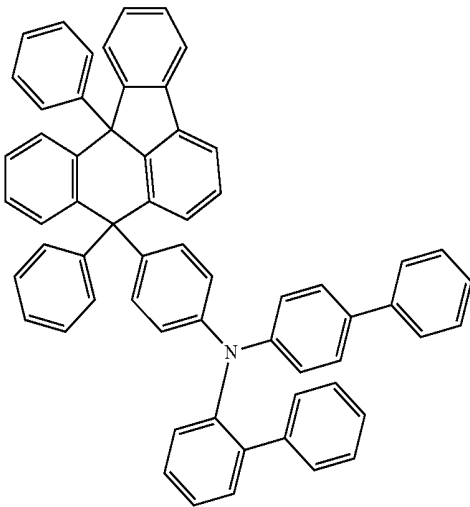
Preparation Example 15 to Preparation Example 28

[0322]



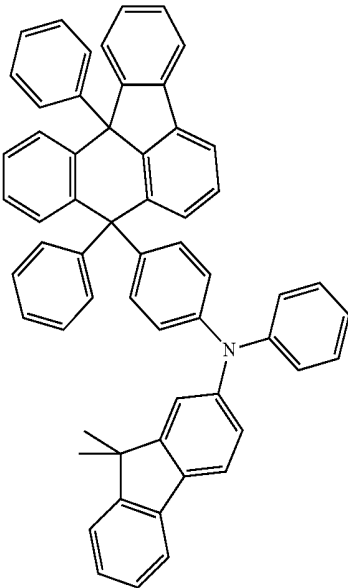
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18

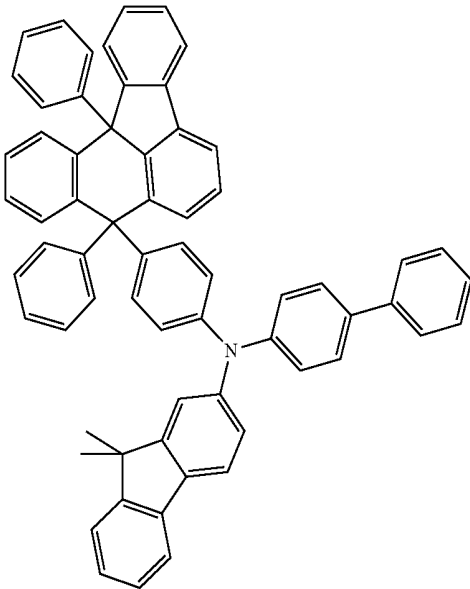


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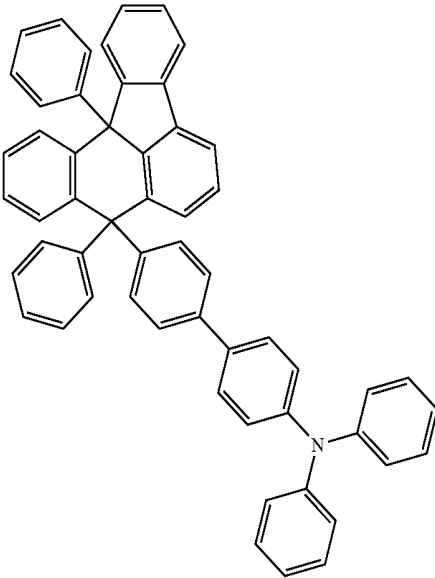
21



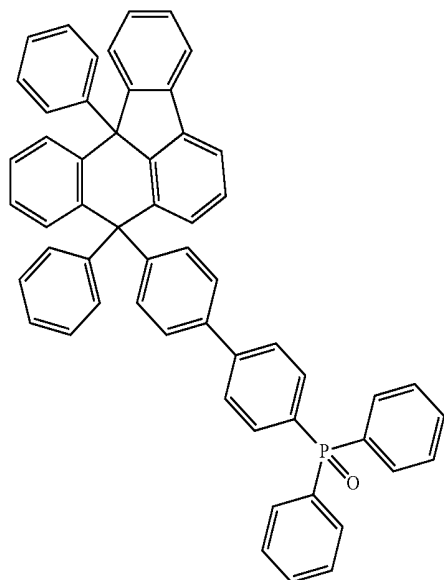
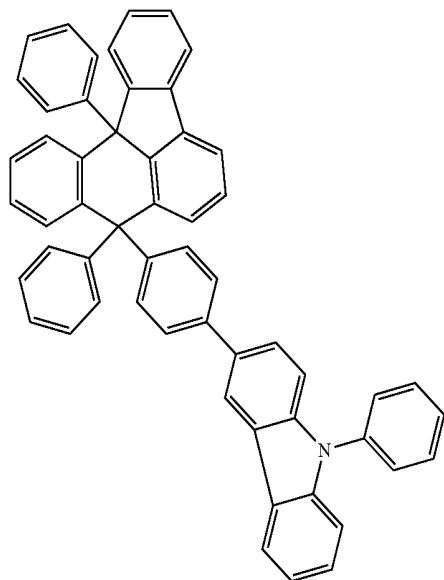
19



20

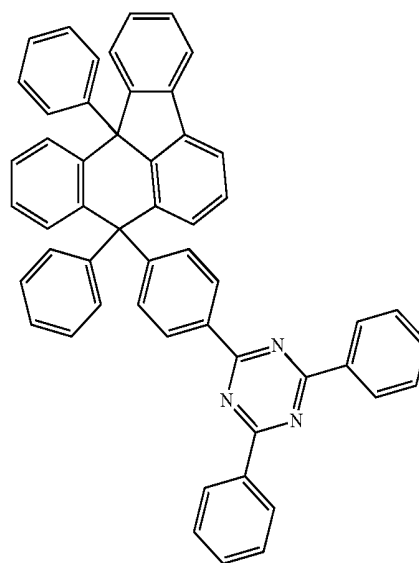


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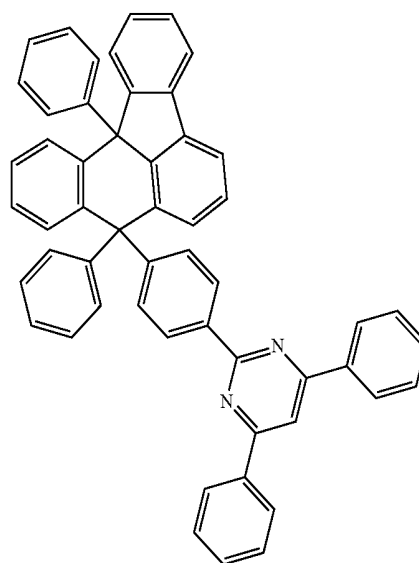


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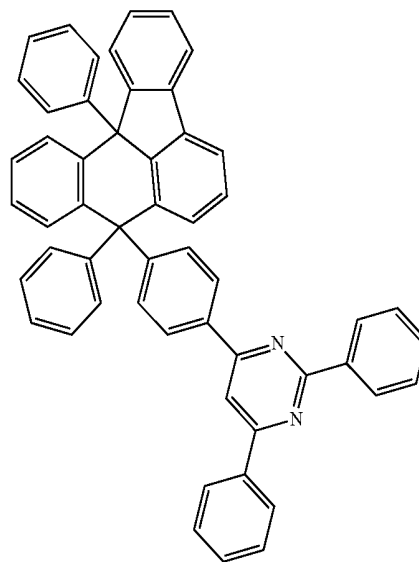
25



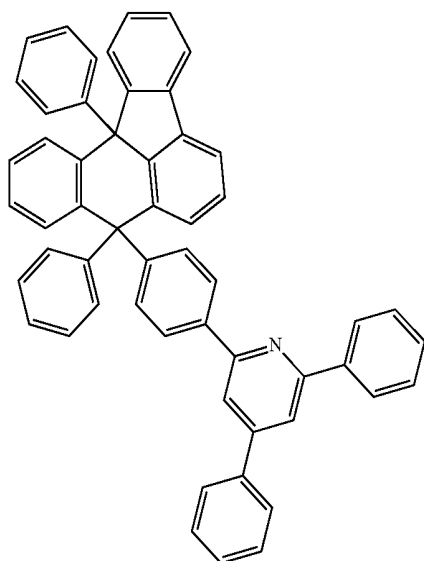
26



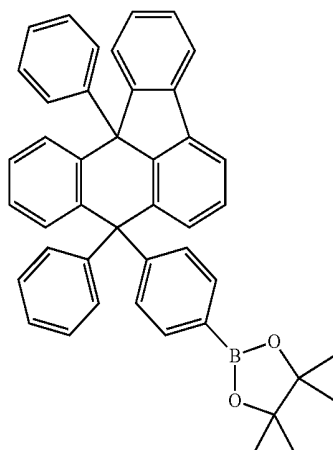
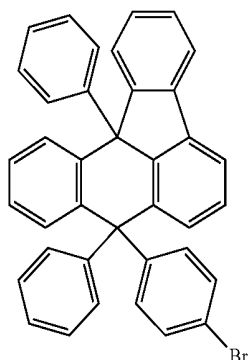
27



-continued



[0323] Compounds 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27 and 28 were prepared in the same manner as in Preparation Examples 1 to 14 except that Compound B or B-1 was used as the starting material instead of Compound A or A-1.

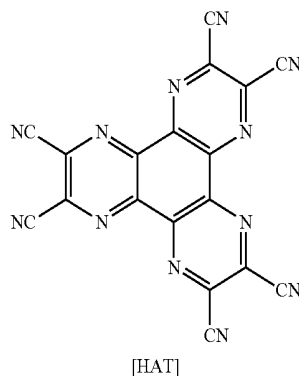


Example 1-1

28

[0324] A glass substrate on which indium tin oxide (ITO) was coated as a thin film to a thickness of 1,000 Å was placed in detergent-dissolved distilled water and ultrasonic cleaned. Herein, a product of Fischer Co. was used as the detergent, and as the distilled water, distilled water filtered twice with a filter manufactured by Millipore Co. was used. After the ITO was cleaned for 30 minutes, ultrasonic cleaning was repeated twice using distilled water for 10 minutes. After the cleaning with distilled water was finished, the substrate was ultrasonic cleaned with solvents of isopropyl alcohol, acetone and methanol, then dried, and then transferred to a plasma cleaner. In addition, the substrate was cleaned for 5 minutes using oxygen plasma, and then transferred to a vacuum depositor.

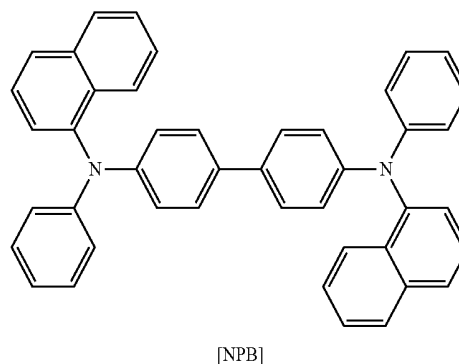
[0325] On the transparent ITO electrode prepared as above, a hole injection layer was formed by thermal vacuum depositing the following compound hexanitride hexaazatriphenylene (HAT) to a thickness of 500 Å.



B

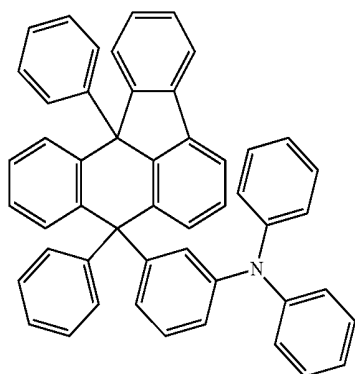
[0326] A hole transfer layer was formed on the hole injection layer by vacuum depositing the following compound 4,4'-bis[N-(1-naphthyl)-N-phenylamino]biphenyl (NPB) (300 Å), a material transferring holes.

B-1

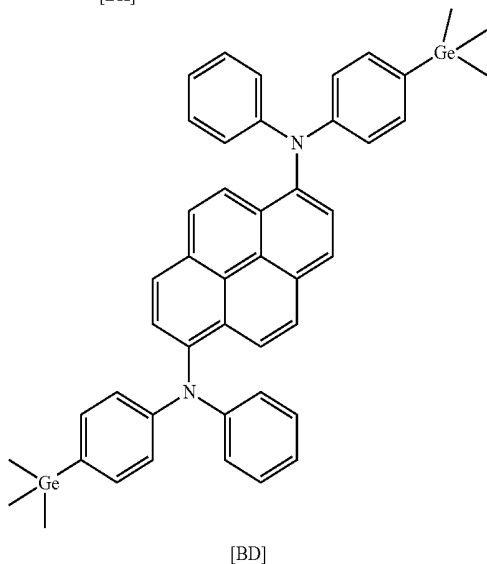
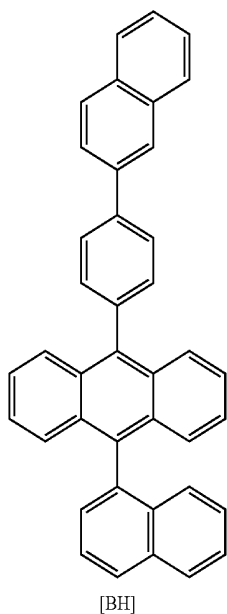


[0327] Subsequently, an electron suppression layer was formed on the hole transfer layer to a film thickness of 100 Å by vacuum depositing the following Compound 1.

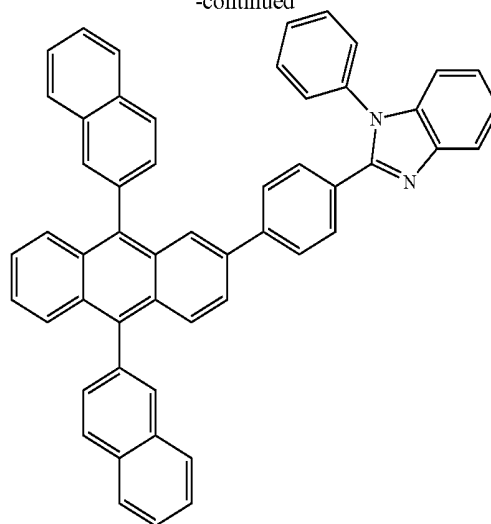
[0328] [Compound 1]



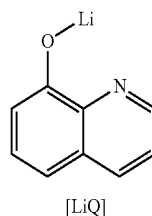
[0329] Next, a light emitting layer was formed on the electron suppression layer to a film thickness of 300 Å by vacuum depositing BH and BD shown below in a weight ratio of 25:1.



-continued



[ET1]



[0330] An electron injection and transfer layer was formed on the light emitting layer to a thickness of 300 Å by vacuum depositing the compound ET1 and the compound lithium quinolate (LiQ) in a weight ratio of 1:1. A cathode was formed on the electron injection and transfer layer by depositing lithium fluoride (LiF) to a thickness of 12 Å and aluminum to a thickness of 2,000 Å in consecutive order.

[0331] An organic light emitting device was manufactured by maintaining, in the above-mentioned processes, the deposition rates of the organic materials at 0.4 Å/sec to 0.7 Å/sec, the deposition rates of the lithium fluoride and the aluminum of the cathode at 0.3 Å/sec and 2 Å/sec, respectively, and the degree of vacuum during the deposition at 2×10^{-7} torr to 5×10^{-7} torr.

Example 1-2

[0332] An organic light emitting device was manufactured in the same manner as in Example 1-1 except that Compound 2 was used instead of Compound 1.

Example 1-3

[0333] An organic light emitting device was manufactured in the same manner as in Example 1-1 except that Compound 3 was used instead of Compound 1.

Example 1-4

[0334] An organic light emitting device was manufactured in the same manner as in Example 1-1 except that Compound 4 was used instead of Compound 1.

Example 1-5

[0335] An organic light emitting device was manufactured in the same manner as in Example 1-1 except that Compound 5 was used instead of Compound 1.

Example 1-6

[0336] An organic light emitting device was manufactured in the same manner as in Example 1-1 except that Compound 6 was used instead of Compound 1.

[EB 1]

Example 1-7

[0337] An organic light emitting device was manufactured in the same manner as in Example 1-1 except that Compound 7 was used instead of Compound 1.

Example 1-8

[0338] An organic light emitting device was manufactured in the same manner as in Example 1-1 except that Compound 8 was used instead of Compound 1.

Example 1-9

[0339] An organic light emitting device was manufactured in the same manner as in Example 1-1 except that Compound 15 was used instead of Compound 1.

Example 1-10

[0340] An organic light emitting device was manufactured in the same manner as in Example 1-1 except that Compound 16 was used instead of Compound 1.

Example 1-11

[0341] An organic light emitting device was manufactured in the same manner as in Example 1-1 except that Compound 17 was used instead of Compound 1.

Example 1-12

[0342] An organic light emitting device was manufactured in the same manner as in Example 1-1 except that Compound 18 was used instead of Compound 1.

Example 1-13

[0343] An organic light emitting device was manufactured in the same manner as in Example 1-1 except that Compound 19 was used instead of Compound 1.

Example 1-14

[0344] An organic light emitting device was manufactured in the same manner as in Example 1-1 except that Compound 20 was used instead of Compound 1.

Example 1-15

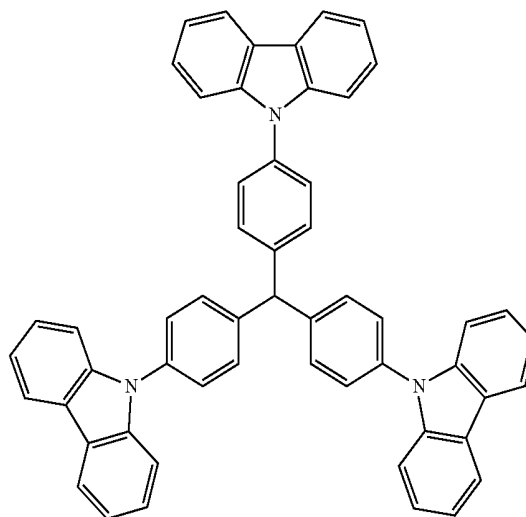
[0345] An organic light emitting device was manufactured in the same manner as in Example 1-1 except that Compound 21 was used instead of Compound 1.

Example 1-16

[0346] An organic light emitting device was manufactured in the same manner as in Example 1-1 except that Compound 22 was used instead of Compound 1.

Comparative Example 1-1

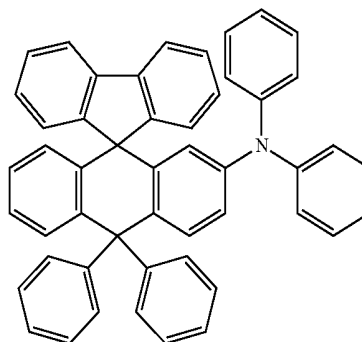
[0347] An organic light emitting device was manufactured in the same manner as in Example 1-1 except that the following EB 1 (TCTA) was used instead of Compound 1.



Comparative Example 1-2

[0348] An organic light emitting device was manufactured in the same manner as in Example 1-1 except that EB 2 was used instead of Compound 1.

[EB 2]



[0349] When a current was applied to the organic light emitting devices manufactured in Examples 1-1 to 1-16 and Comparative Examples 1-1 and 1-2, results of the following Table 1 were obtained.

TABLE 1

	Compound (Electron Suppression Layer)	Voltage (V@10 mA/cm ²)	Efficiency (cd/A@10 mA/cm ²)	Color Coordinate (x, y)
Example 1-1	Compound 1	3.55	5.40	(0.139, 0.125)
Example 1-2	Compound 2	3.62	5.35	(0.138, 0.126)
Example 1-3	Compound 3	3.47	5.59	(0.138, 0.127)
Example 1-4	Compound 4	3.48	5.57	(0.137, 0.125)
Example 1-5	Compound 5	3.49	5.58	(0.137, 0.125)

TABLE 1-continued

	Compound (Electron Suppression Layer)	Voltage (V@10 mA/cm ²)	Efficiency (cd/A@10 mA/cm ²)	Color Coordinate (x, y)
Example 1-6	Compound 6	3.44	5.51	(0.137, 0.127)
Example 1-7	Compound 7	3.43	5.53	(0.137, 0.125)
Example 1-8	Compound 8	3.44	5.55	(0.137, 0.125)
Example 1-9	Compound 15	3.53	5.44	(0.138, 0.125)
Example 1-10	Compound 16	3.58	5.43	(0.137, 0.125)
Example 1-11	Compound 17	3.53	5.41	(0.137, 0.125)
Example 1-12	Compound 18	3.55	5.41	(0.137, 0.125)
Example 1-13	Compound 19	3.62	5.55	(0.138, 0.126)
Example 1-14	Compound 20	3.67	5.54	(0.137, 0.125)
Example 1-15	Compound 21	3.60	5.56	(0.137, 0.127)
Example 1-16	Compound 22	3.61	5.58	(0.137, 0.127)
Comparative Example 1-1	EB 1 (TCTA)	4.56	4.32	(0.138, 0.127)
Comparative Example 1-2	EB 2	4.25	4.58	(0.139, 0.125)

[0350] As seen from Table 1, it was seen that the organic light emitting devices of Examples 1-1 to 1-16 using the compound represented by Chemical Formula 1 as an electron suppression layer in the organic light emitting device exhibited properties of low voltage and high efficiency compared to Comparative Example 1 using existing TCTA and Comparative Example 2 having a core structure similar to Chemical Formula 1 of the present disclosure.

[0351] It was identified that the compound of Chemical Formula 1 according to the present disclosure had an excellent electron suppression ability and exhibited properties of low voltage and high efficiency, and therefore, is capable of being used in an organic light emitting device.

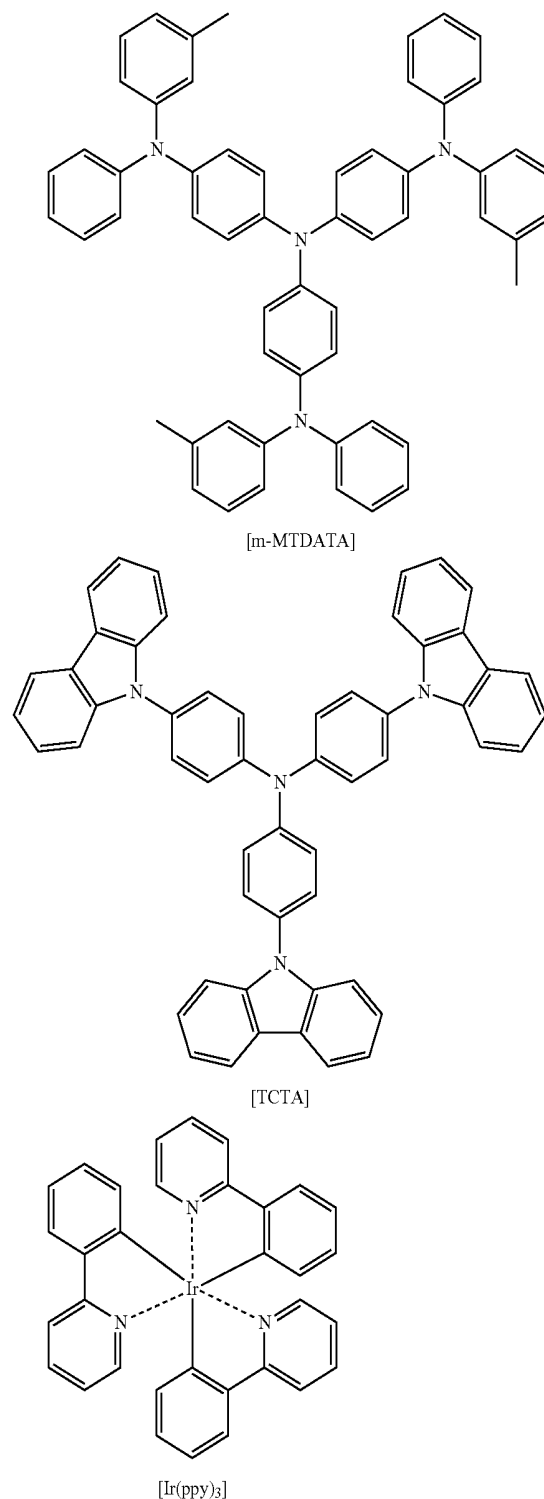
Example 2-1

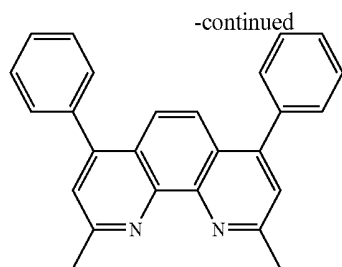
[0352] The compounds synthesized in the synthesis examples were high-purity sublimation purified using commonly known methods, and then a green organic light emitting device was manufactured using a method as below.

[0353] A glass substrate on which indium tin oxide (ITO) was coated as a thin film to a thickness of 1,000 Å was placed in detergent-dissolved distilled water and ultrasonic cleaned. Herein, a product of Fischer Co. was used as the detergent, and as the distilled water, distilled water filtered twice with a filter manufactured by Millipore Co. was used. After the ITO was cleaned for 30 minutes, ultrasonic cleaning was repeated twice using distilled water for 10 minutes. After the cleaning with distilled water was finished, the substrate was ultrasonic cleaned with solvents of isopropyl alcohol, acetone and methanol, then dried, and then transferred to a plasma cleaner. In addition, the substrate was cleaned for 5 minutes using oxygen plasma, and then transferred to a vacuum depositor.

[0354] An organic light emitting device was manufactured by forming a light emitting element in the order of m-MT-DATA (60 nm)/TCTA (80 nm)/Compound 11+10% Ir(ppy)₃ (300 nm)/BCP (10 nm)/Alq₃ (30 nm)/LiF (1 nm)/Al (200 nm) on the transparent ITO electrode prepared as above using Compound 11 as a host.

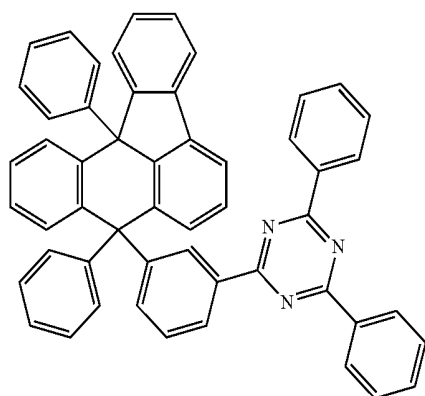
[0355] Structures of the m-MTDATA, the TCTA, the Ir(ppy)₃ and the BCP are as follows.





[BCP]

[Compound 11]



Example 2-2

[0356] An organic light emitting device was manufactured in the same manner as in Example 2-1 except that Compound 12 was used instead of Compound 11.

Example 2-3

[0357] An organic light emitting device was manufactured in the same manner as in Example 2-1 except that Compound 13 was used instead of Compound 11.

Example 2-4

[0358] An organic light emitting device was manufactured in the same manner as in Example 2-1 except that Compound 14 was used instead of Compound 11.

Example 2-5

[0359] An organic light emitting device was manufactured in the same manner as in Example 2-1 except that Compound 25 was used instead of Compound 11.

Example 2-6

[0360] An organic light emitting device was manufactured in the same manner as in Example 2-1 except that Compound 26 was used instead of Compound 11.

Example 2-7

[0361] An organic light emitting device was manufactured in the same manner as in Example 2-1 except that Compound 27 was used instead of Compound 11.

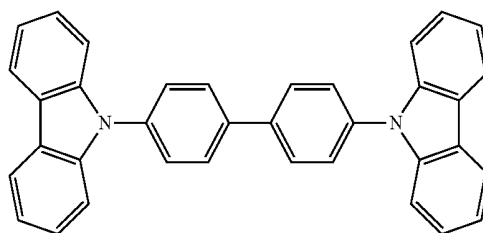
Example 2-8

[0362] An organic light emitting device was manufactured in the same manner as in Example 2-1 except that Compound 28 was used instead of Compound 11.

Comparative Example 1

[0363] An organic light emitting device was manufactured in the same manner as in Example 2-1 except that the following GH 1 (CBP) was used instead of Compound 11.

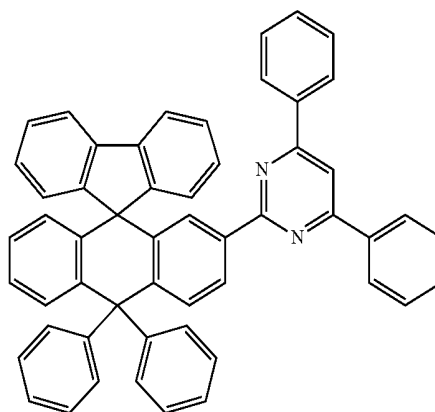
[GH 1]



Comparative Example 2

[0364] An organic light emitting device was manufactured in the same manner as in Example 2-1 except that the following GH 2 was used instead of Compound 11.

[GH 2]



[0365] When a current was applied to the organic light emitting devices manufactured in Examples 2-1 to 2-8 and Comparative Examples 1 and 2, results of the following Table 2 were obtained.

TABLE 2

Compound (Host)	Voltage (V@10 mA/cm ²)	Efficiency (cd/A@10 mA/cm ²)	EL Peak (nm)
Example 2-1 Compound 11	5.18	46.93	517
Example 2-2 Compound 12	5.26	45.24	516
Example 2-3 Compound 13	5.15	46.54	518
Example 2-4 Compound 14	5.29	45.15	517
Example 2-5 Compound 25	5.28	45.31	515
Example 2-6 Compound 26	5.13	46.63	516
Example 2-7 Compound 27	5.29	45.42	516
Example 2-8 Compound 28	5.27	45.54	517

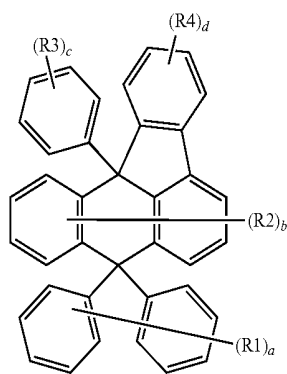
TABLE 2-continued

	Compound (Host)	Voltage (V@10 mA/cm ²)	Efficiency (cd/A@10 mA/cm ²)	EL Peak (nm)
Comparative Example 1	GH 1 (CBP)	7.21	35.41	517
Comparative Example 2	GH 2	6.51	39.56	517

[0366] From the test results, it was identified that the green organic light emitting devices of Examples 2-1 to 2-8 using the compound represented by Chemical Formula 1 according to the present disclosure as a host material of a green light emitting layer exhibited superior performance in terms of current efficiency and driving voltage compared to Comparative Example using existing CBP and the green organic light emitting device of Comparative Example 2 having a core structure similar to Chemical Formula 1 of the present disclosure.

[0367] Hereinbefore, preferred embodiments of the present disclosure (electron suppression layer, green light emitting layer) have been described, however, the present disclosure is not limited thereto, and various modifications may be made within the scope of the claims and the detailed descriptions, and the modifications are also included in the scope of the present disclosure.

1. A compound represented by the following Chemical Formula 1:



[Chemical Formula 1]

wherein, in Chemical Formula 1,

R1 to R4 are the same as or different from each other, and each independently hydrogen;

deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a substituted or unsubstituted silyl group; a substituted or unsubstituted boron group; a substituted or unsubstituted alkyl group; a substituted or unsubstituted cycloalkyl group; a substituted or unsubstituted alkoxy group; a substituted or unsubstituted aryloxy group; a substituted or unsubstituted alkylthioxy group; a substituted or unsubstituted arylthioxy group; a substituted or unsubstituted alkylsulfoxy group; a substituted or unsubstituted arylsulfoxy group; a substituted

or unsubstituted alkenyl group; a substituted or unsubstituted aralkyl group; a substituted or unsubstituted aralkenyl group; a substituted or unsubstituted alkylaryl group; a substituted or unsubstituted alkylamine group; a substituted or unsubstituted aralkylamine group; a substituted or unsubstituted heteroarylamine group; a substituted or unsubstituted arylamine group; a substituted or unsubstituted arylheteroarylamine group; a substituted or unsubstituted arylphosphine group; a substituted or unsubstituted phosphine oxide group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group, or bond to an adjacent group to form a substituted or unsubstituted ring,

a is an integer of 0 to 10,

b is an integer of 0 to 7,

c is an integer of 0 to 5,

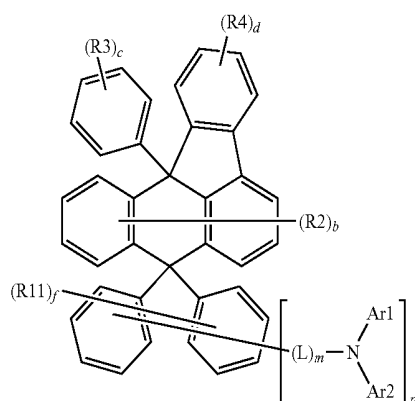
d is an integer of 0 to 4, and

when a, b, c and d are each 2 or greater, structures in the parentheses are the same as or different from each other.

2. The compound of claim 1, wherein, in Chemical Formula 1, a is from 1 to 10, at least one of R1 s is represented by -(L)m-A, L is a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group, m is an integer of 1 to 10, A is —NAr1Ar2; a substituted or unsubstituted N-containing heterocyclic group; —P(=O)R5R6; a substituted or unsubstituted anthracene group; or an aryl group substituted with a halogen group or a nitrile group, and Ar1, Ar2, R5 and R6 are the same as or different from each other, and each independently hydrogen; deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a substituted or unsubstituted silyl group; a substituted or unsubstituted boron group; a substituted or unsubstituted alkyl group; a substituted or unsubstituted cycloalkyl group; a substituted or unsubstituted alkoxy group; a substituted or unsubstituted aryloxy group; a substituted or unsubstituted alkylthioxy group; a substituted or unsubstituted arylthioxy group; a substituted or unsubstituted alkylsulfoxy group; a substituted or unsubstituted arylsulfoxy group; a substituted or unsubstituted alkenyl group; a substituted or unsubstituted aralkyl group; a substituted or unsubstituted aralkenyl group; a substituted or unsubstituted alkylaryl group; a substituted or unsubstituted alkylamine group; a substituted or unsubstituted aralkylamine group; a substituted or unsubstituted heteroarylamine group; a substituted or unsubstituted arylamine group; a substituted or unsubstituted arylheteroarylamine group; a substituted or unsubstituted arylphosphine group; a substituted or unsubstituted phosphine oxide group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group, or bond to an adjacent group to form a substituted or unsubstituted ring.

3. The compound of claim 1, wherein Chemical Formula 1 is represented by the following Chemical Formula 2:

[Chemical Formula 2]



wherein, in Chemical Formula 2,

definitions of R2 to R4, b, c and d are the same as in Chemical Formula 1,

R11 has the same definition as R1 to R4,

L is a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group,

Ar1 and Ar2 are the same as or different from each other, and each independently hydrogen; deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a substituted or unsubstituted silyl group; a substituted or unsubstituted boron group; a substituted or unsubstituted alkyl group; a substituted or unsubstituted cycloalkyl group; a substituted or unsubstituted alkoxy group; a substituted or unsubstituted aryloxy group; a substituted or unsubstituted alkylthioxy group; a substituted or unsubstituted arylthioxy group; a substituted or unsubstituted alkylsulfoxy group; a substituted or unsubstituted arylsulfoxy group; a substituted or unsubstituted alkenyl group; a substituted or unsubstituted aralkyl group; a substituted or unsubstituted aralkenyl group; a substituted or unsubstituted alkylaryl group; a substituted or unsubstituted alkylamine group; a substituted or unsubstituted aralkylamine group; a substituted or unsubstituted heteroarylamine group; a substituted or unsubstituted arylamine group; a substituted or unsubstituted arylheteroarylamine group; a substituted or unsubstituted arylphosphine group; a substituted or unsubstituted phosphine oxide group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group, or bond to an adjacent group to form a substituted or unsubstituted ring,

p is an integer of 1 to 10,
f is an integer of 0 to 10,

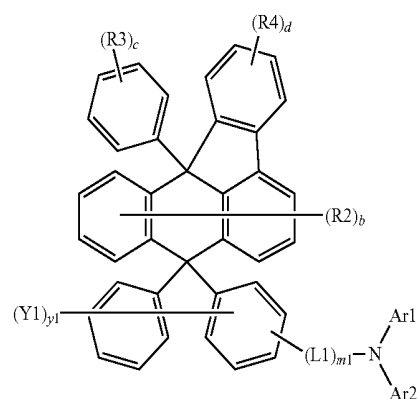
$$1 \leq p+f \leq 10,$$

m is an integer of 1 to 10, and

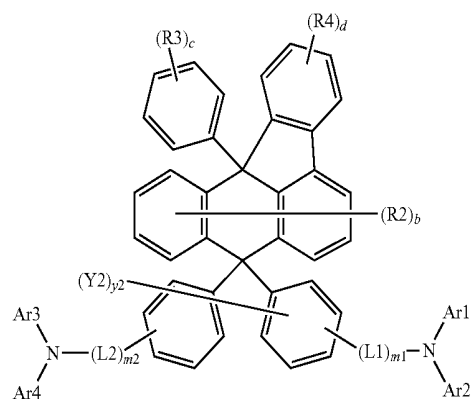
when p, f and m are each 2 or greater, structures in the parentheses are the same as or different from each other.

4. The compound of claim 1, wherein Chemical Formula 1 is represented by the following Chemical Formula 3 or 4:

[Chemical Formula 3]



[Chemical Formula 4]



wherein, in Chemical Formulae 3 and 4,

definitions of R2 to R4, b, c and d are the same as in Chemical Formula 1,

L1 and L2 are the same as or different from each other, and each independently a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group,

Ar1 to Ar4, and Y1 and Y2 are the same as or different from each other, and each independently hydrogen; deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a substituted or unsubstituted silyl group; a substituted or unsubstituted boron group; a substi-

tuted or unsubstituted alkyl group; a substituted or unsubstituted cycloalkyl group; a substituted or unsubstituted alkoxy group; a substituted or unsubstituted aryloxy group; a substituted or unsubstituted alkylthio group; a substituted or unsubstituted arylthio group; a substituted or unsubstituted alkylsulfoxy group; a substituted or unsubstituted arylsulfoxy group; a substituted or unsubstituted alkenyl group; a substituted or unsubstituted aralkyl group; a substituted or unsubstituted aralkenyl group; a substituted or unsubstituted alkylaryl group; a substituted or unsubstituted alkylamine group; a substituted or unsubstituted aralkylamine group; a substituted or unsubstituted heteroarylamine group; a substituted or unsubstituted arylamine group; a substituted or unsubstituted arylheteroarylamine group; a substituted or unsubstituted arylphosphine group; a substituted or unsubstituted phosphine oxide group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group, or bond to an adjacent group to form a substituted or unsubstituted ring,

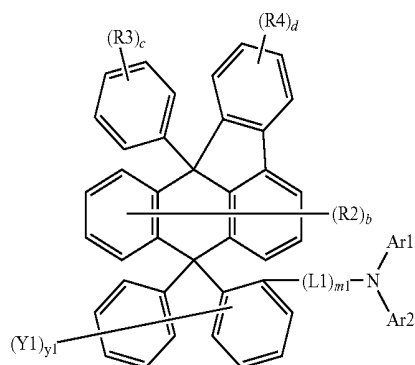
y1 is an integer of 0 to 9,

y2 is an integer of 0 to 8,

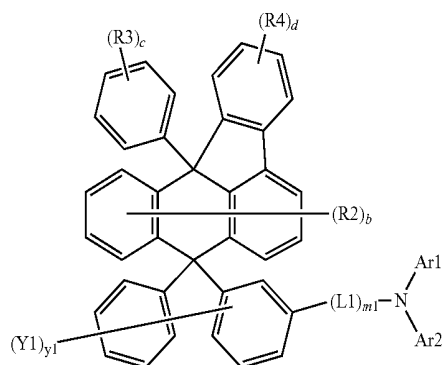
m1 and m2 are the same as or different from each other, and each independently an integer of 1 to 10, and when y1, y2, m1 and m2 are each 2 or greater, structures in the parentheses are the same as or different from each other.

5. The compound of claim 1, wherein Chemical Formula 1 is represented by any one of the following Chemical Formulae 5 to 8:

[Chemical Formula 5]

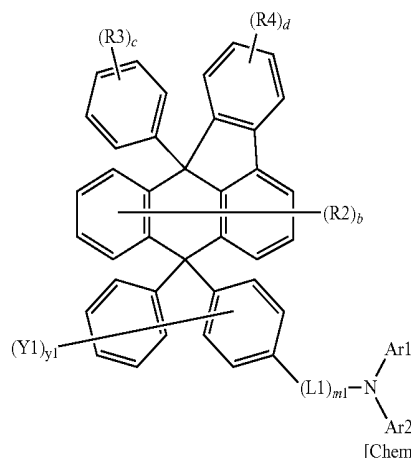


[Chemical Formula 6]

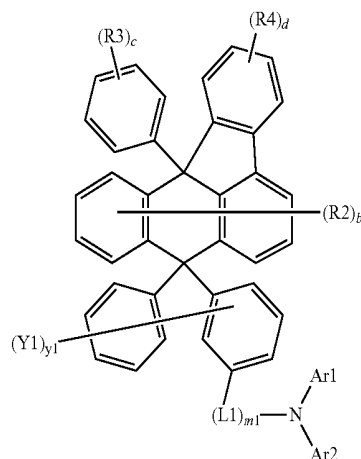


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[Chemical Formula 7]



[Chemical Formula 8]



wherein, in Chemical Formulae 5 to 8,

definitions of R2 to R4, b, c and d are the same as in Chemical Formula 1,

L1 is a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group,

Ar1, Ar2 and Y1 are the same as or different from each other, and each independently hydrogen; deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a substituted or unsubstituted silyl group; a substituted or unsubstituted boron group; a substituted or unsubstituted alkyl group; a substituted or unsubstituted cycloalkyl group; a substituted or unsubstituted alkoxy group; a substituted or unsubstituted aryloxy group; a substituted or unsubstituted alkylthio group; a substituted or unsubstituted arylthio group; a substituted or unsubstituted alkylsulfoxy group; a substituted or unsubstituted arylsulfoxy group; a substituted or unsubstituted alkenyl group; a substituted or unsubstituted aralkyl group; a substituted or unsubstituted aralkenyl group; a substituted or unsubstituted alkylaryl group; a substituted or unsubstituted alkylamine group; a substituted or unsubstituted aralkylamine group; a substituted or unsubstituted heteroarylamine group; a substituted or unsubstituted arylamine group;

a substituted or unsubstituted arylheteroarylamine group; a substituted or unsubstituted arylphosphine group; a substituted or unsubstituted phosphine oxide group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group, or bond to an adjacent group to form a substituted or unsubstituted ring,

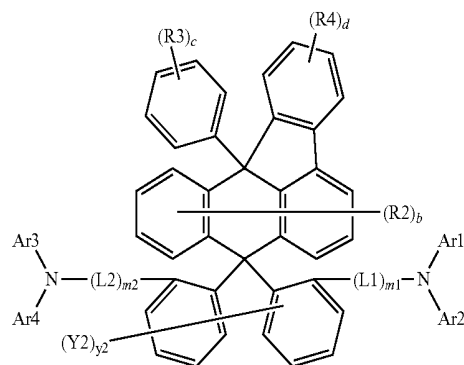
yl is an integer of 0 to 9,

m1 is an integer of 1 to 10, and

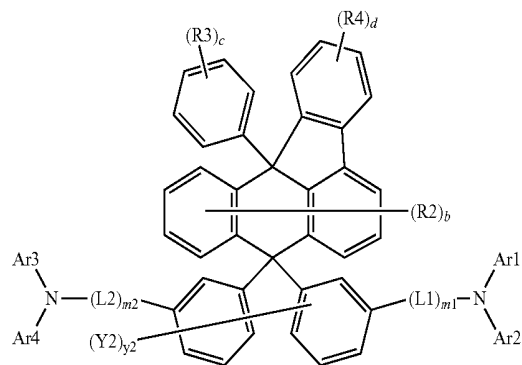
when y1 and m1 are each 2 or greater, structures in the parentheses are the same as or different from each other.

6. The compound of claim 1, wherein Chemical Formula 1 is represented by any one of the following Chemical Formulae 9 to 12:

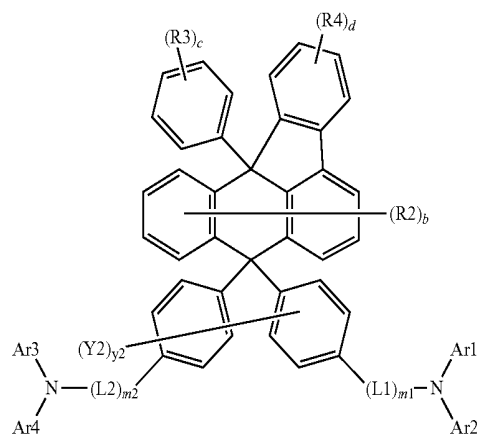
[Chemical Formula 9]



[Chemical Formula 10]

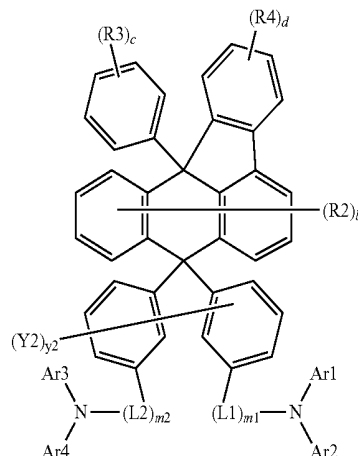


[Chemical Formula 11]



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[Chemical Formula 12]



wherein, in Chemical Formulae 9 to 12, definitions of R2 to R4, b, c and d are the same as in Chemical Formula 1,

L1 and L2 are the same as or different from each other, and each independently a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group,

Ar1 to Ar4 and Y2 are the same as or different from each other, and each independently hydrogen; deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a substituted or unsubstituted silyl group; a substituted or unsubstituted boron group; a substituted or unsubstituted alkyl group; a substituted or unsubstituted cycloalkyl group; a substituted or unsubstituted alkoxy group; a substituted or unsubstituted aryloxy group; a substituted or unsubstituted alkylthioxy group; a substituted or unsubstituted arylthioxy group; a substituted or unsubstituted alkylsulfoxy group; a substituted or unsubstituted arylsulfoxy group; a substituted or unsubstituted alkenyl group; a substituted or unsubstituted aralkyl group; a substituted or unsubstituted alkylaryl group; a substituted or unsubstituted alkylamine group; a substituted or unsubstituted aralkylamine group; a substituted or unsubstituted heteroarylamine group; a substituted or unsubstituted arylamine group; a substituted or unsubstituted arylheteroarylamine group; a substituted or unsubstituted arylphosphine group; a substituted or unsubstituted phosphine oxide group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group, or bond to an adjacent group to form a substituted or unsubstituted ring,

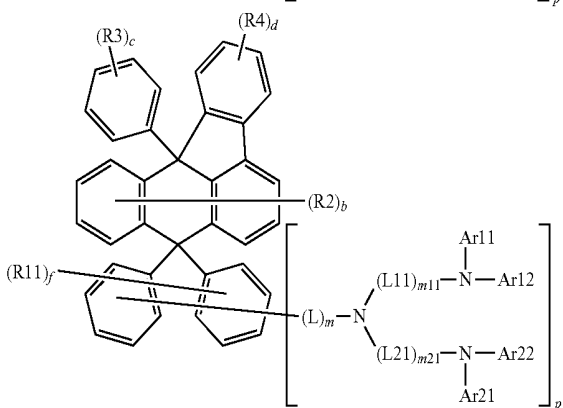
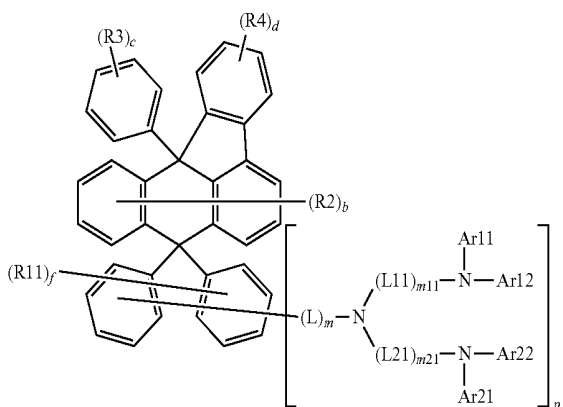
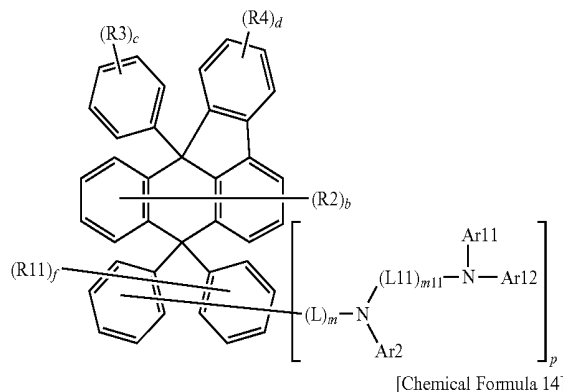
y2 is an integer of 0 to 8,

m1 and m2 are the same as or different from each other, and each independently an integer of 1 to 10, and

when y2, m1 and m2 are each 2 or greater, structures in the parentheses are the same as or different from each other.

7. The compound of claim 1, wherein Chemical Formula 1 is represented by the following Chemical Formula 13 or 14:

[Chemical Formula 13]



wherein, in Chemical Formulae 13 and 14, definitions of R2 to R4, b, c and d are the same as in Chemical Formula 1,

R11 has the same definition as R2 to R4,

L, L11 and L21 are the same as or different from each other, and each independently a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group,

Ar2, Ar11, Ar12, Ar21 and Ar22 are the same as or different from each other, and each independently hydrogen; deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a substituted or unsubstituted silyl group; a substituted or unsubstituted boron group; a substituted or unsubstituted alkyl group; a substituted or unsubstituted cycloalkyl group; a substituted or

unsubstituted alkoxy group; a substituted or unsubstituted aryloxy group; a substituted or unsubstituted alkylthio group; a substituted or unsubstituted arylthio group; a substituted or unsubstituted alkylsulfoxy group; a substituted or unsubstituted arylsulfoxy group; a substituted or unsubstituted alkenyl group; a substituted or unsubstituted aralkyl group; a substituted or unsubstituted aralkenyl group; a substituted or unsubstituted alkylaryl group; a substituted or unsubstituted alkylamine group; a substituted or unsubstituted heteroalkylamine group; a substituted or unsubstituted heteroarylamine group; a substituted or unsubstituted arylheteroarylamine group; a substituted or unsubstituted arylphosphine group; a substituted or unsubstituted phosphine oxide group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group, or bond to an adjacent group to form a substituted or unsubstituted ring,

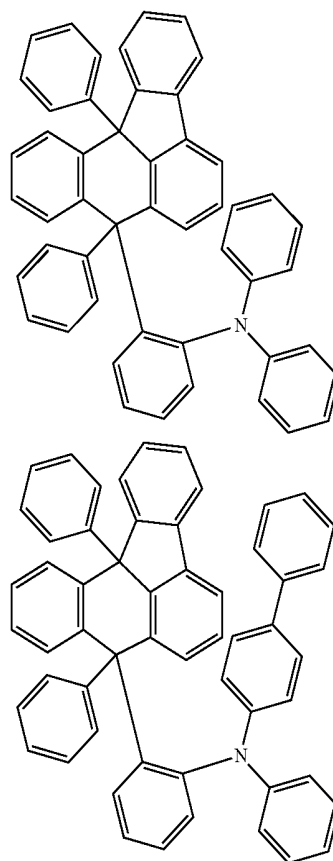
p is an integer of 1 to 10,

f is an integer of 0 to 10,

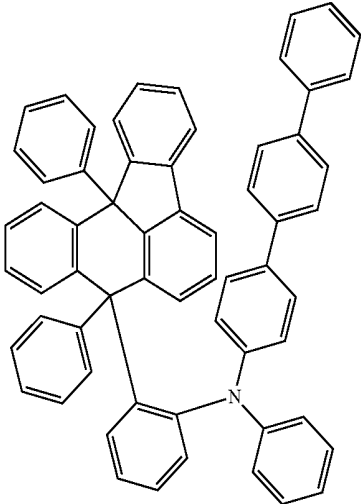
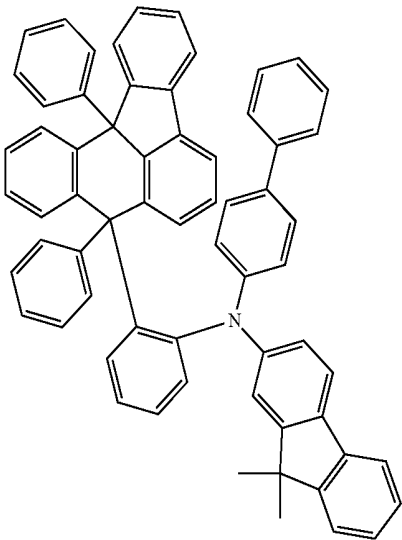
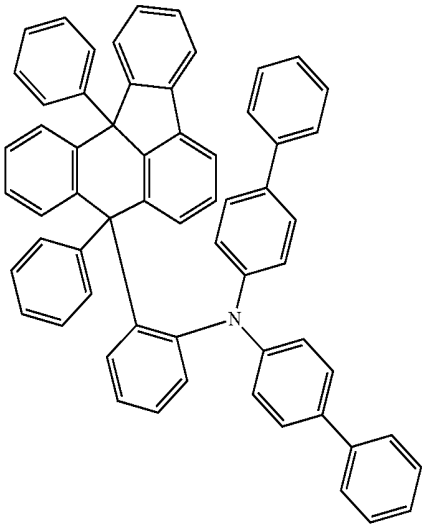
$1 \leq p + f \leq 10$,

m, m11 and m21 are the same as or different from each other, and each independently an integer of 1 to 10, and when p, f, m, m11 and m21 are each 2 or greater, structures in the parentheses are the same as or different from each other.

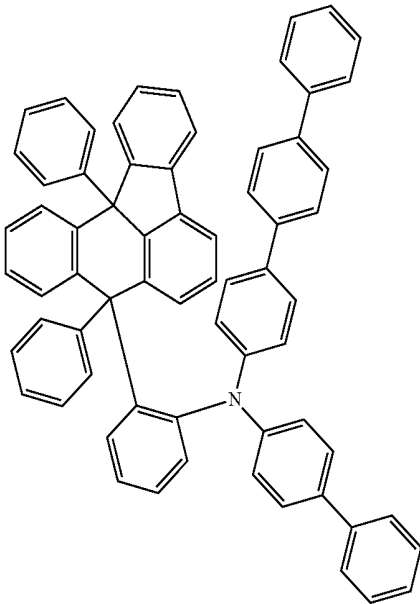
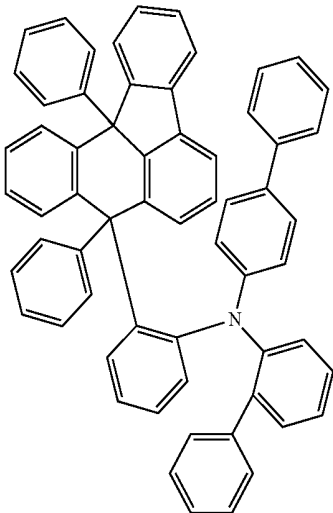
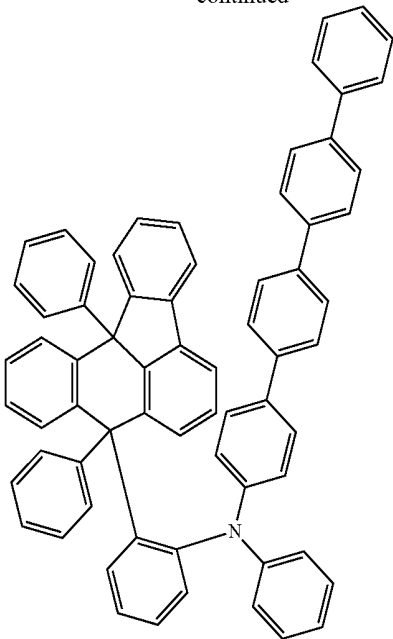
8. The compound of claim 1, wherein the compound of Chemical Formula 1 is any one selected from among the following structural formulae:



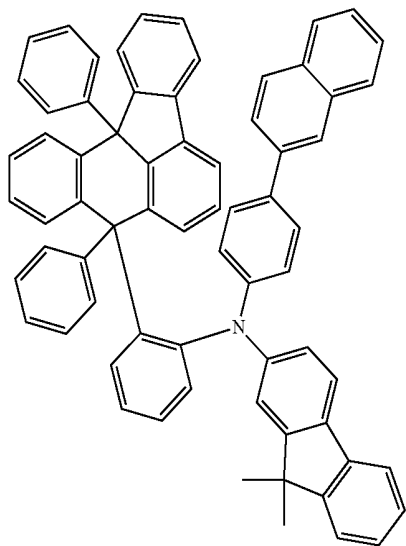
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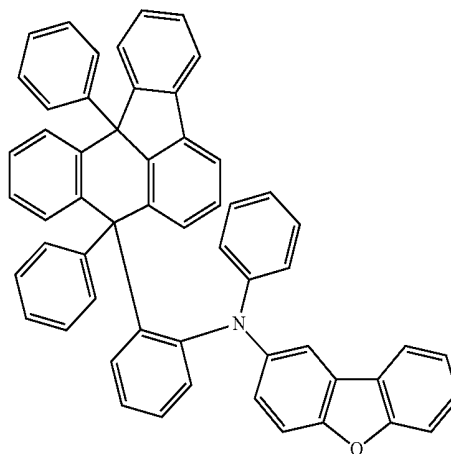
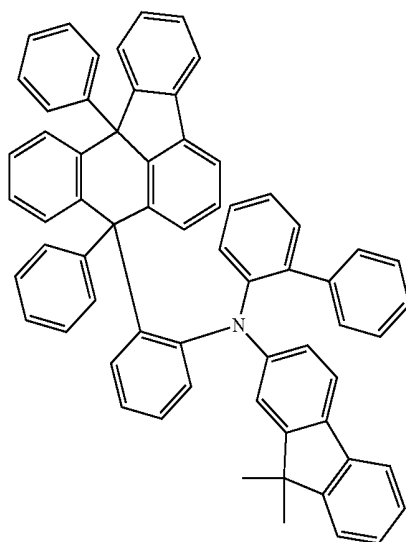
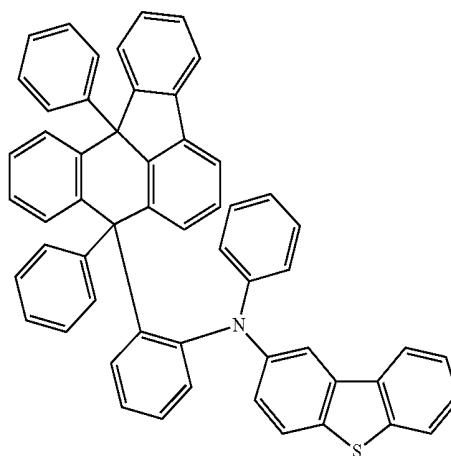
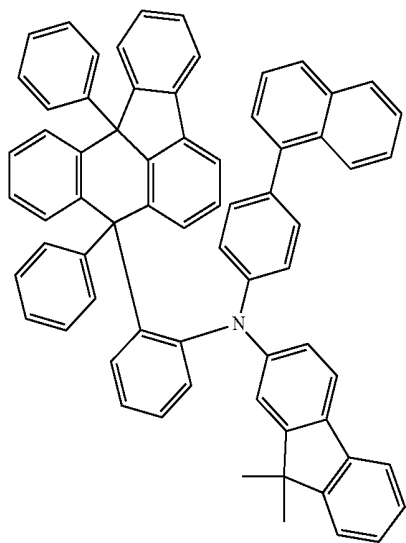
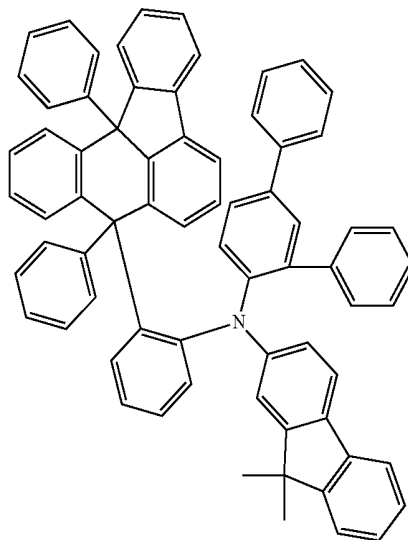
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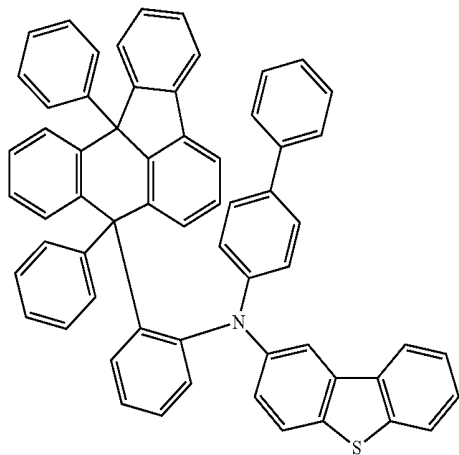
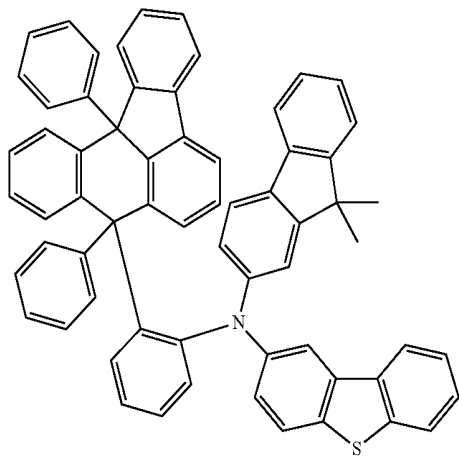
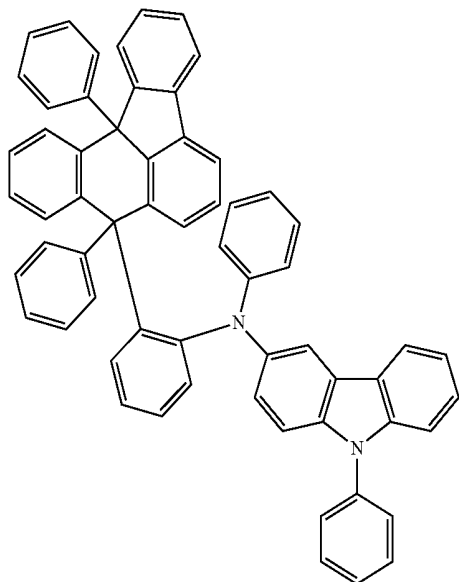
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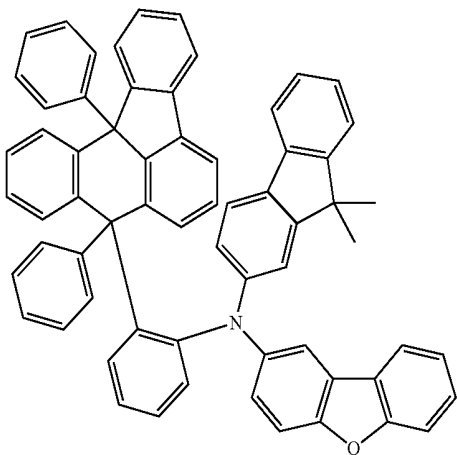
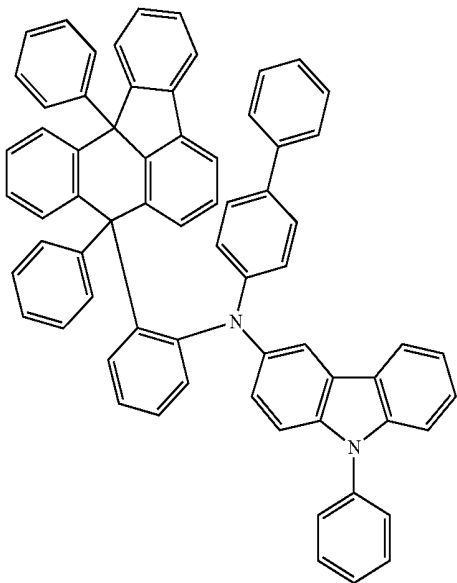
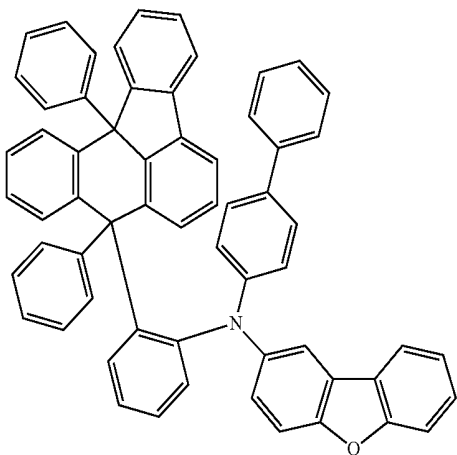
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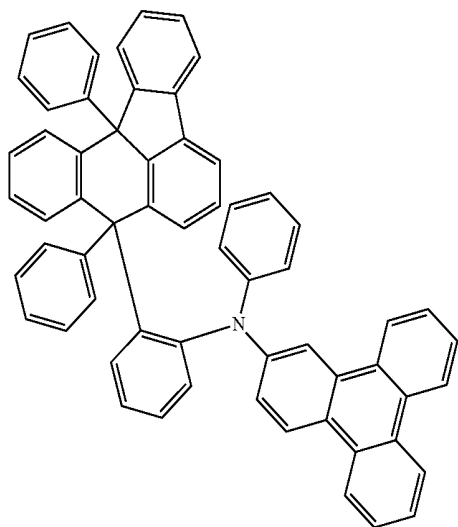
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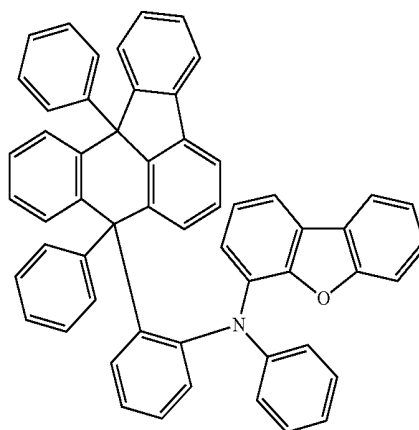
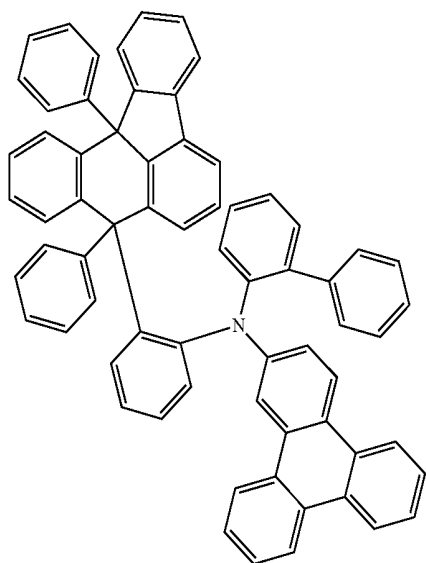
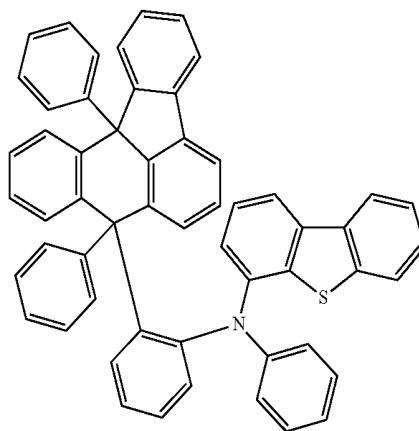
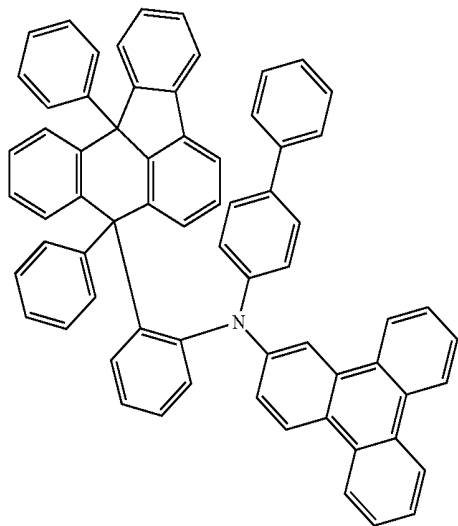
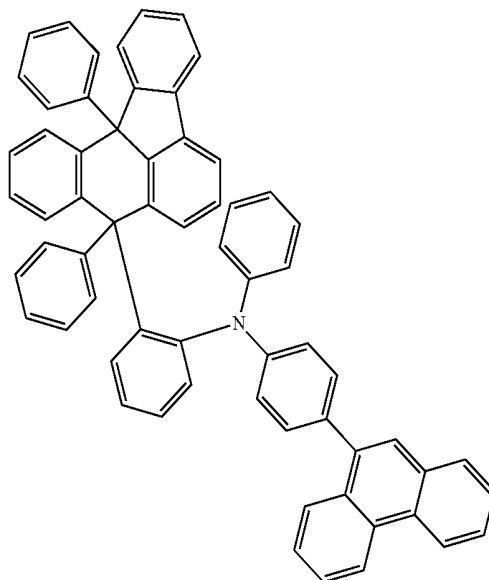
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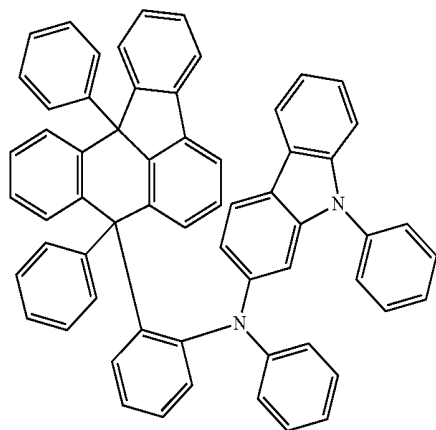
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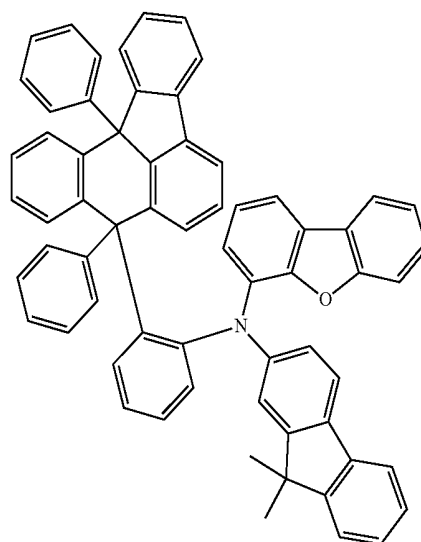
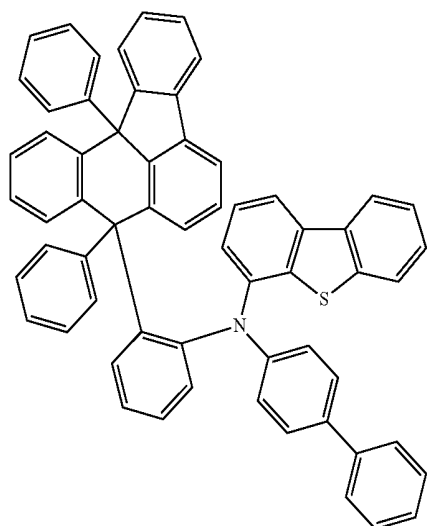
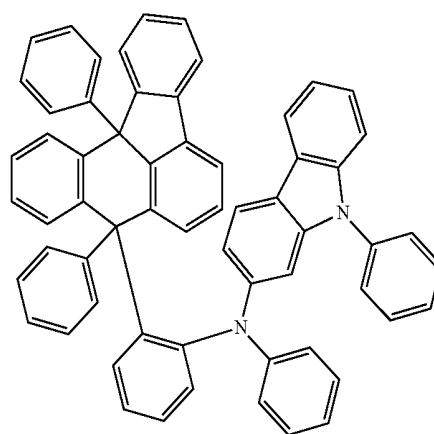
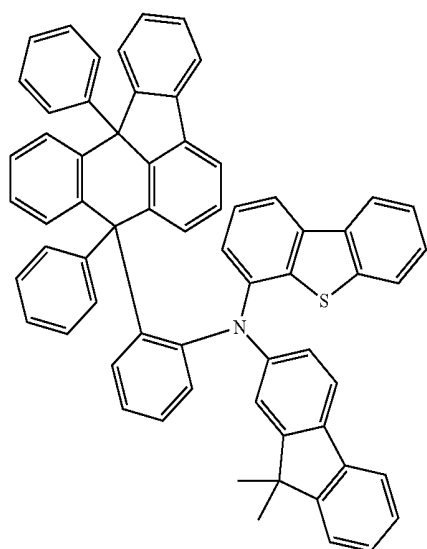
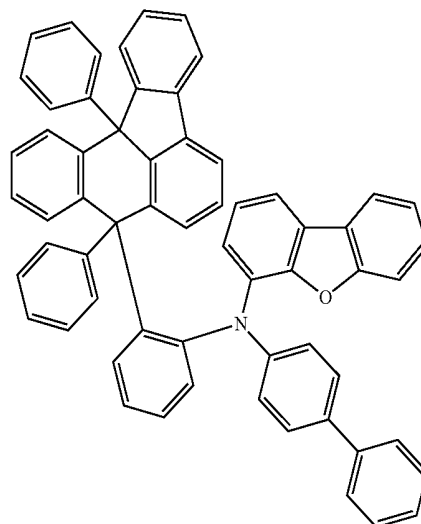
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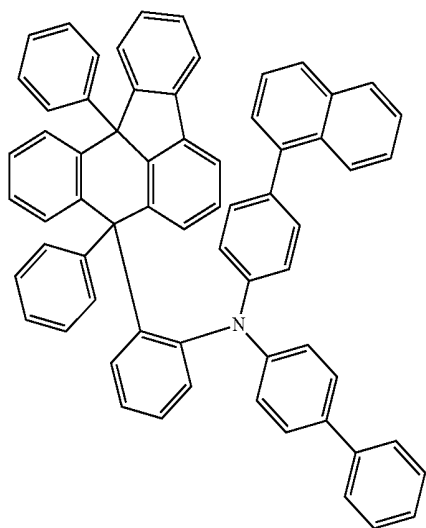
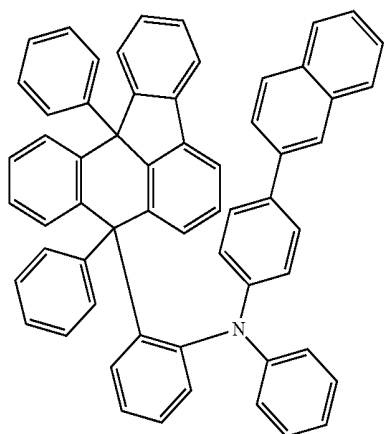
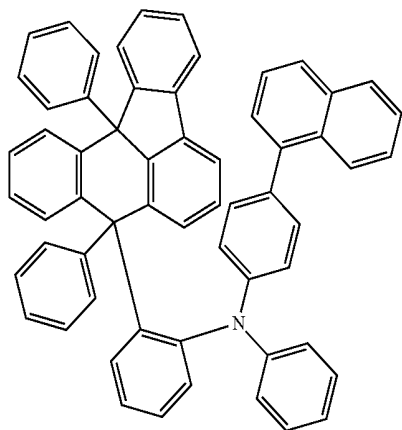
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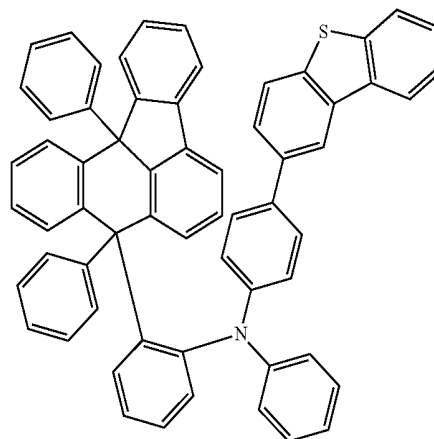
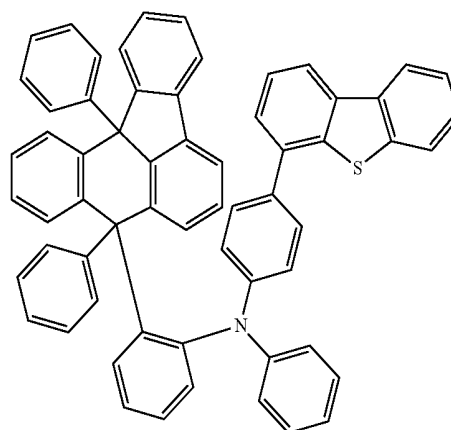
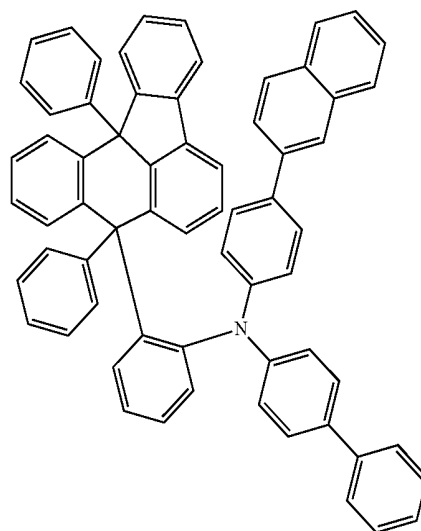
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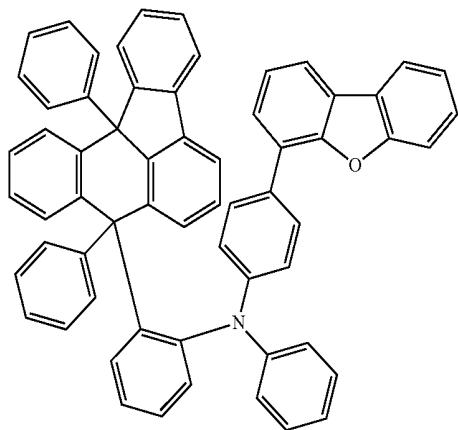
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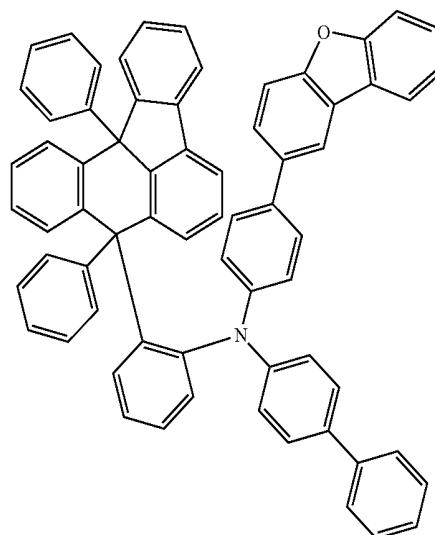
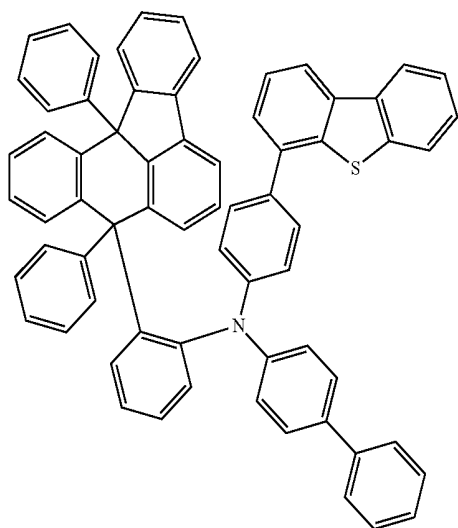
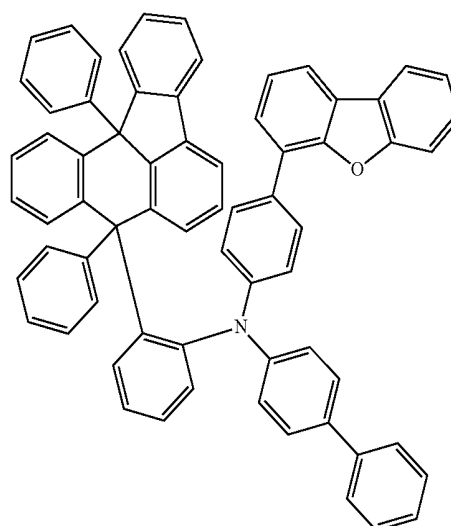
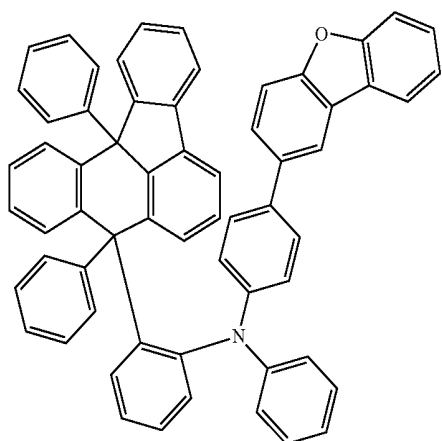
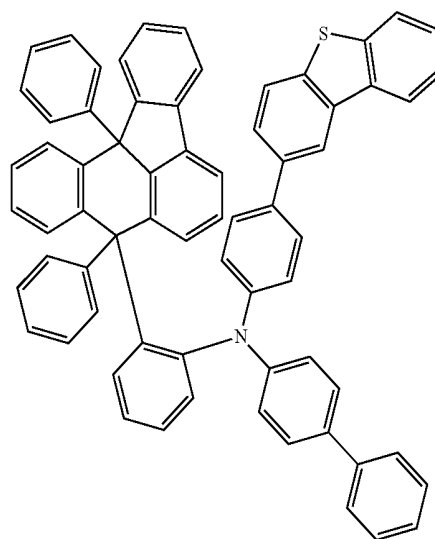
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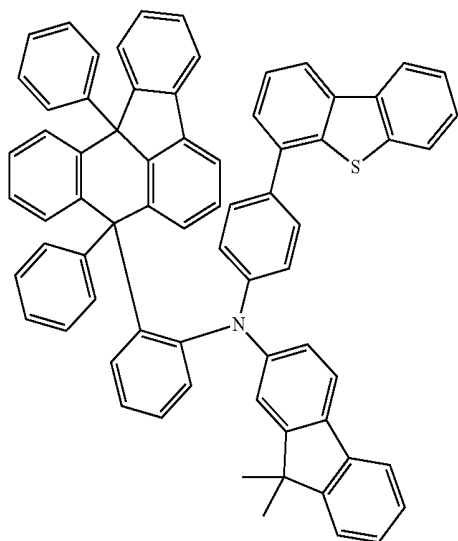
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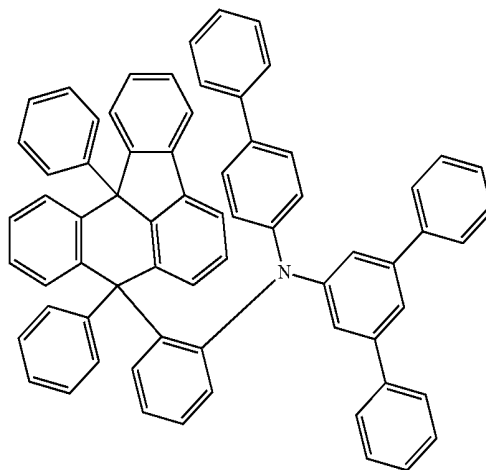
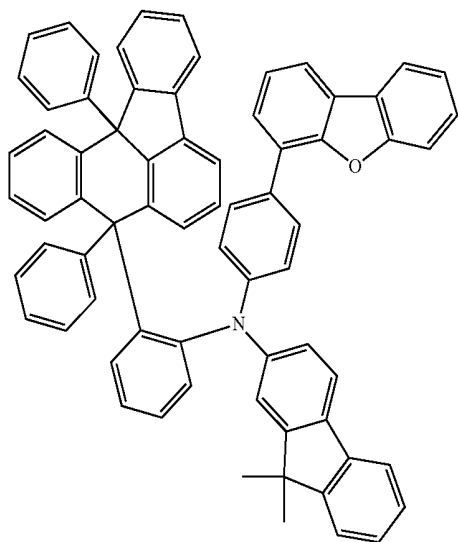
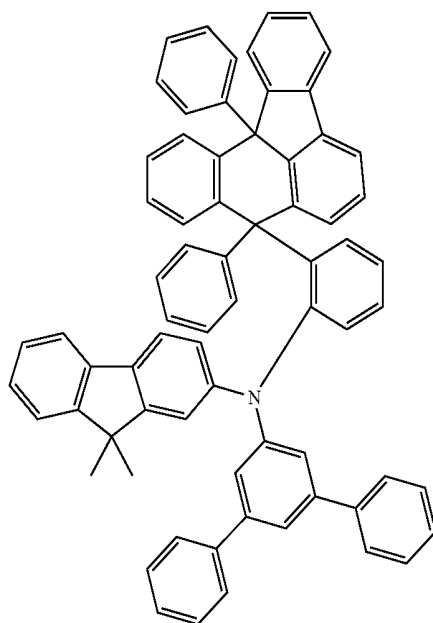
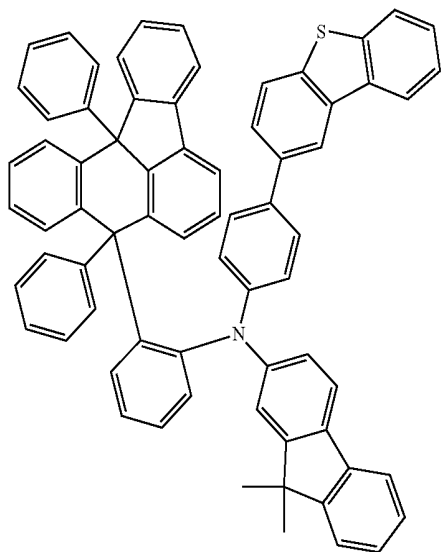
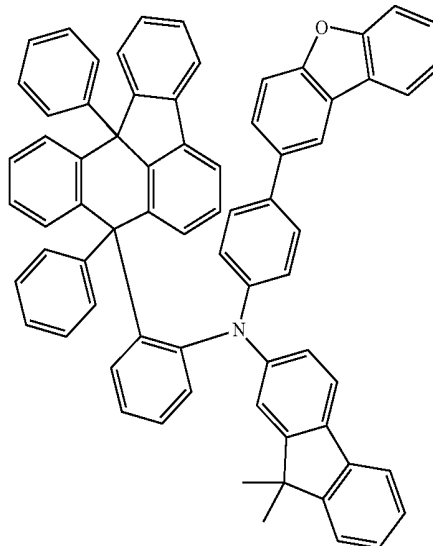
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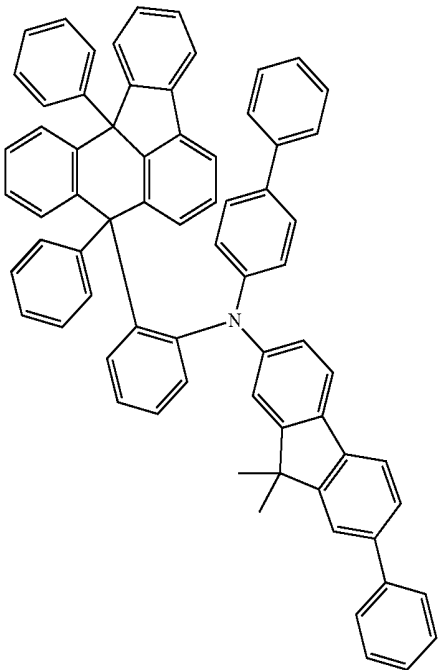
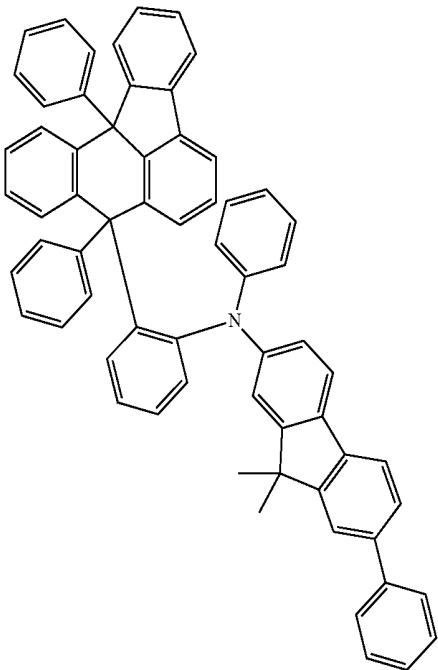
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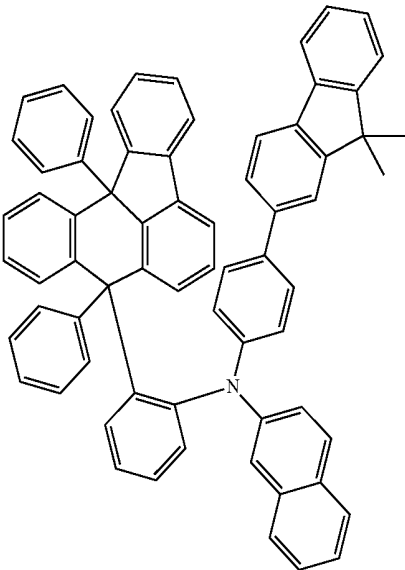
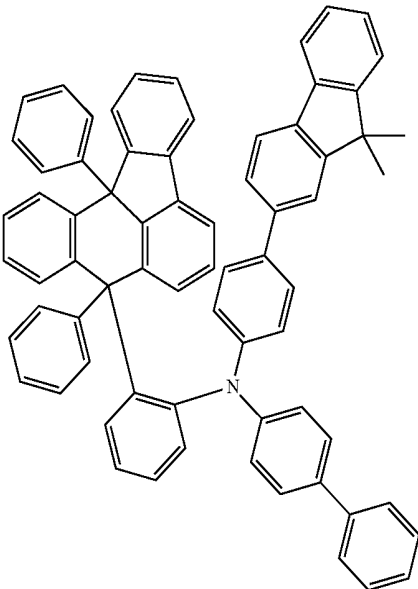
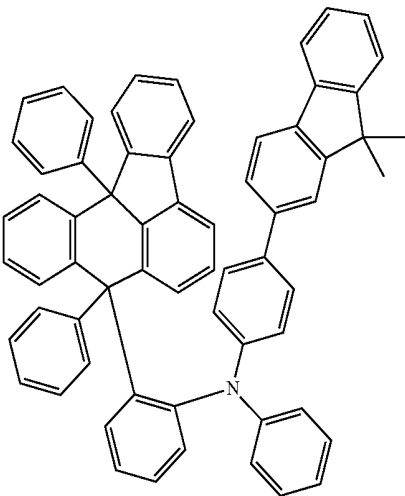
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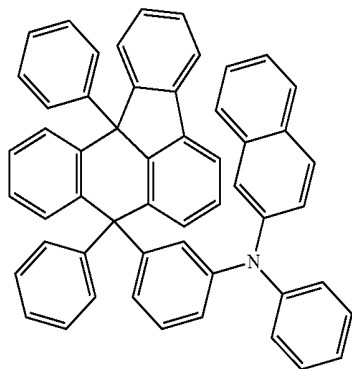
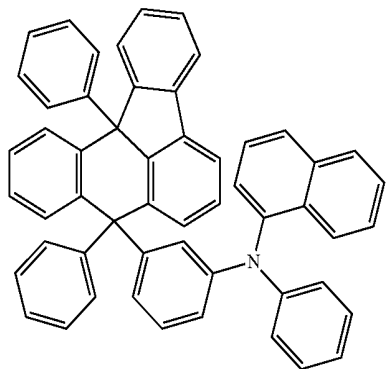
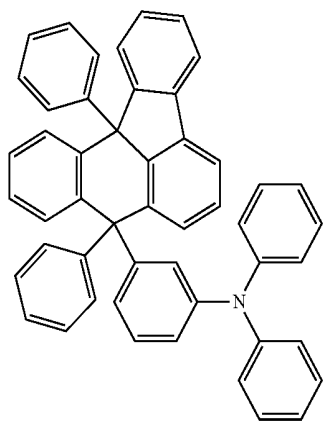
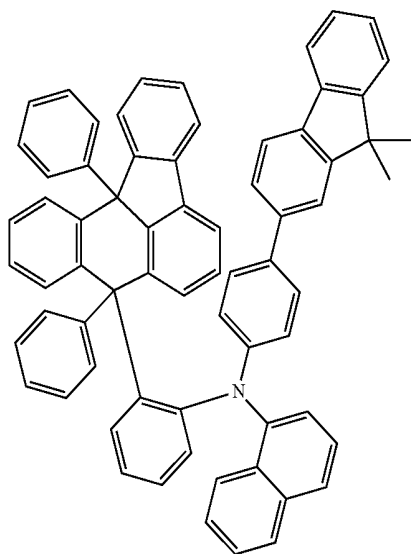
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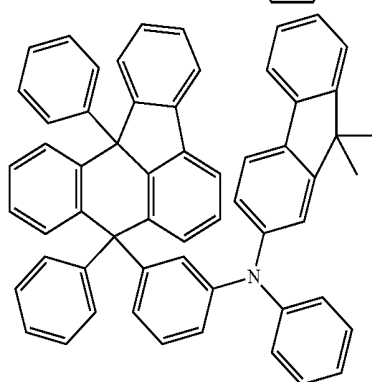
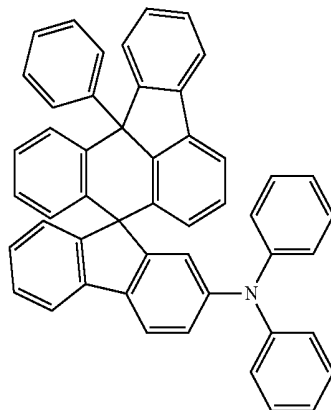
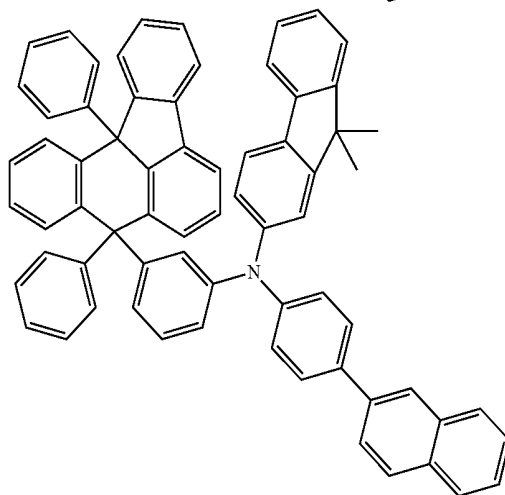
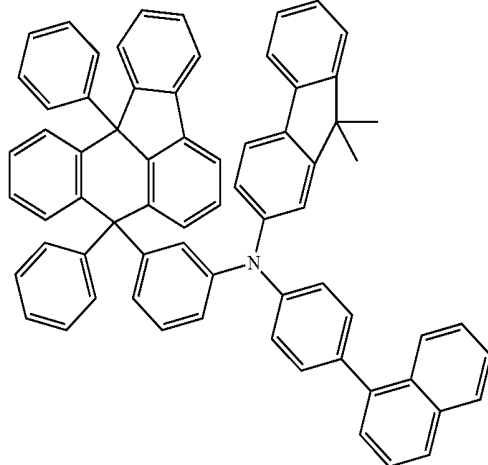
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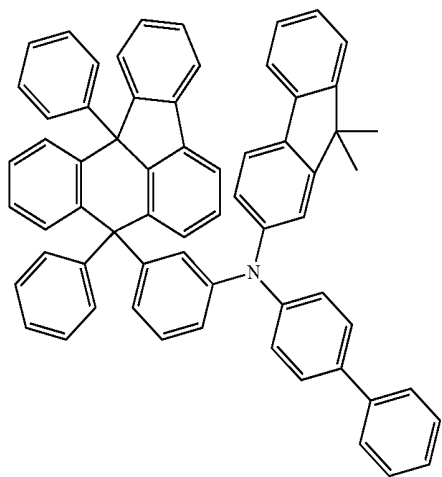
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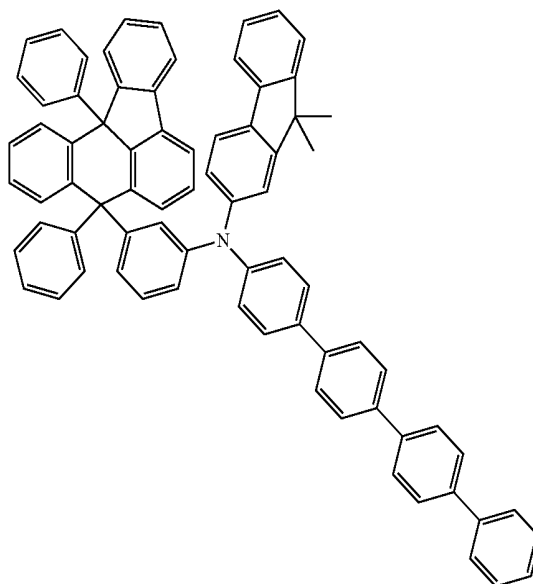
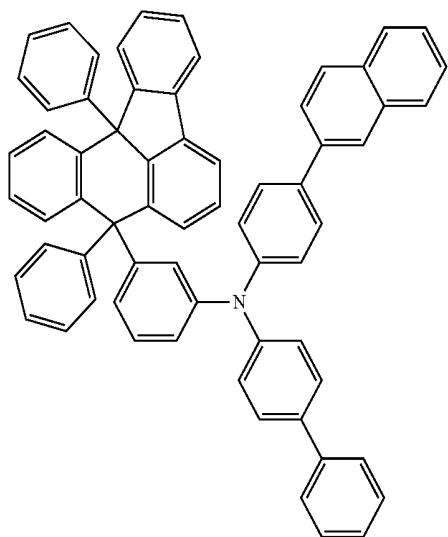
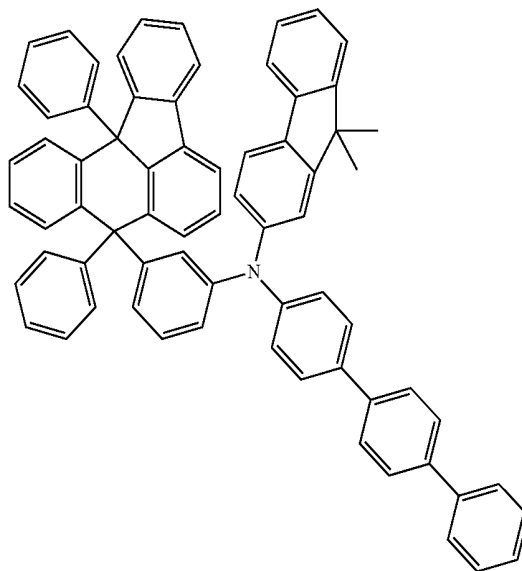
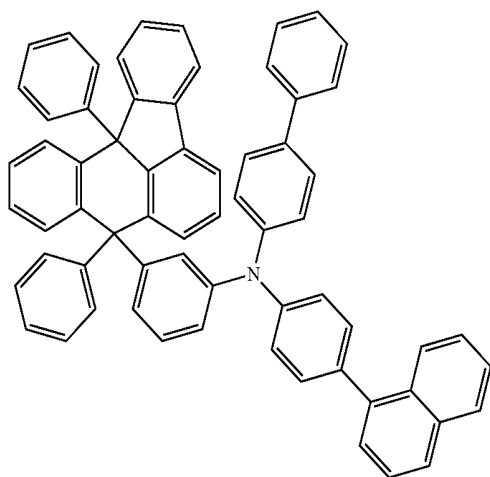
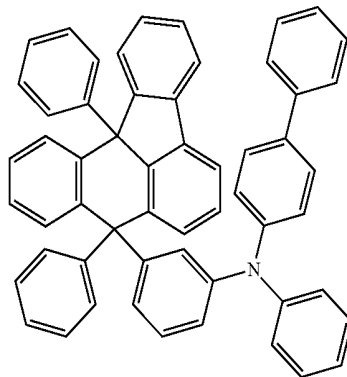
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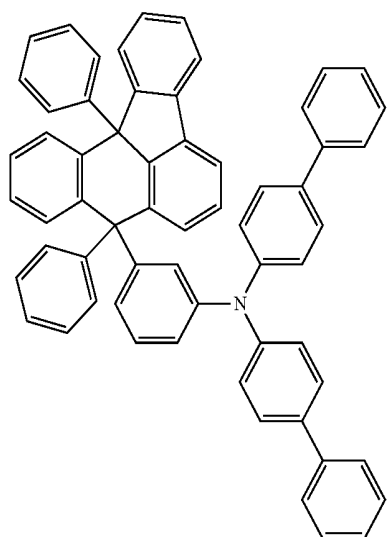
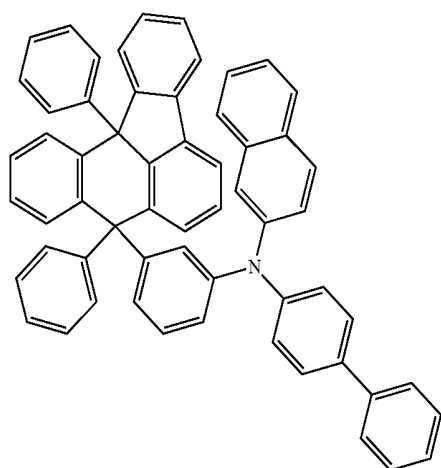
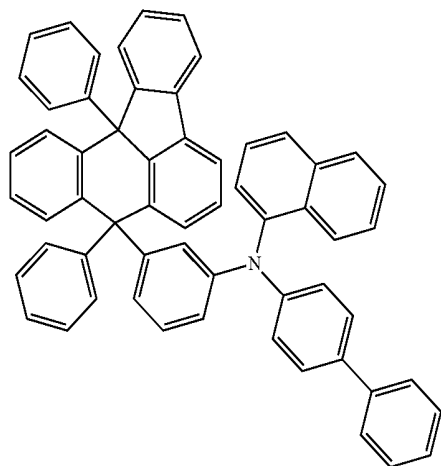
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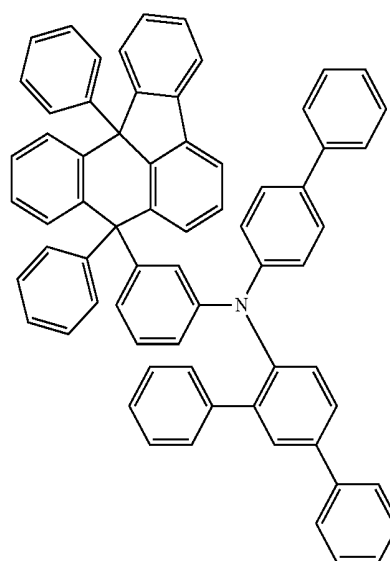
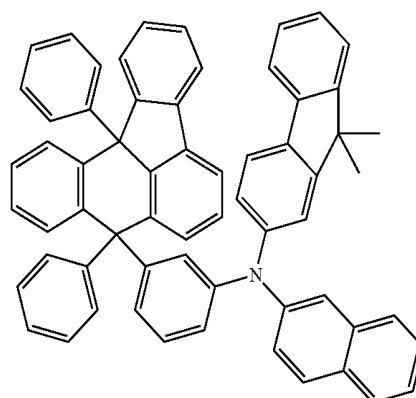
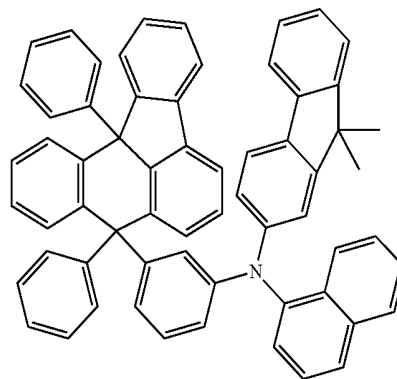
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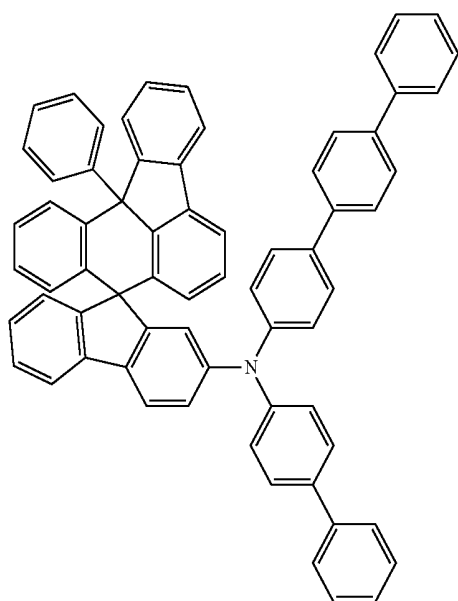
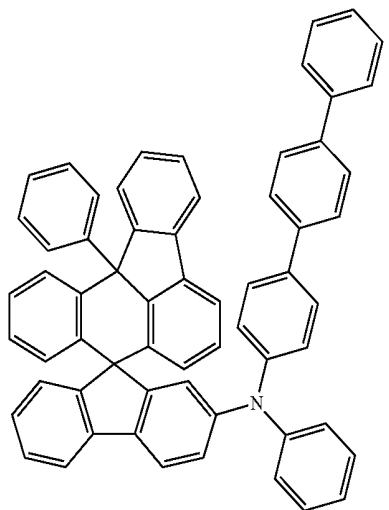
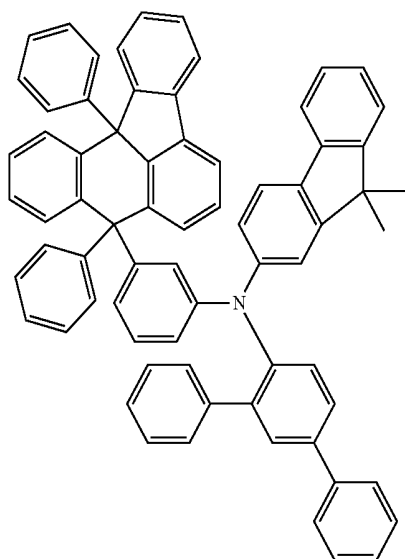
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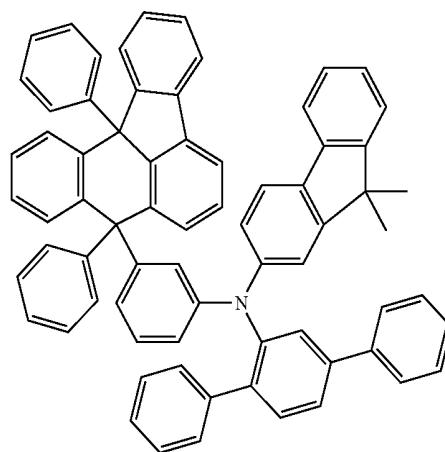
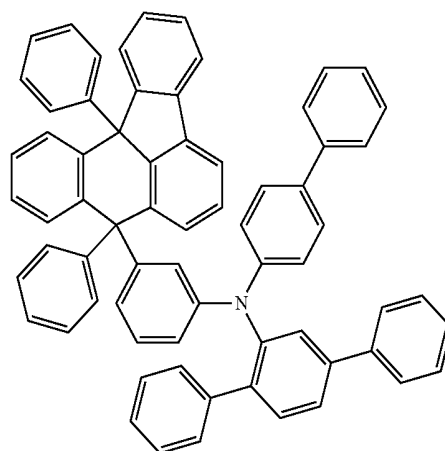
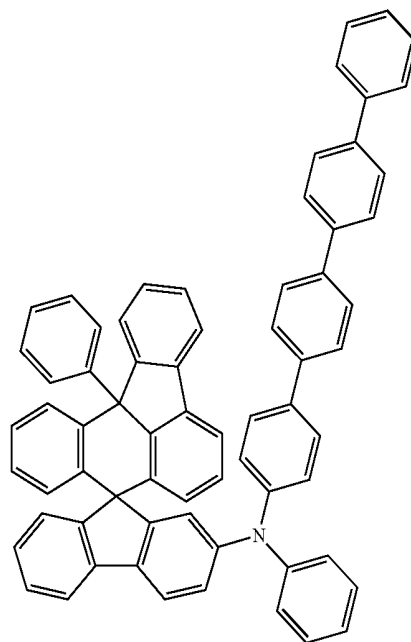
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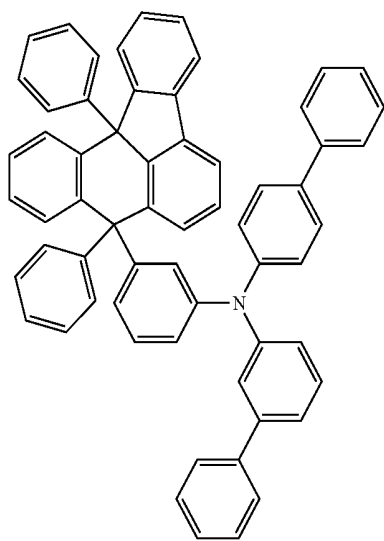
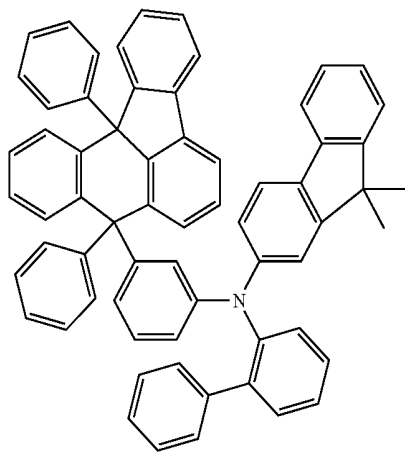
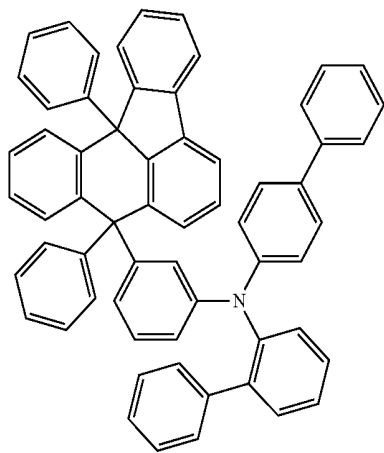
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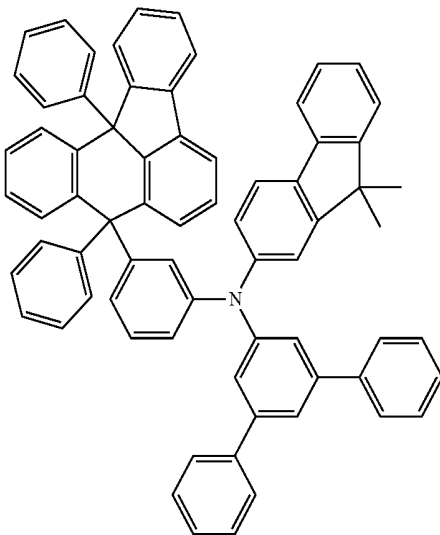
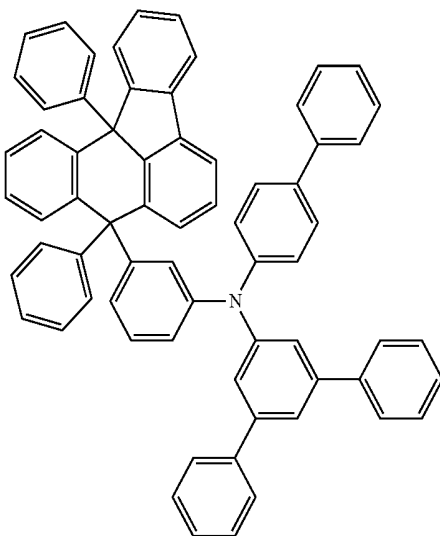
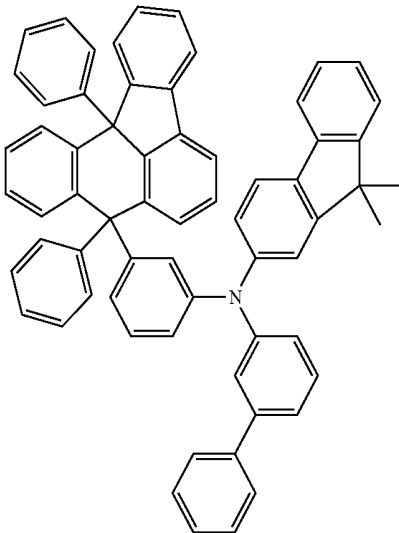
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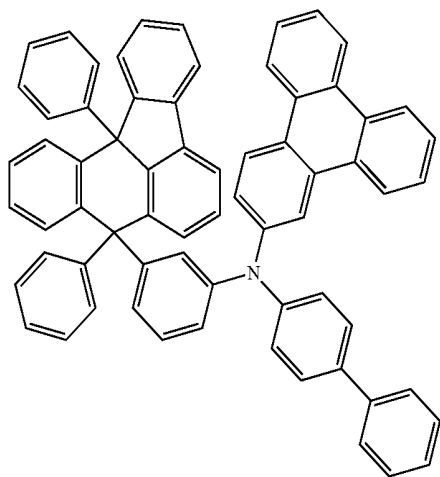
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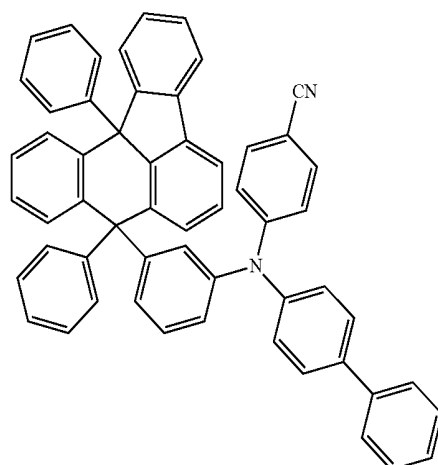
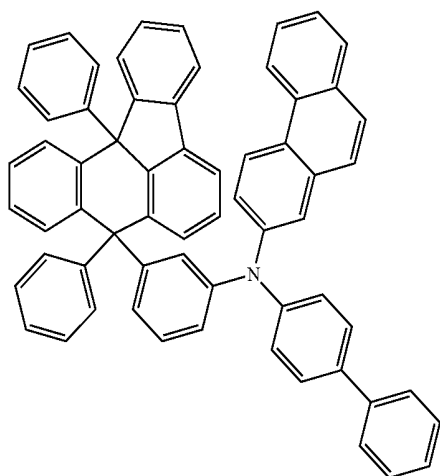
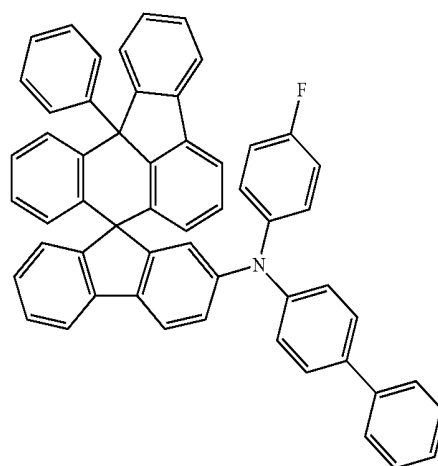
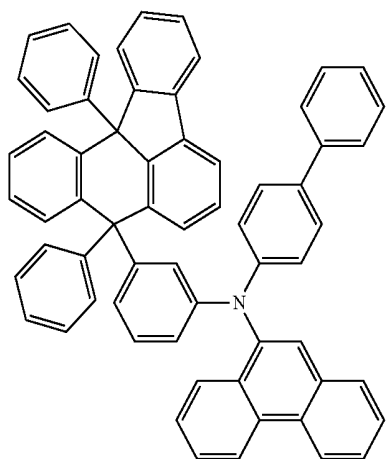
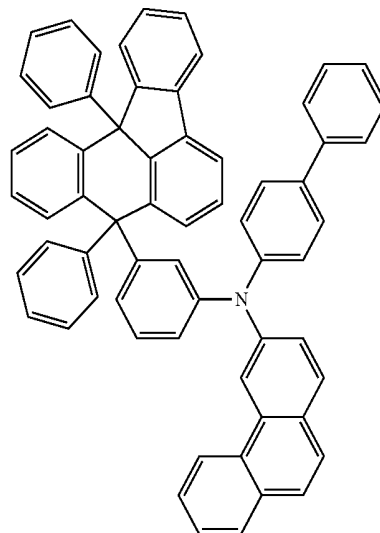
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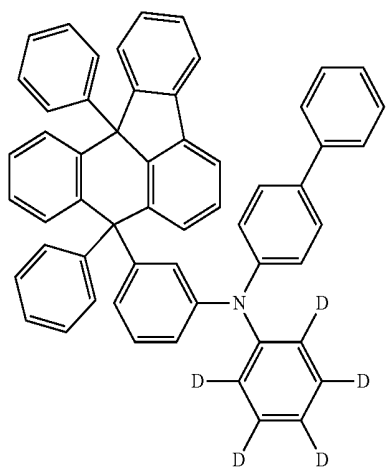
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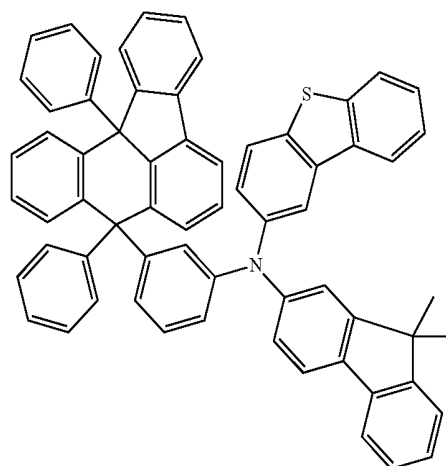
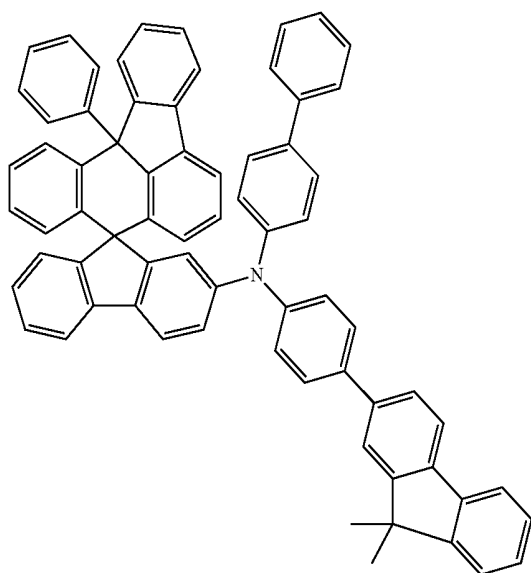
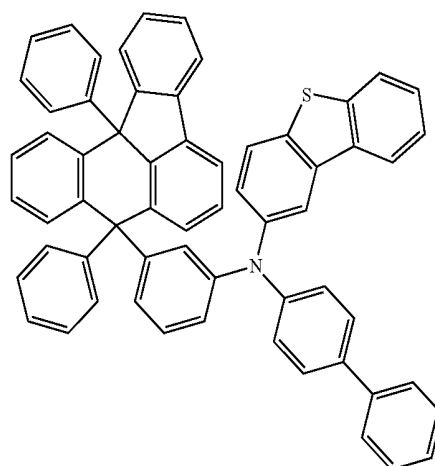
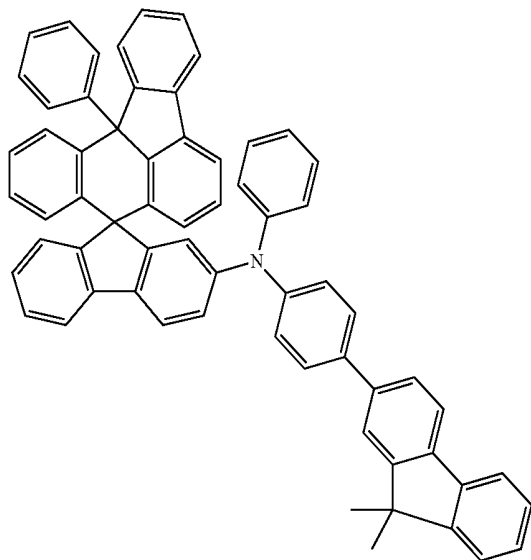
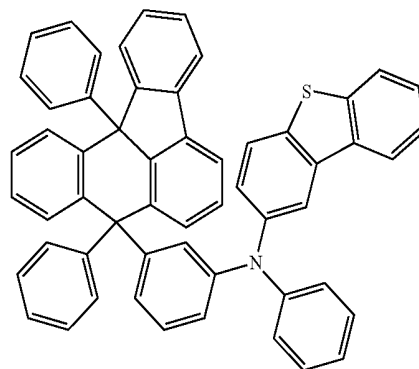
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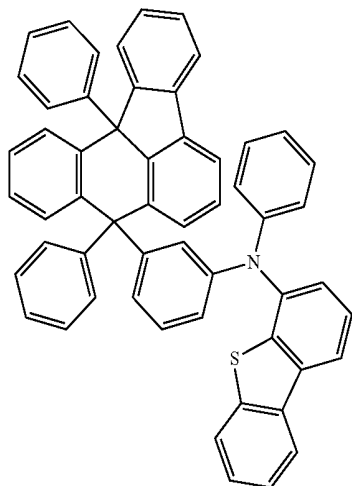
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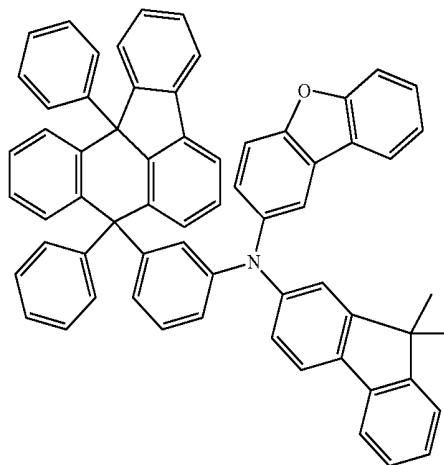
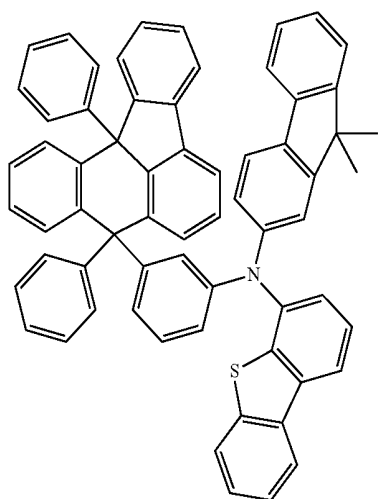
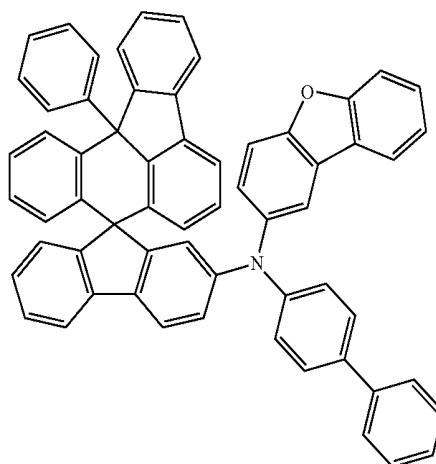
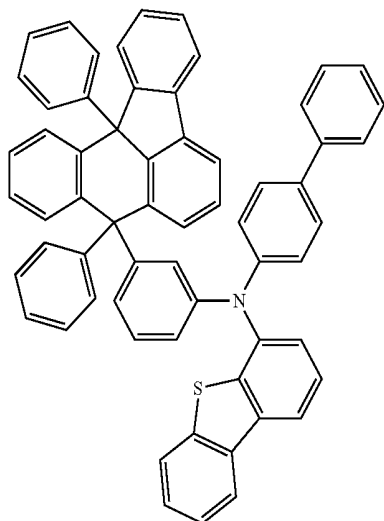
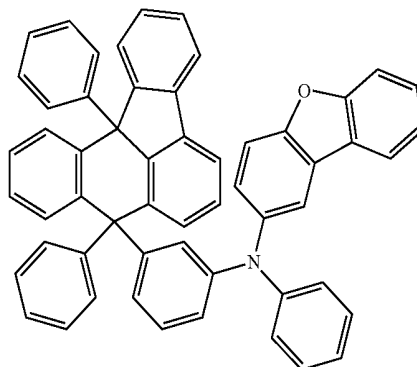
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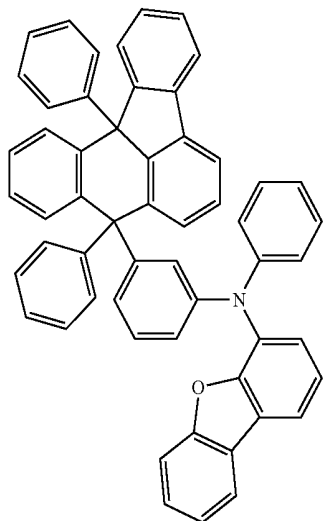
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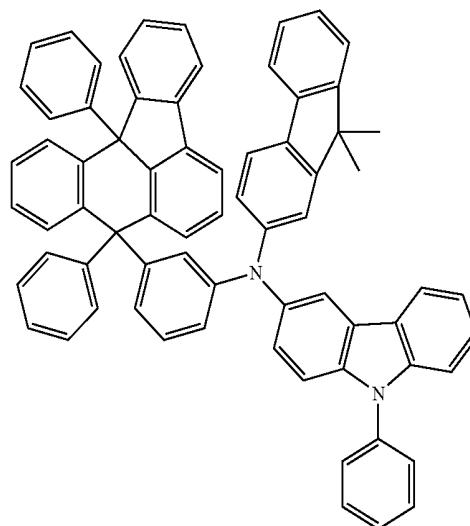
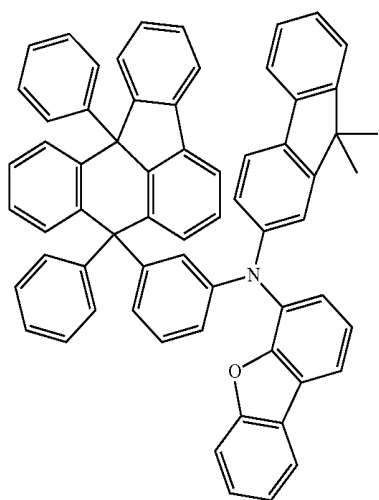
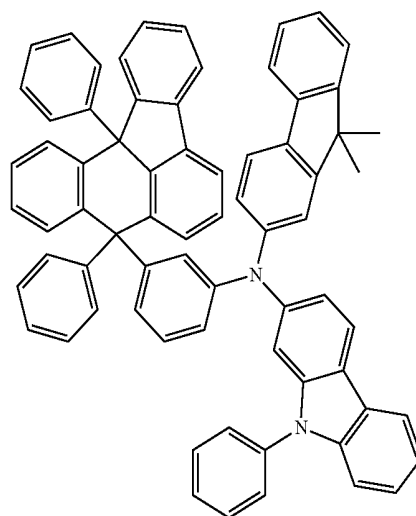
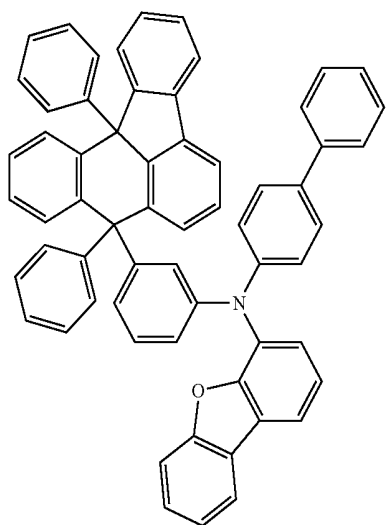
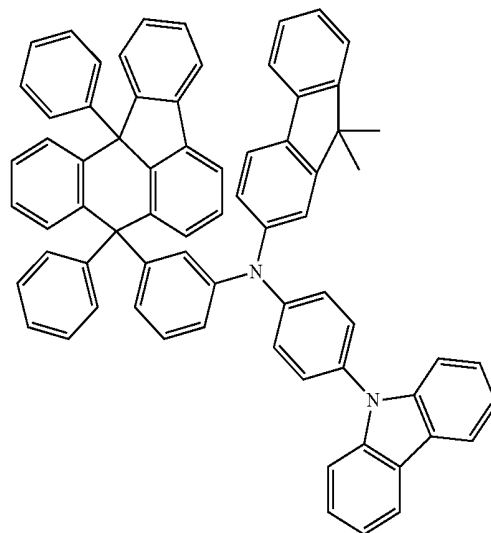
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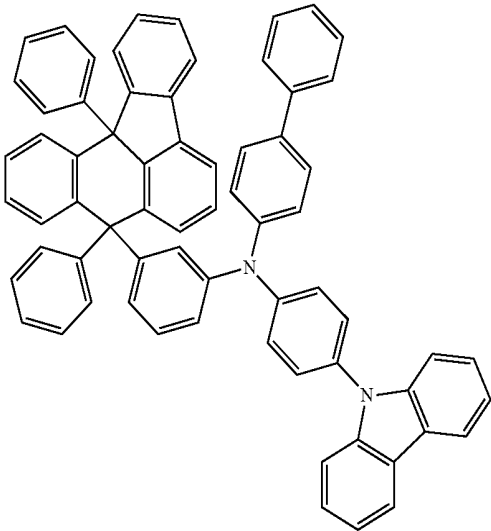
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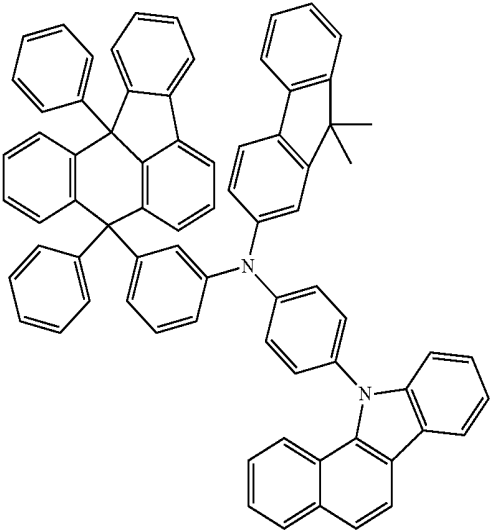
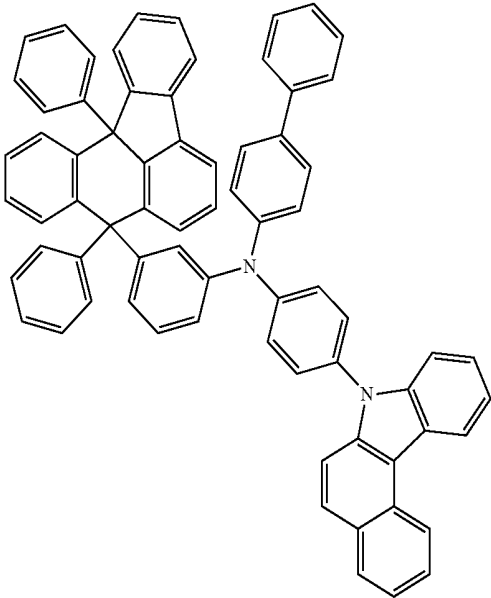
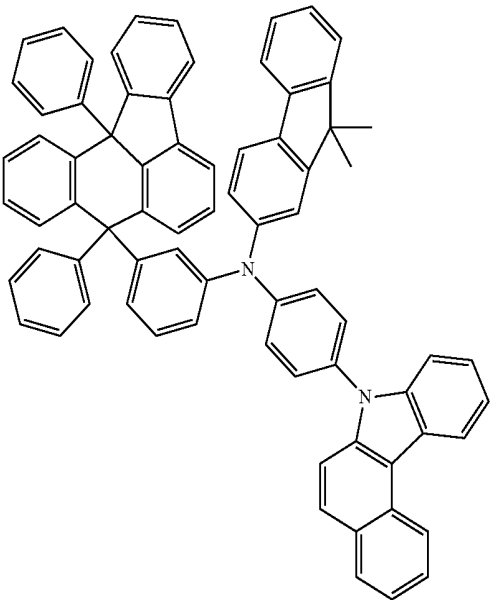
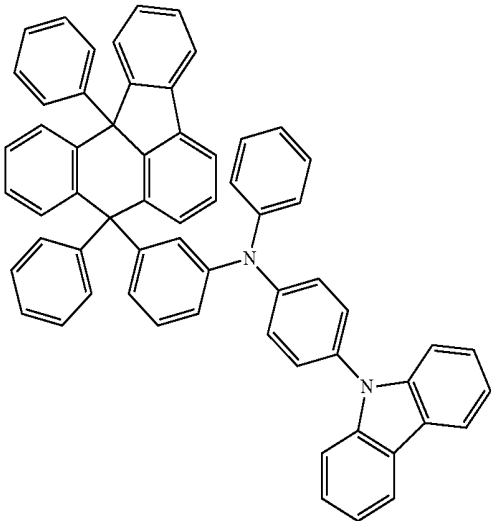
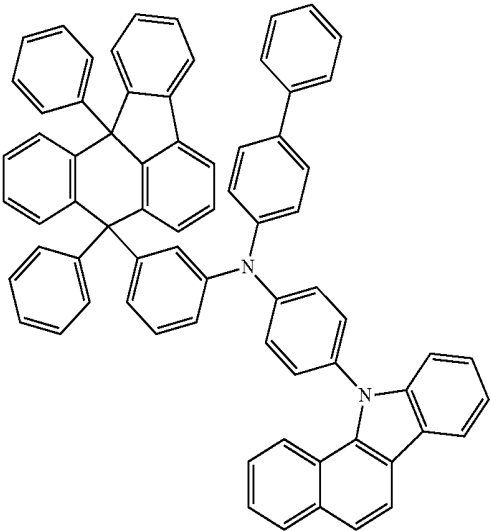
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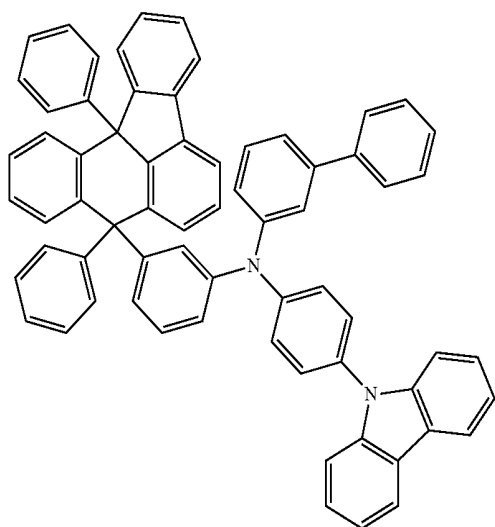
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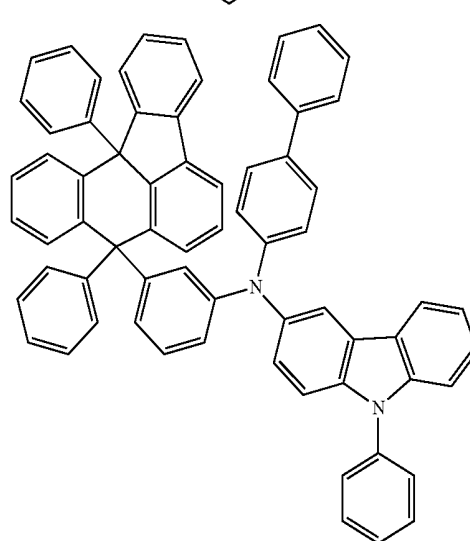
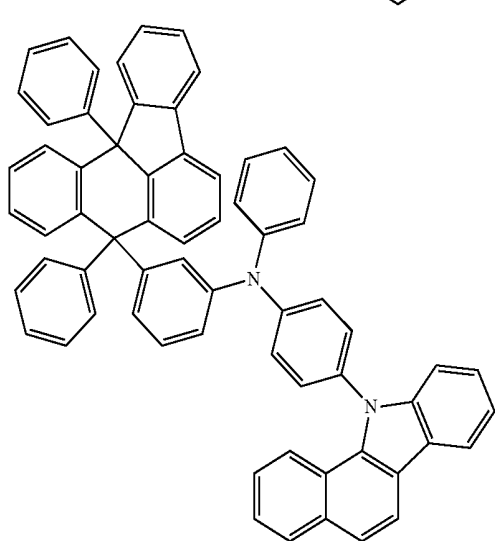
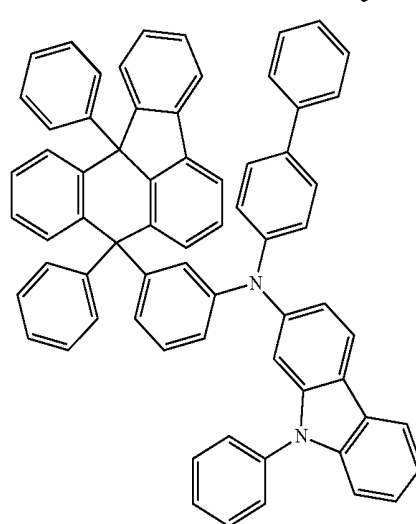
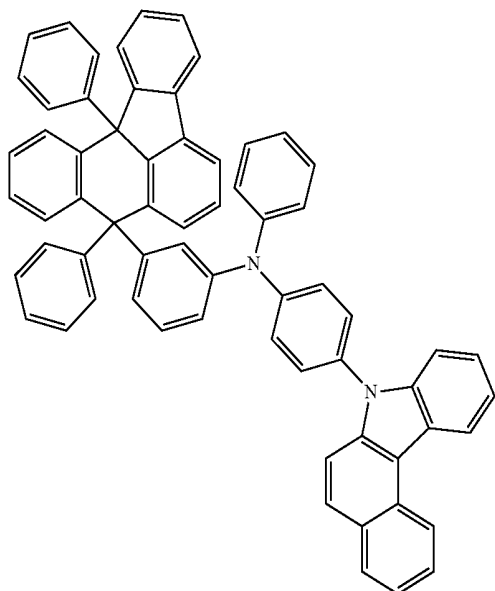
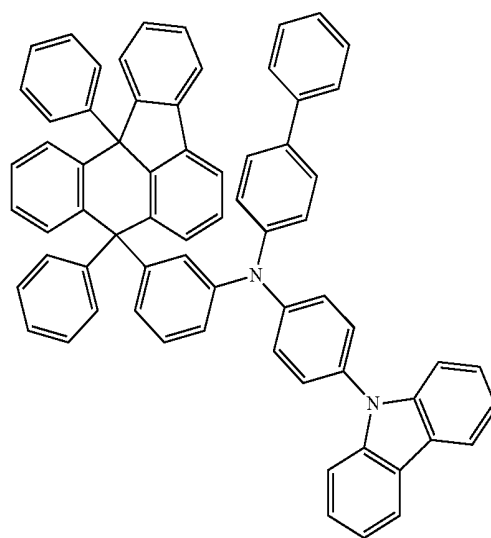
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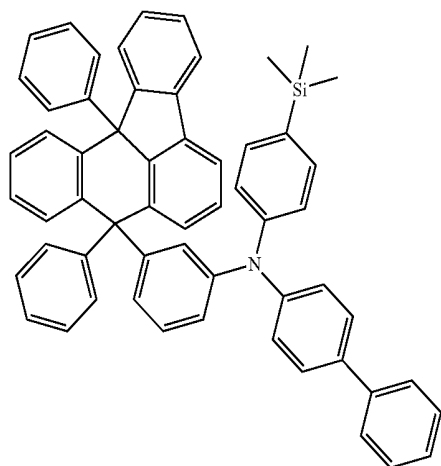
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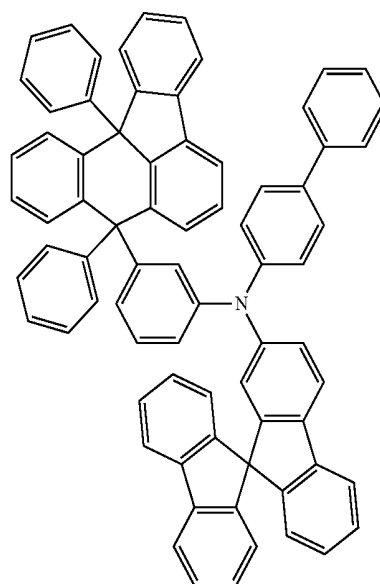
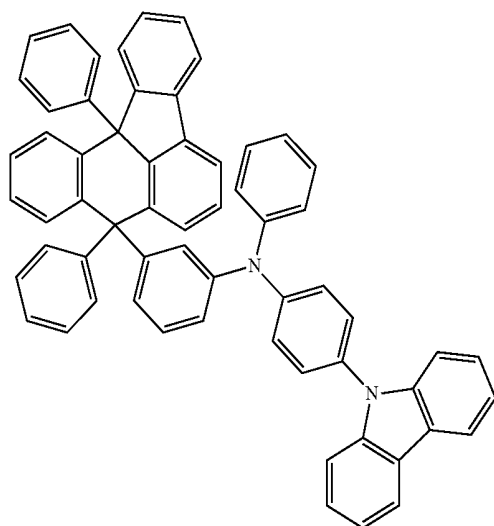
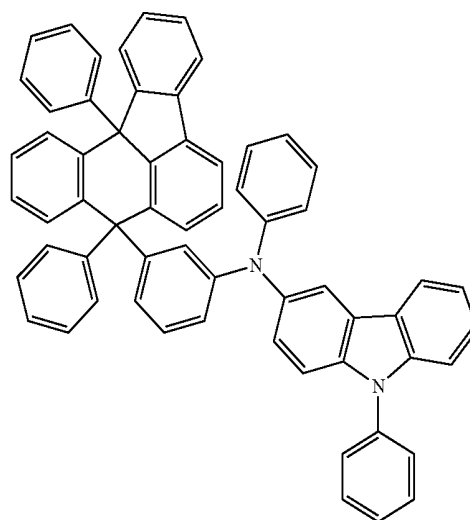
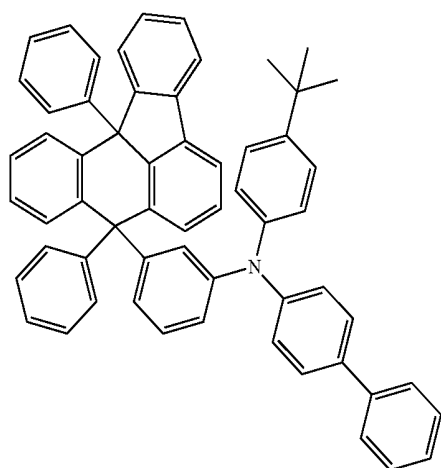
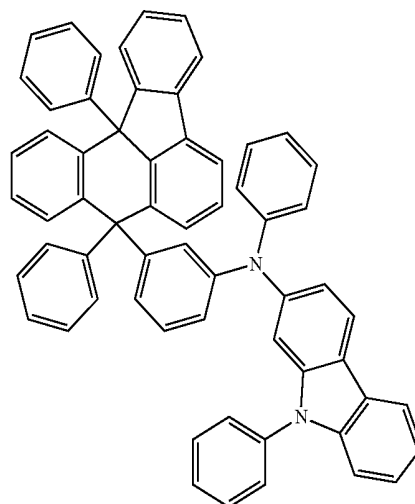
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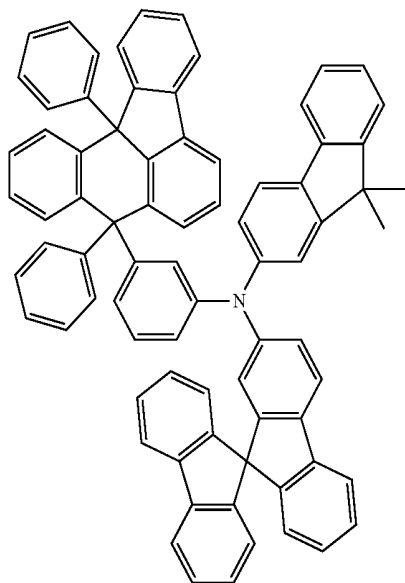
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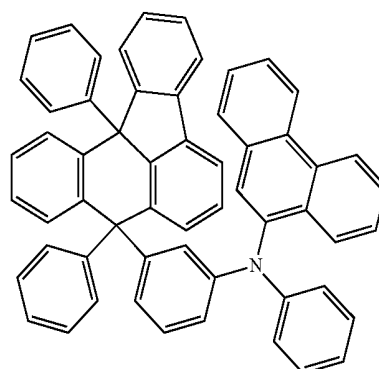
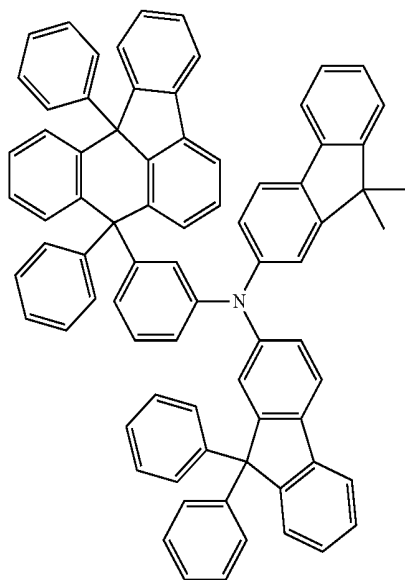
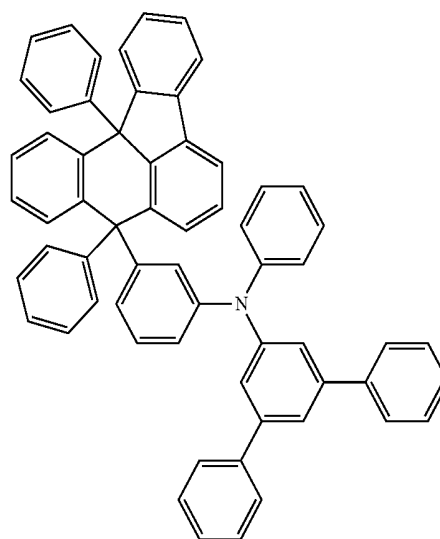
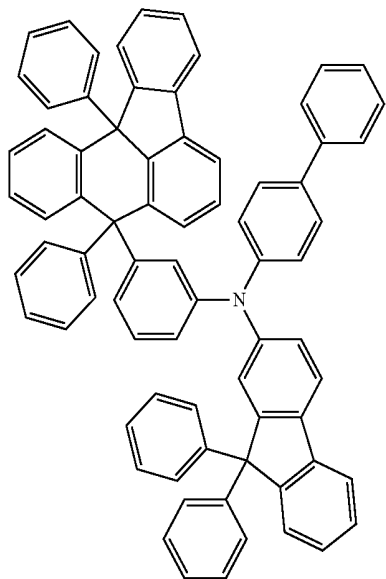
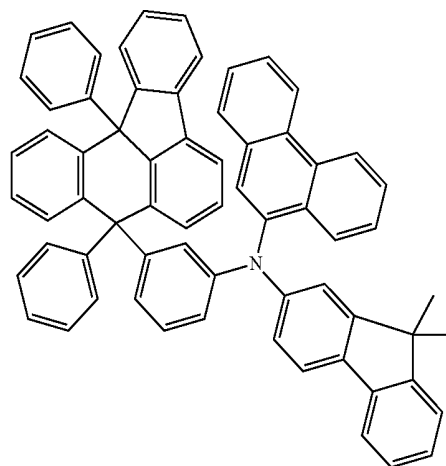
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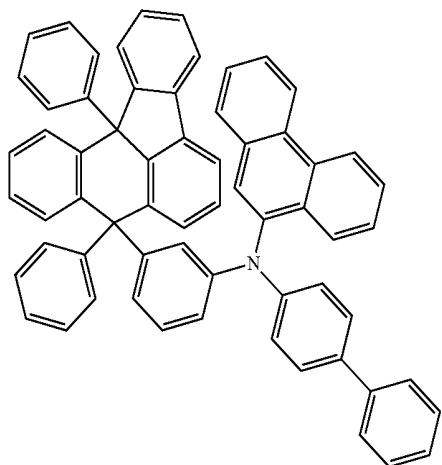
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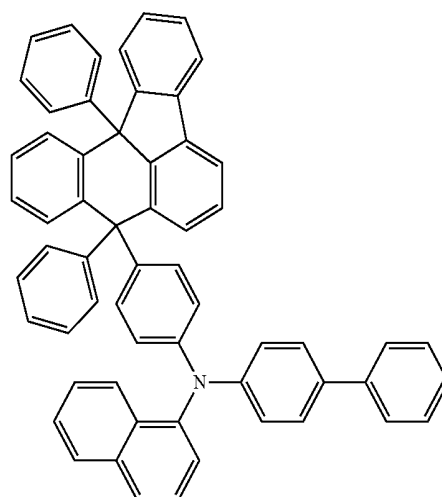
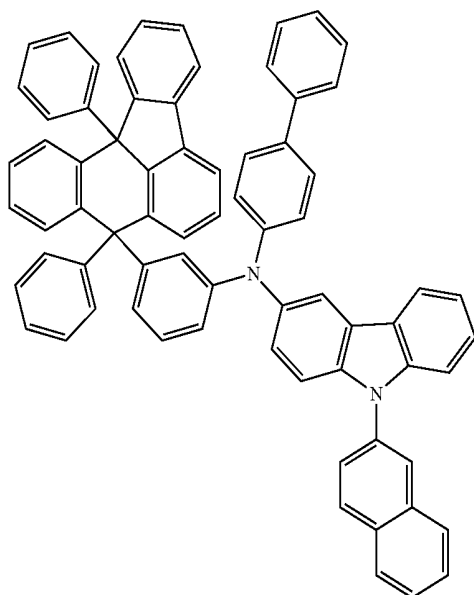
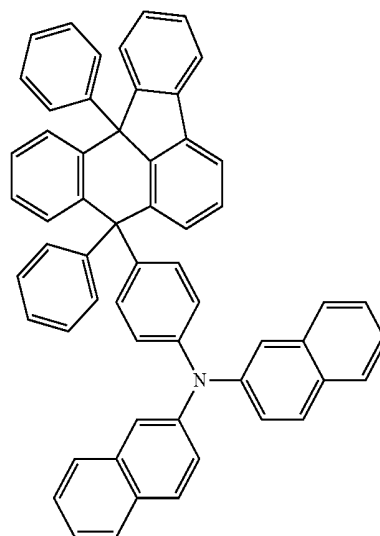
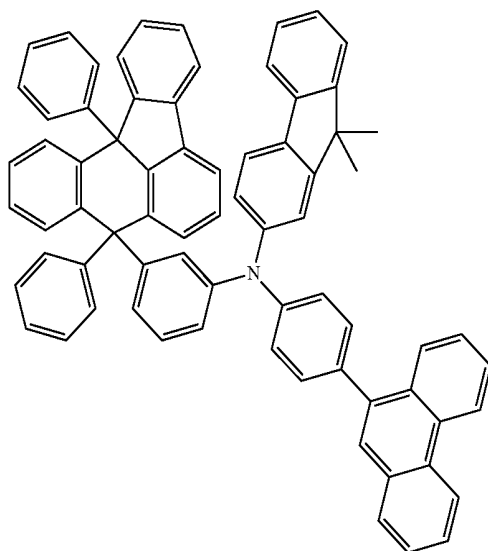
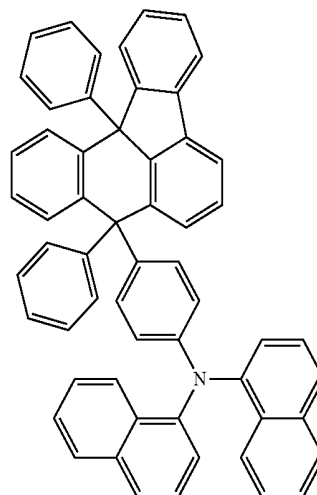
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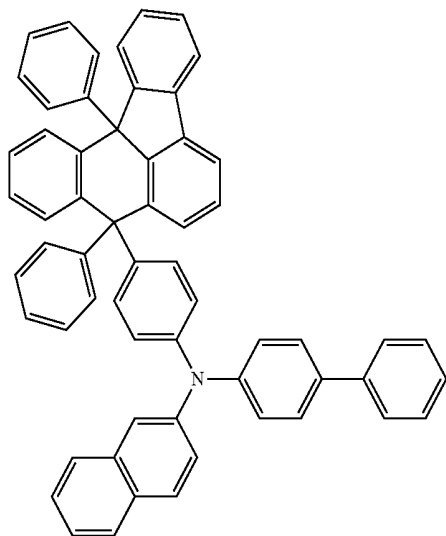
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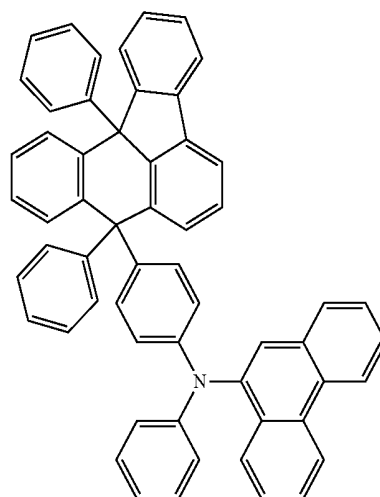
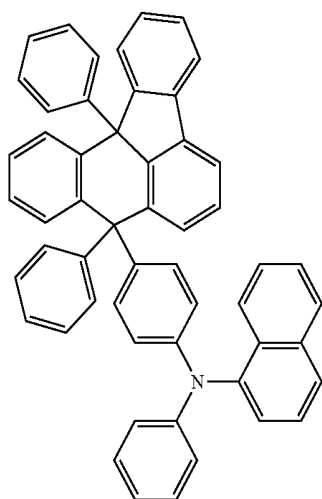
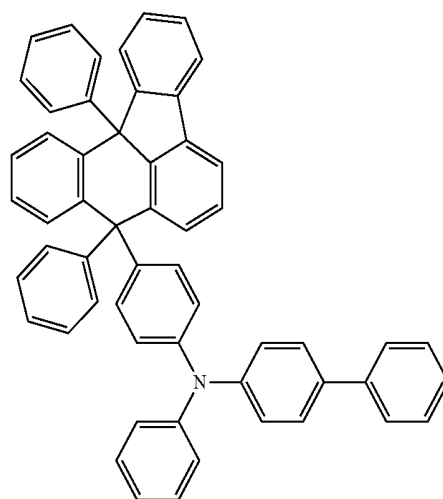
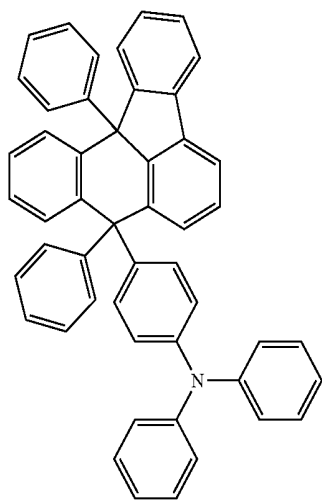
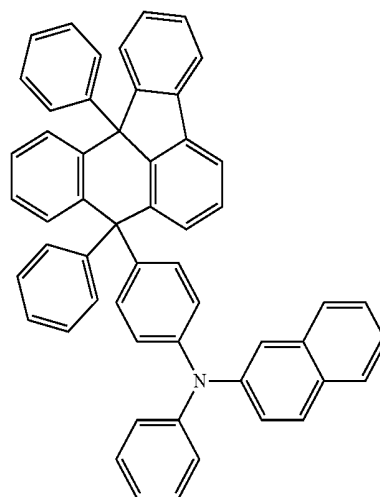
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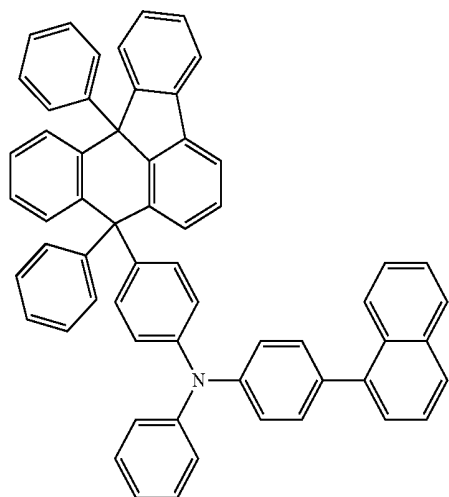
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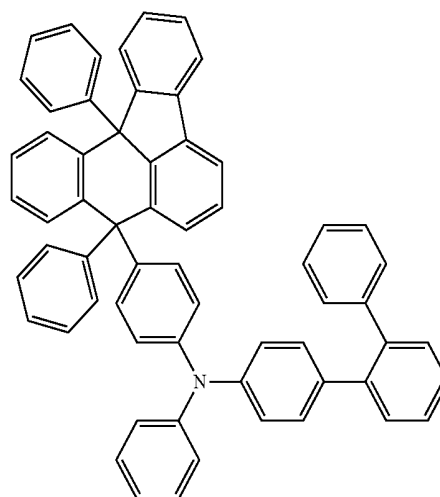
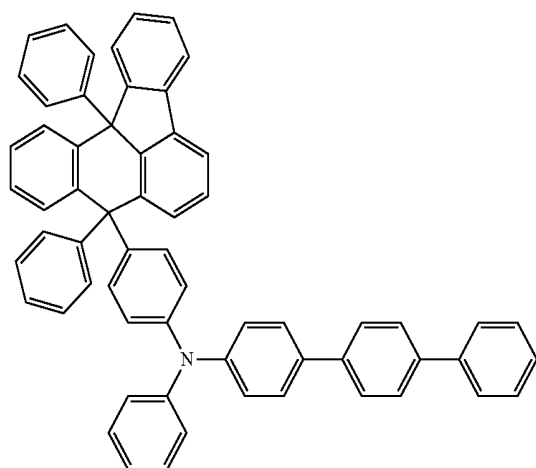
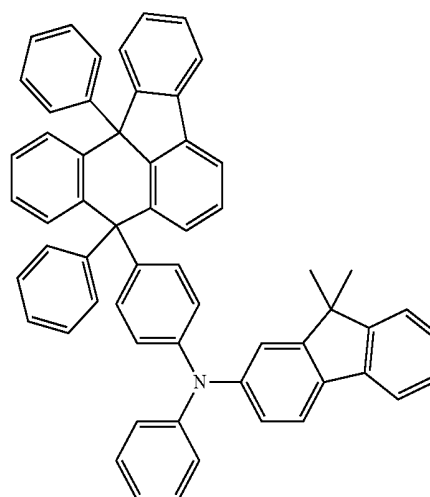
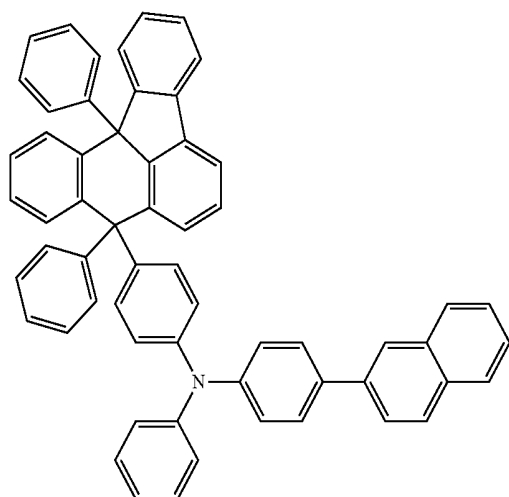
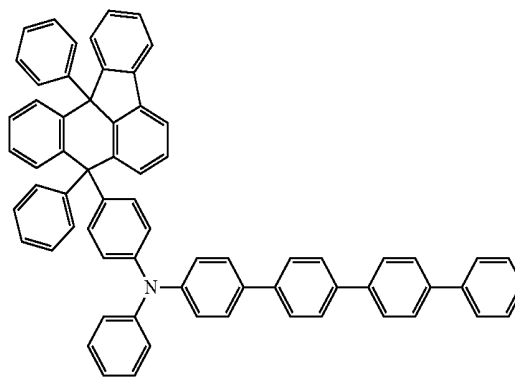
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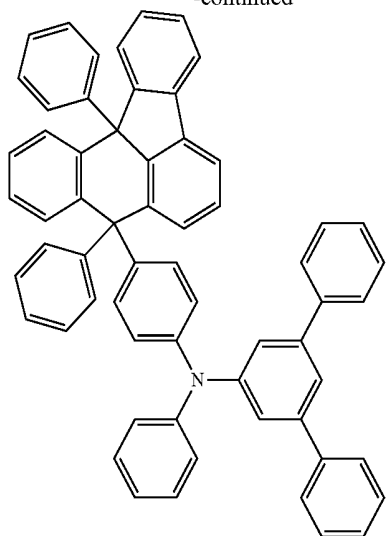
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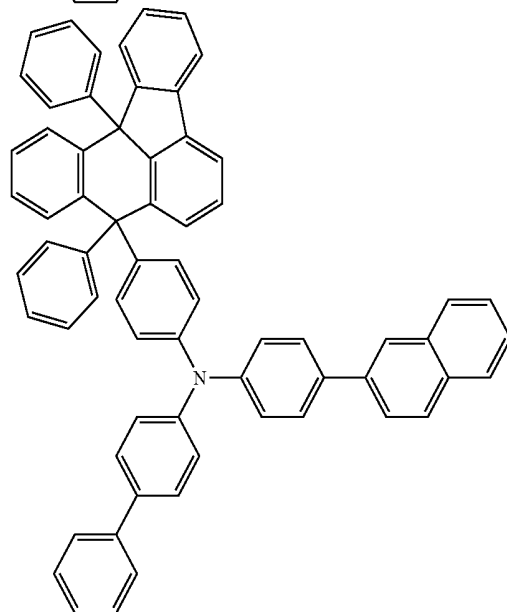
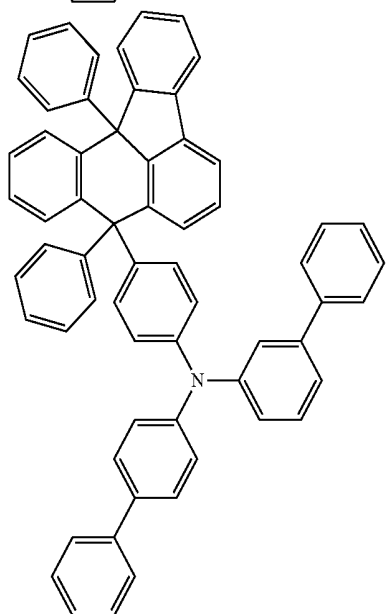
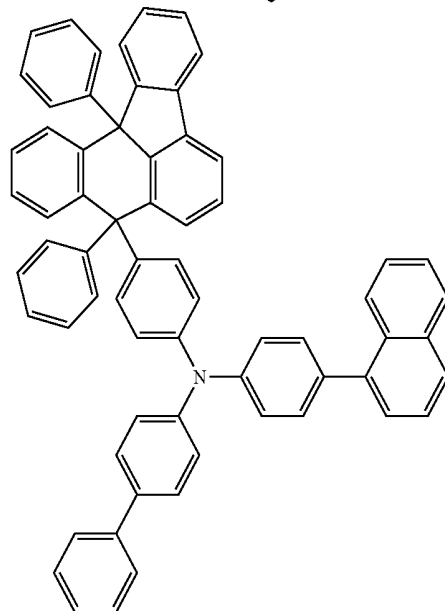
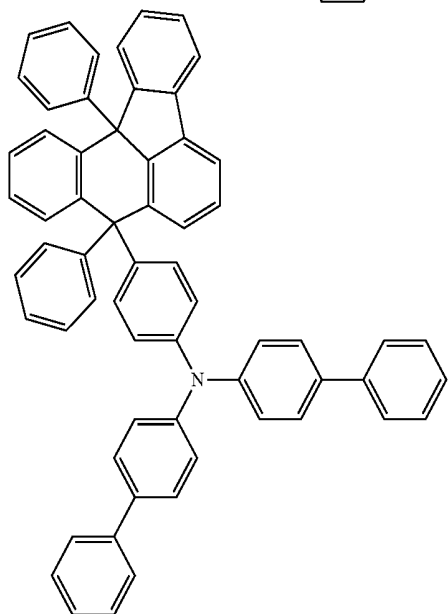
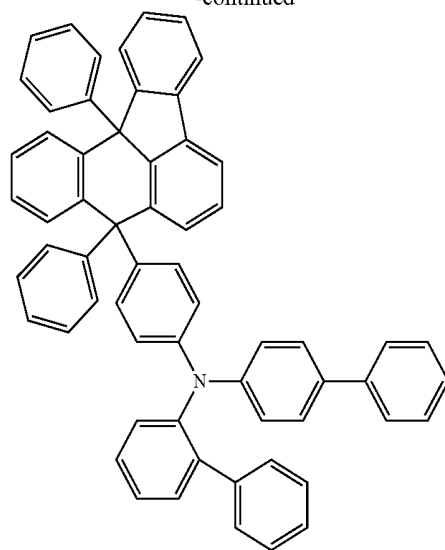
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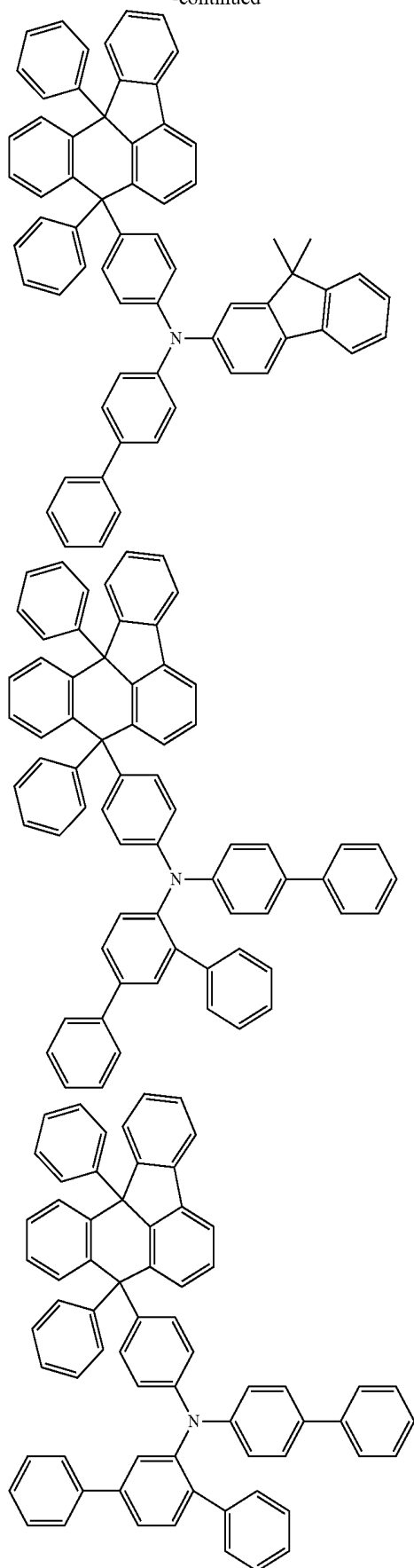
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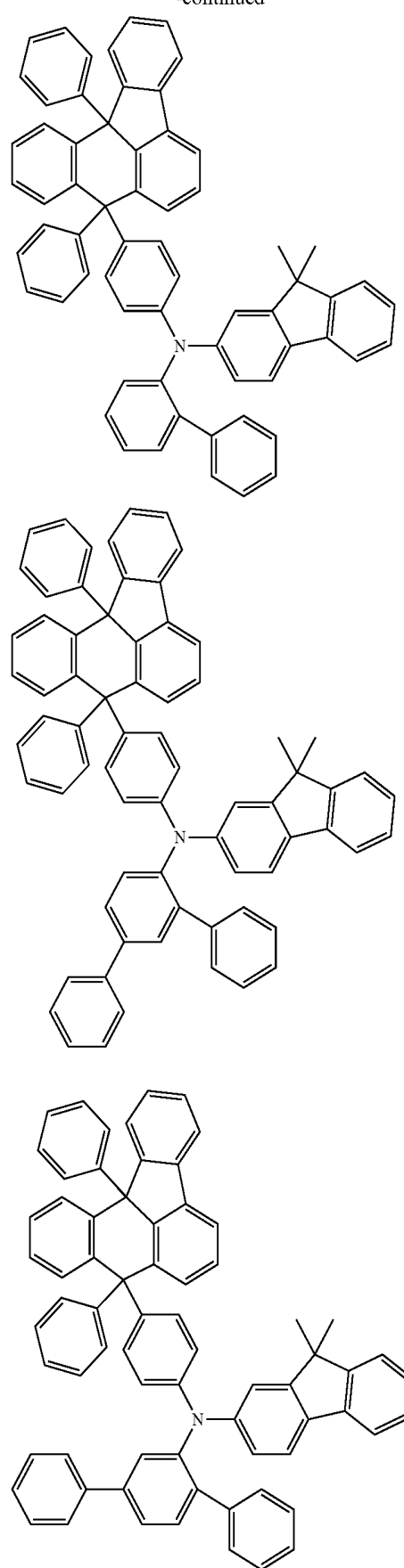
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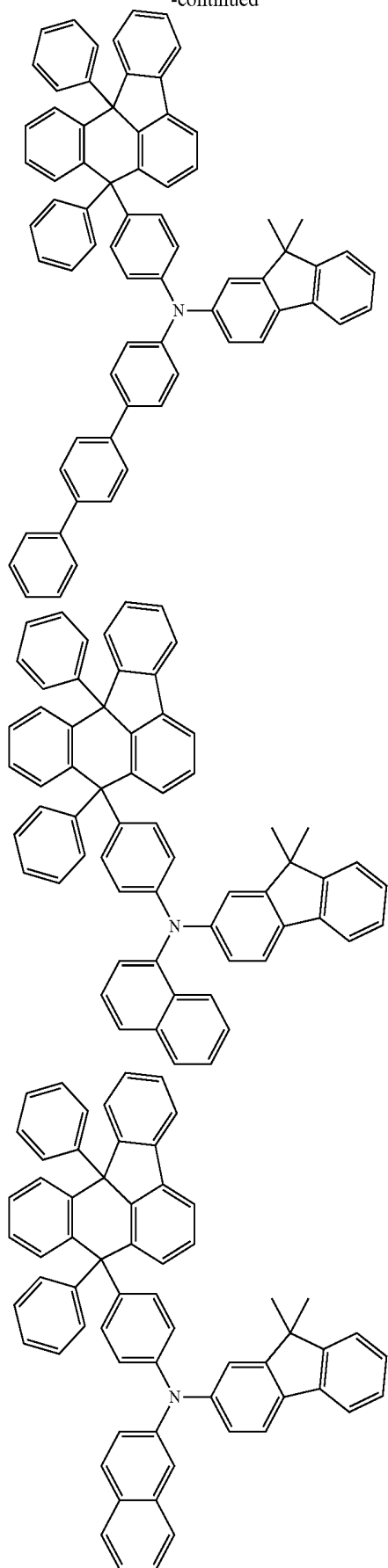
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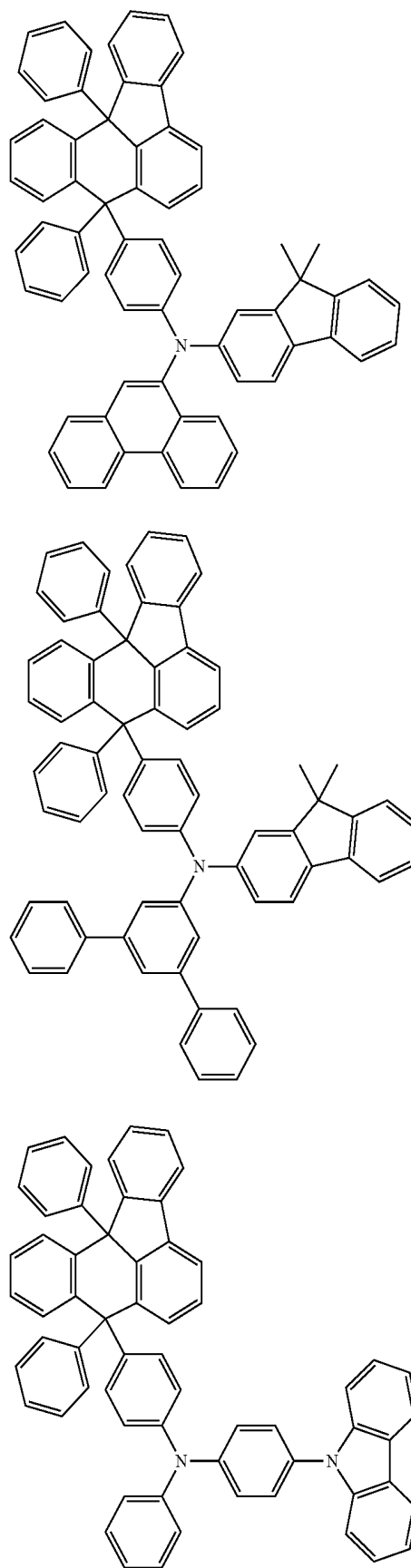
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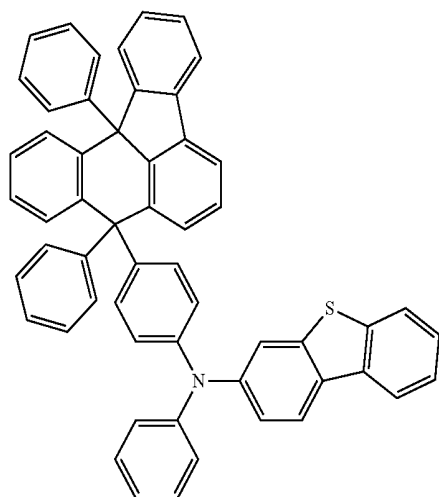
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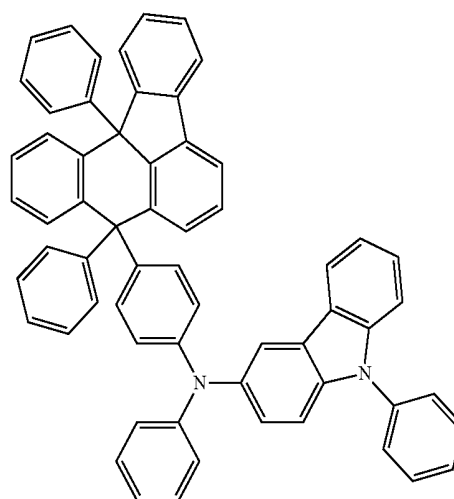
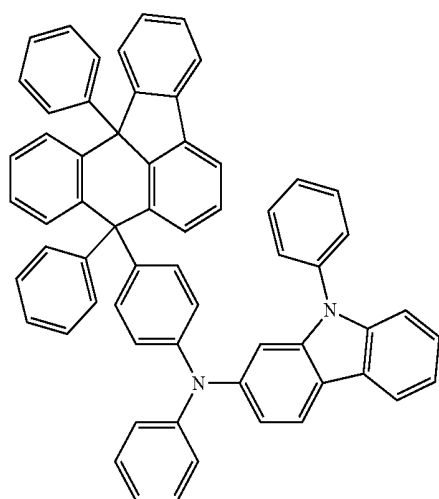
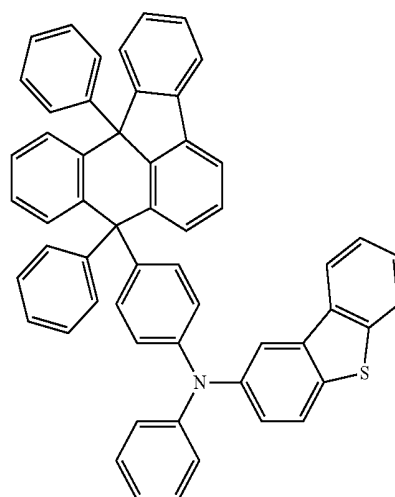
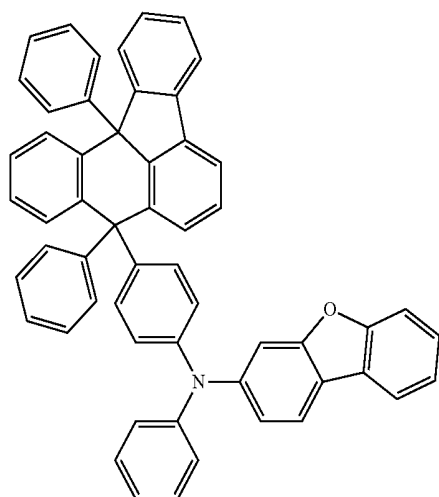
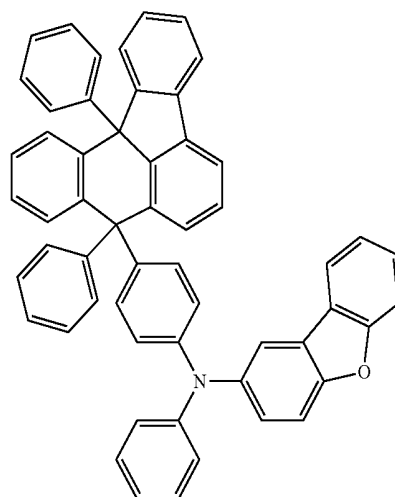
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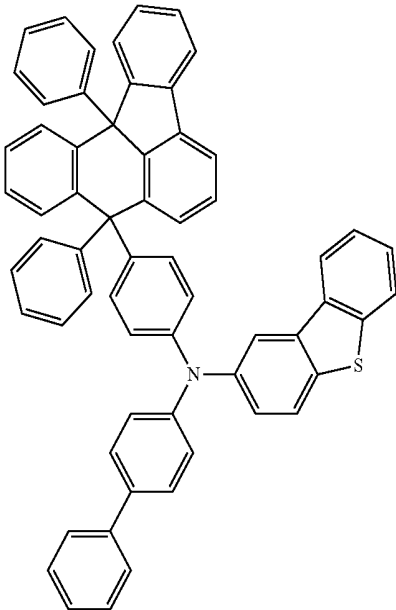
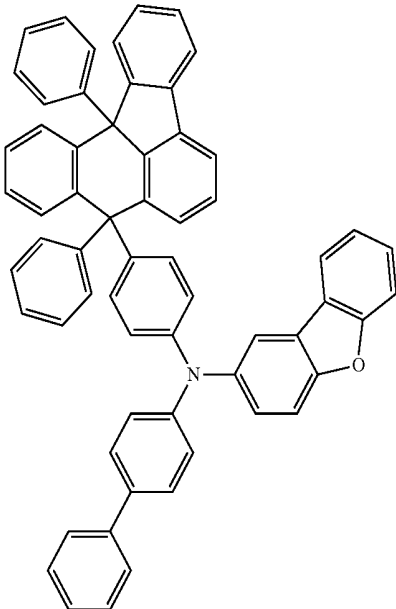
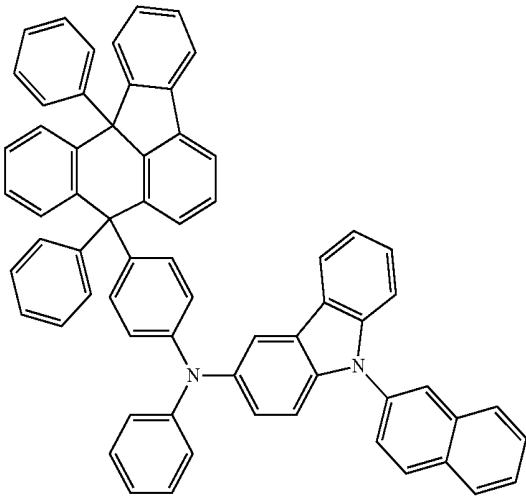
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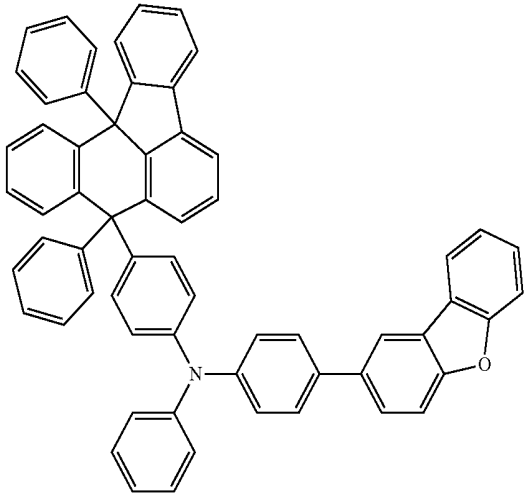
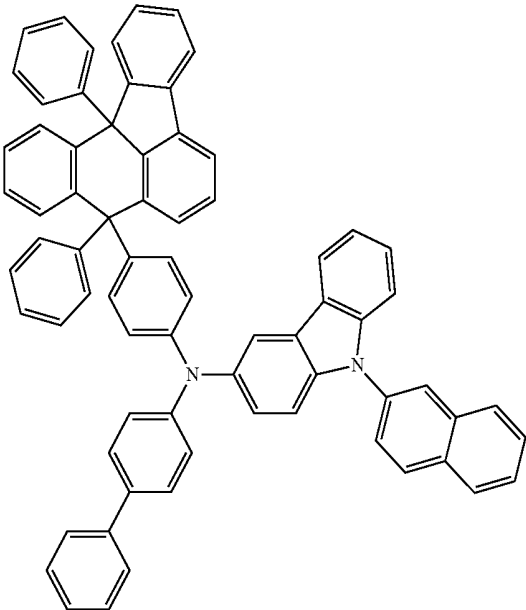
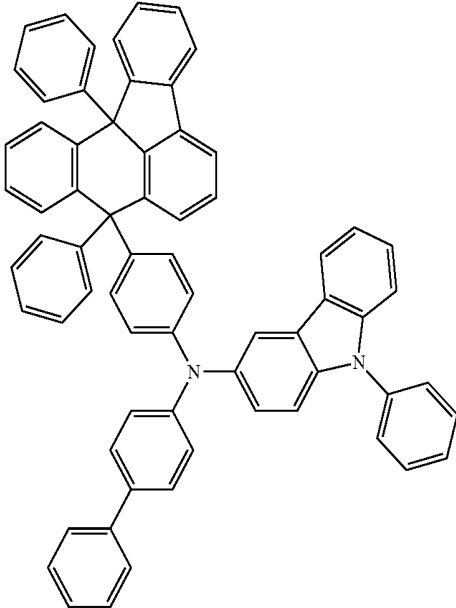
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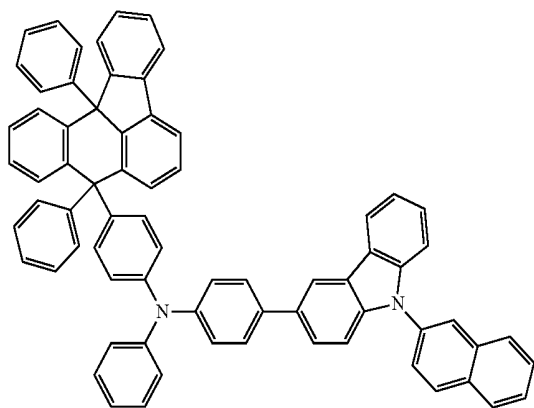
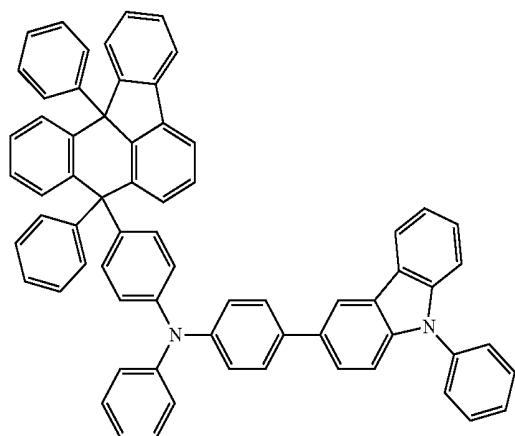
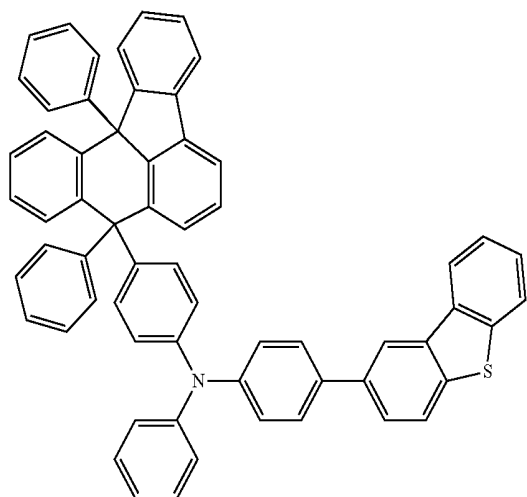
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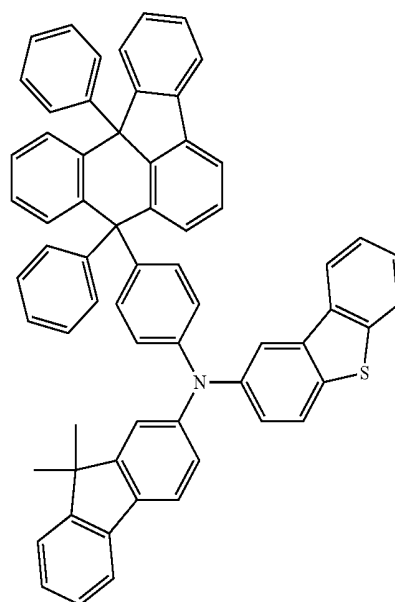
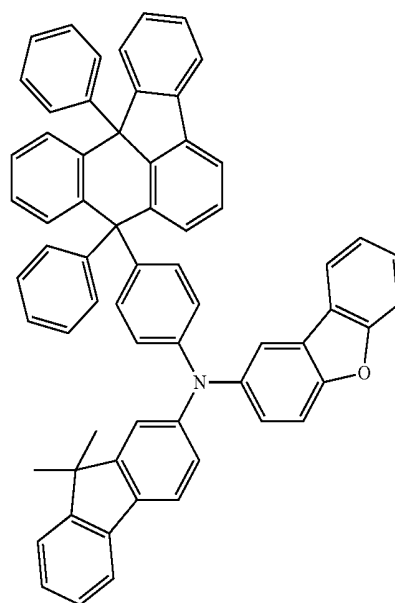
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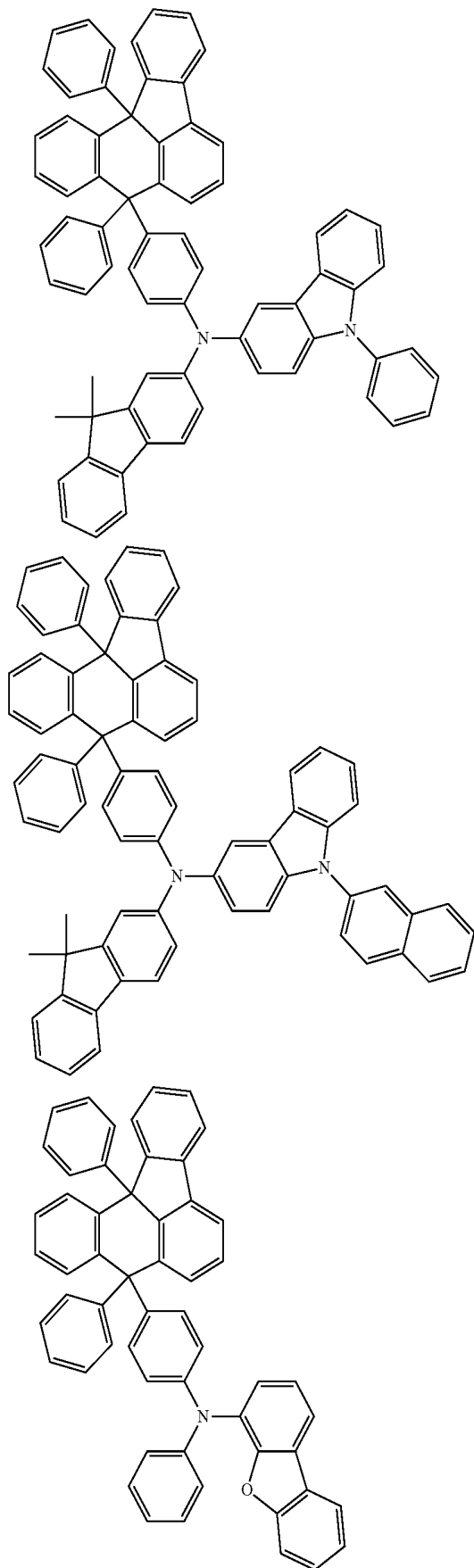
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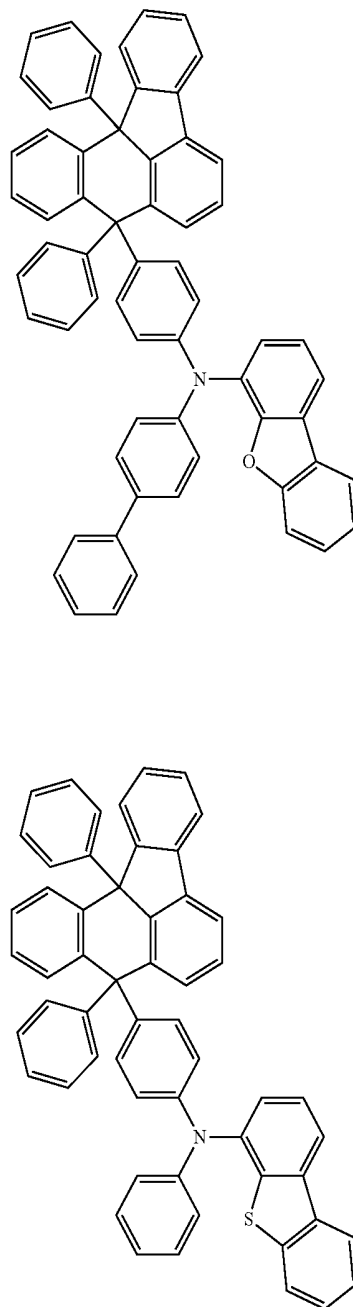
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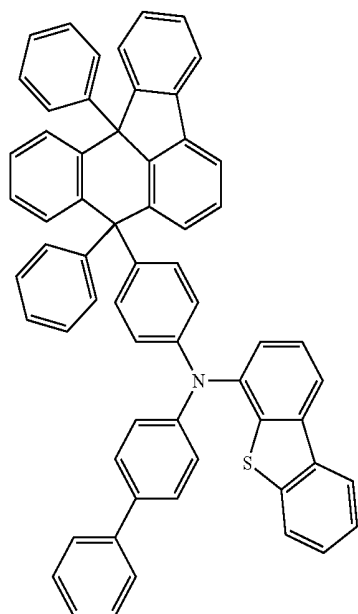
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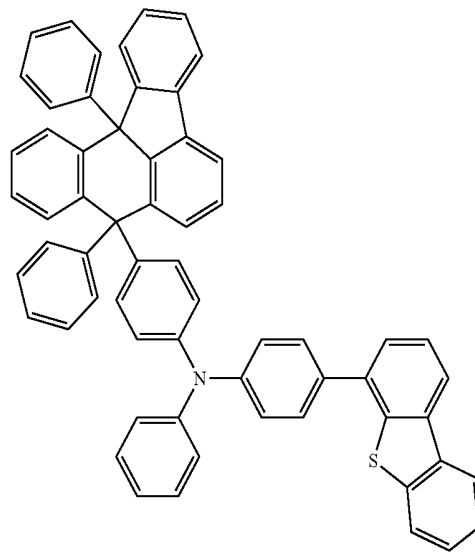
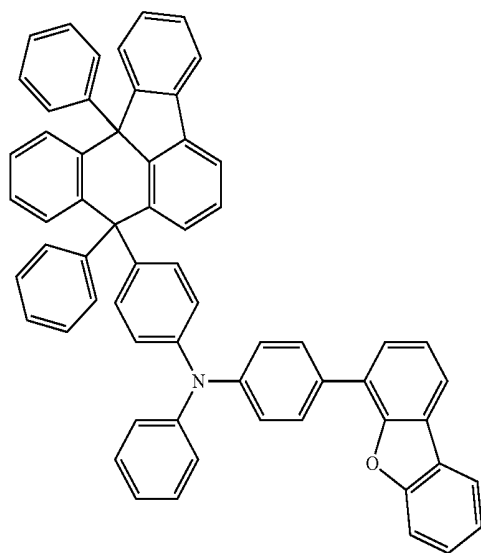
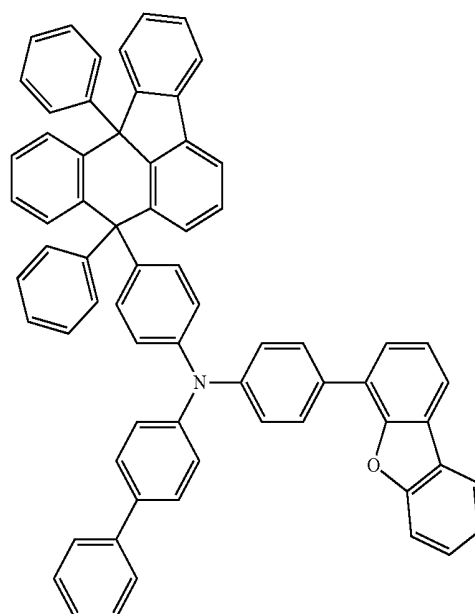
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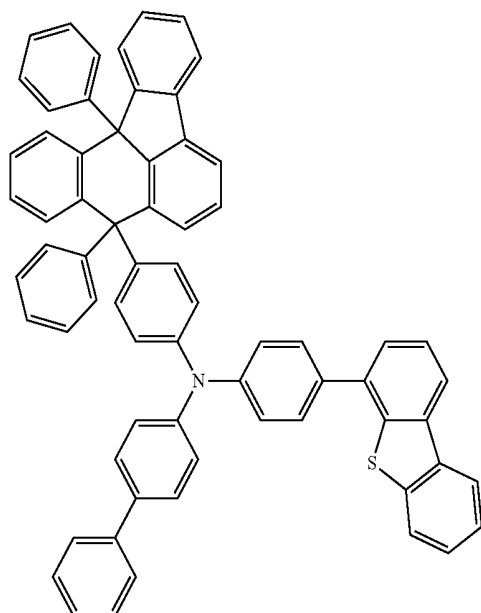
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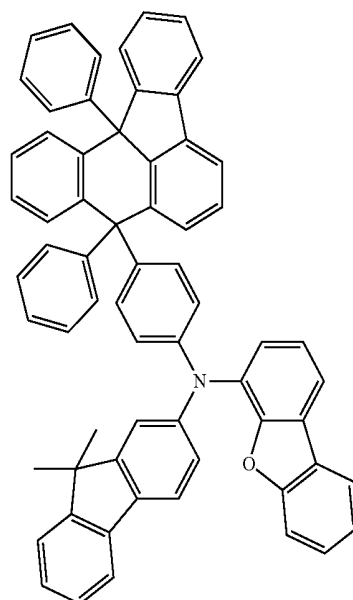
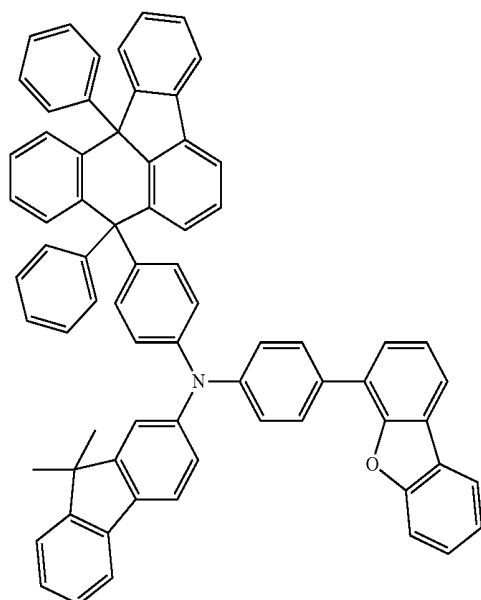
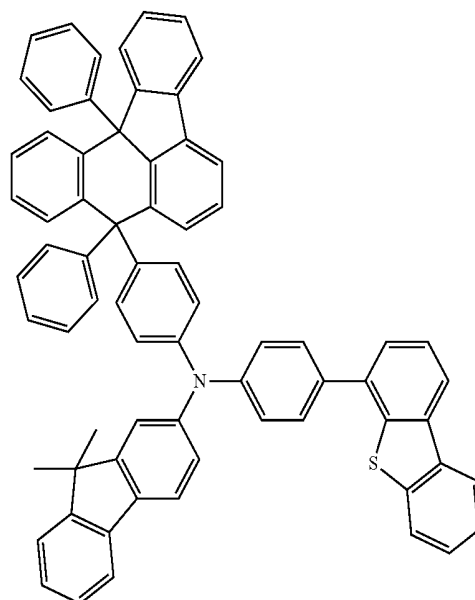
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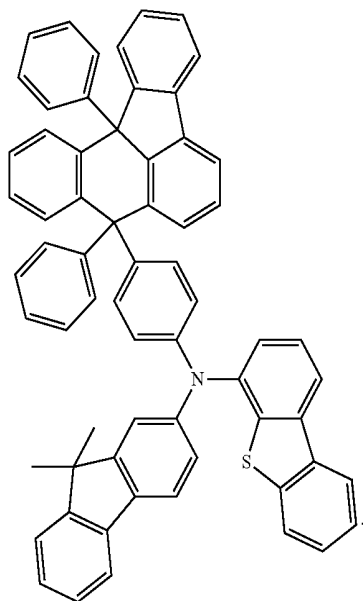
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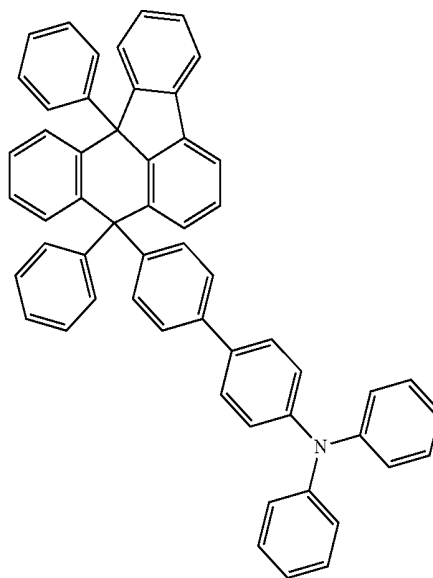
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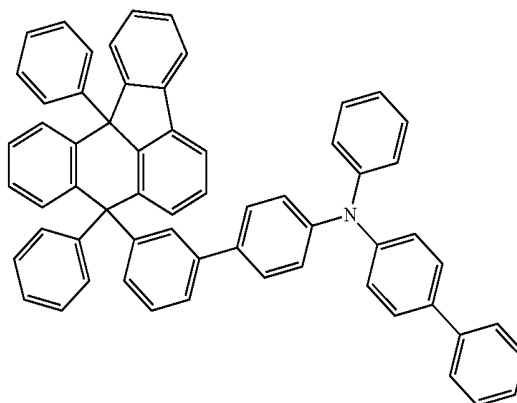
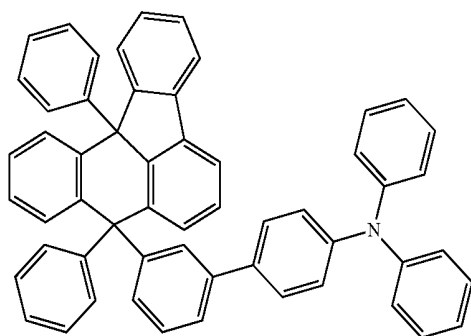
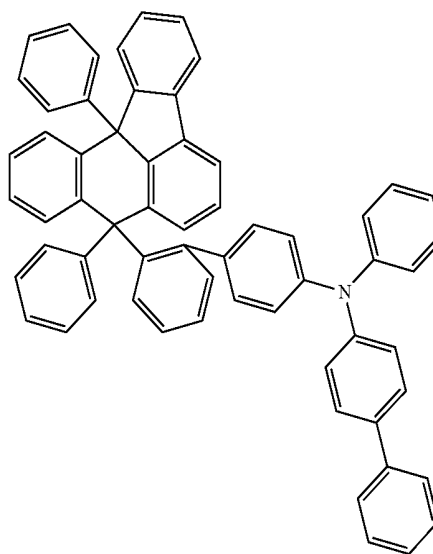
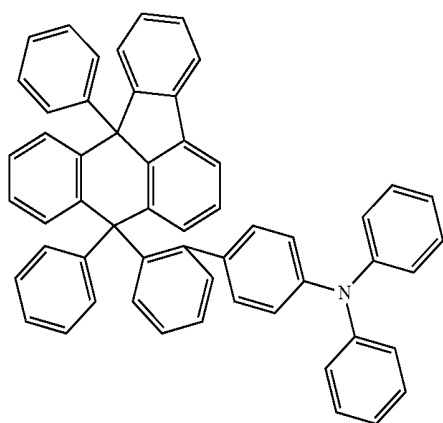
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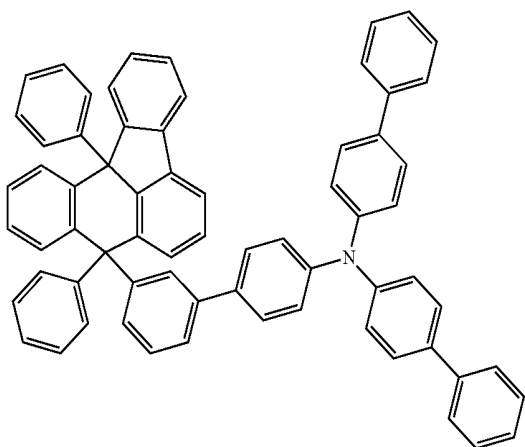
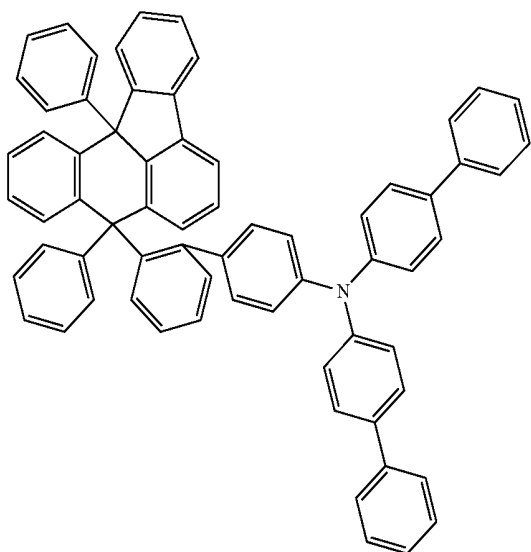
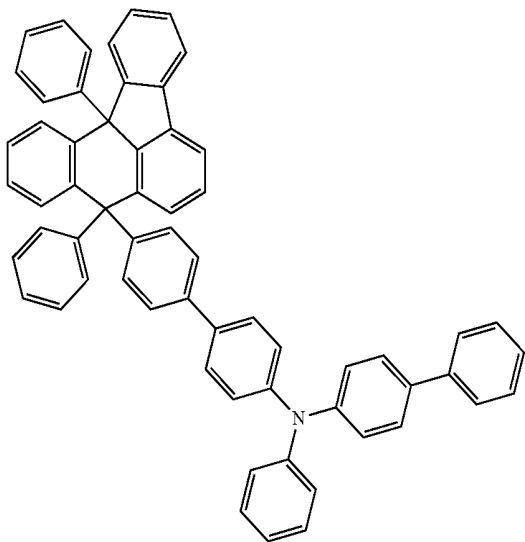
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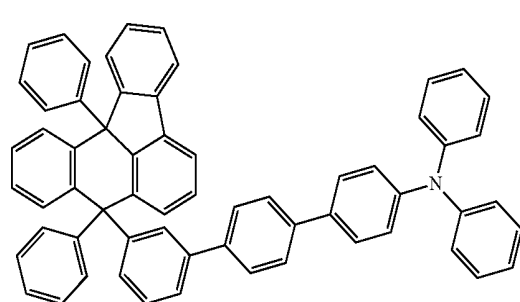
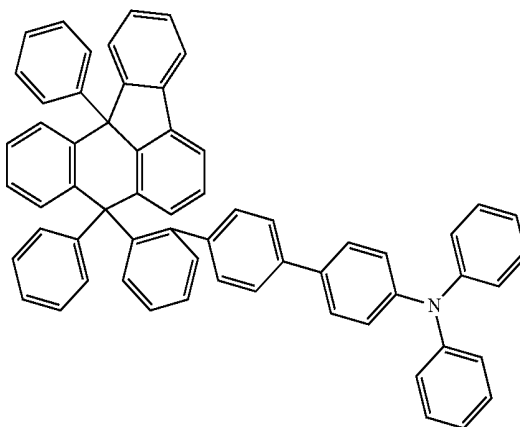
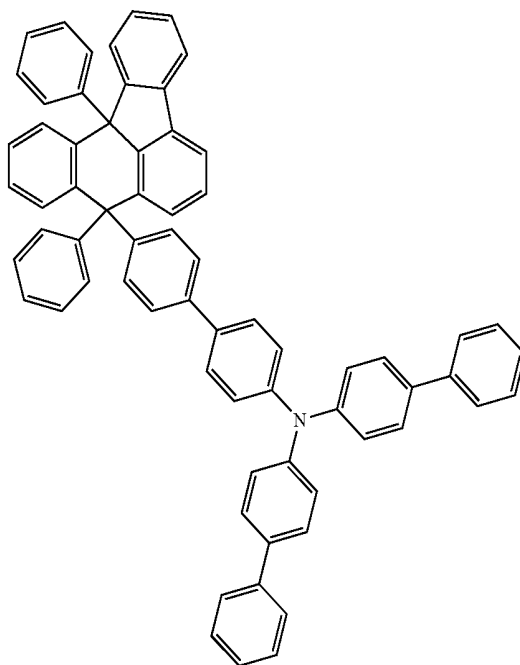
9. The compound of claim 1, wherein the compound of Chemical Formula 1 is any one selected from among the following structural formulae:



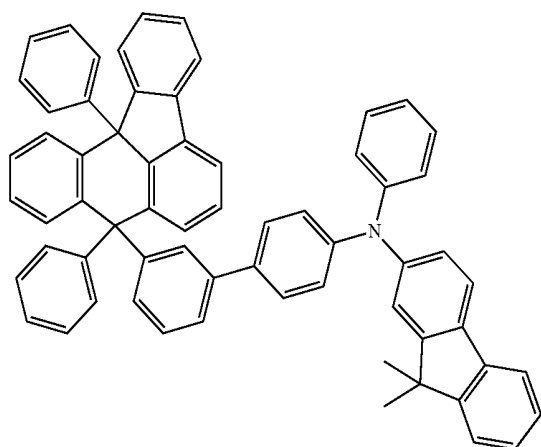
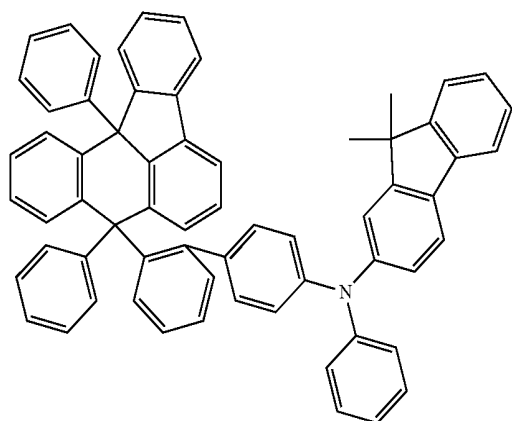
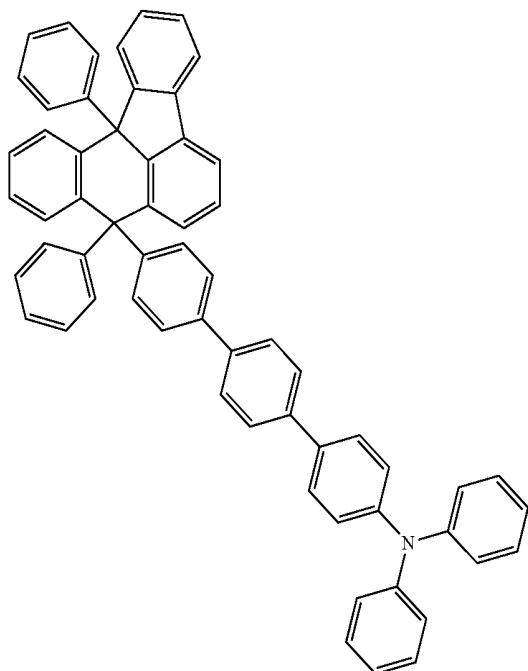
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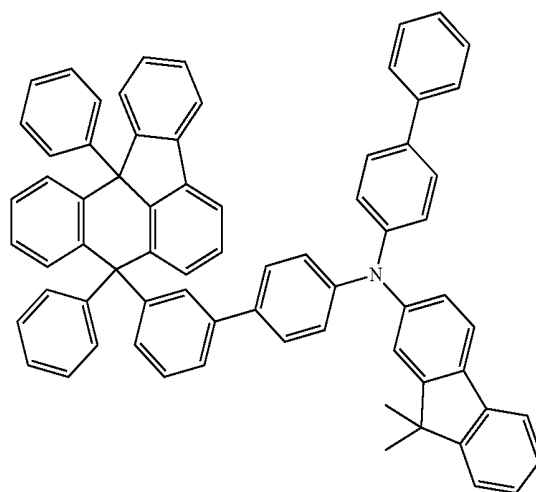
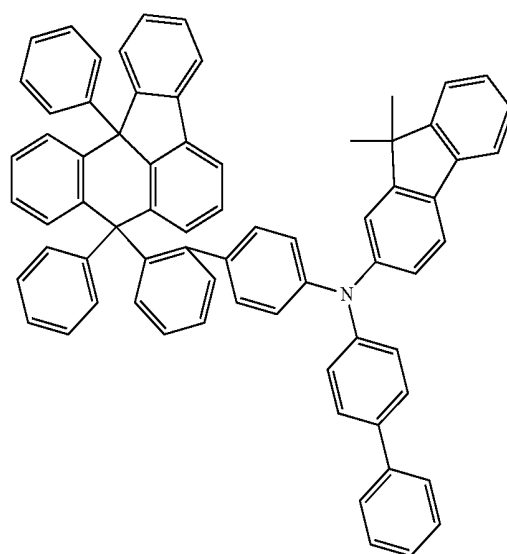
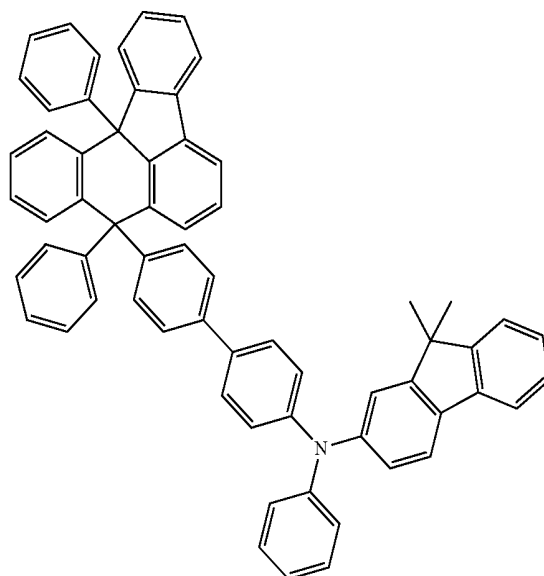
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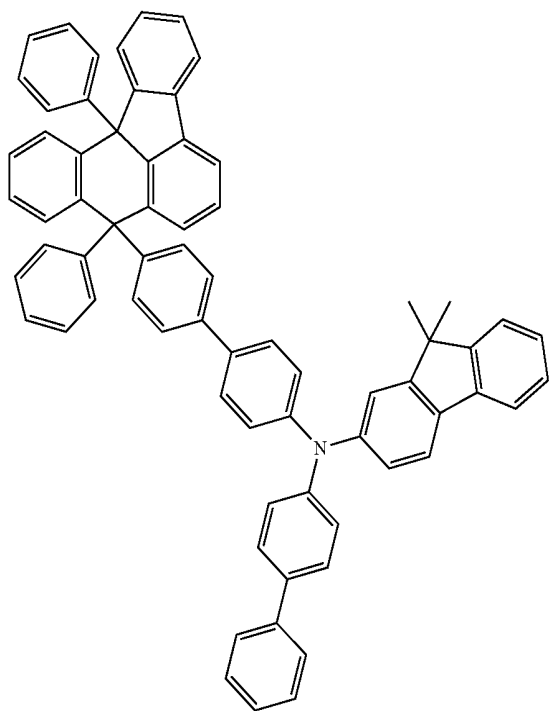
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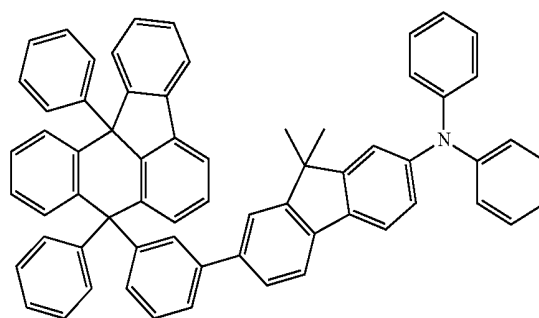
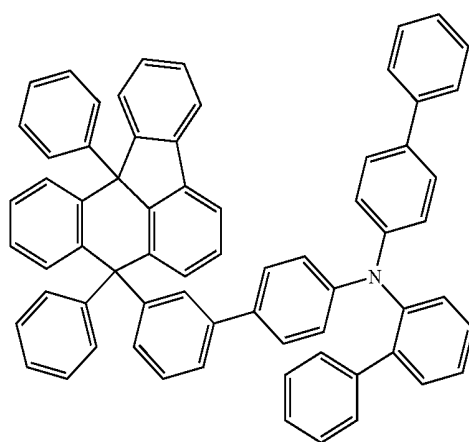
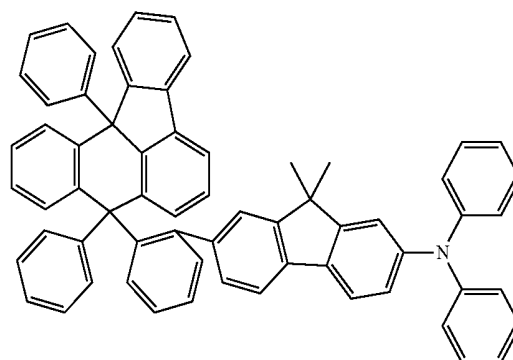
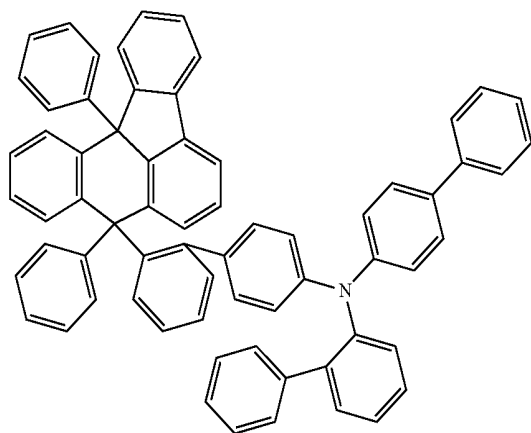
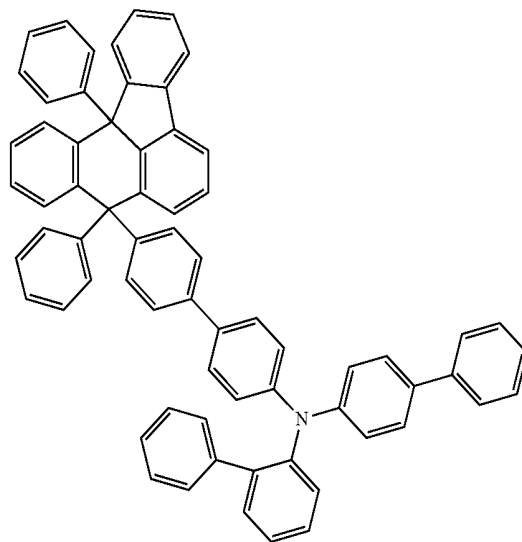
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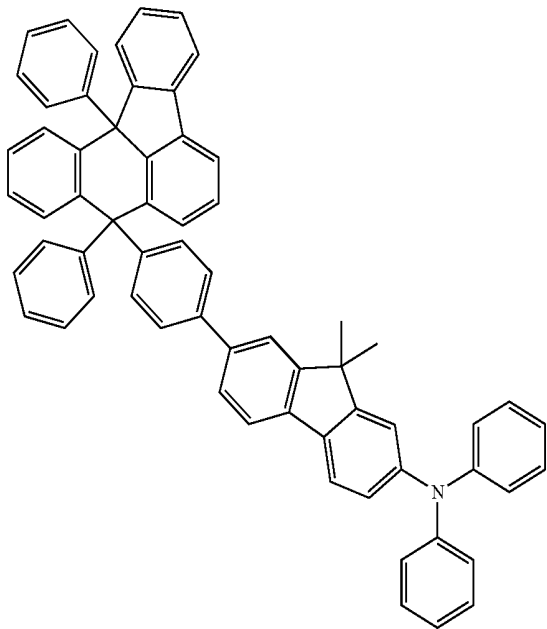
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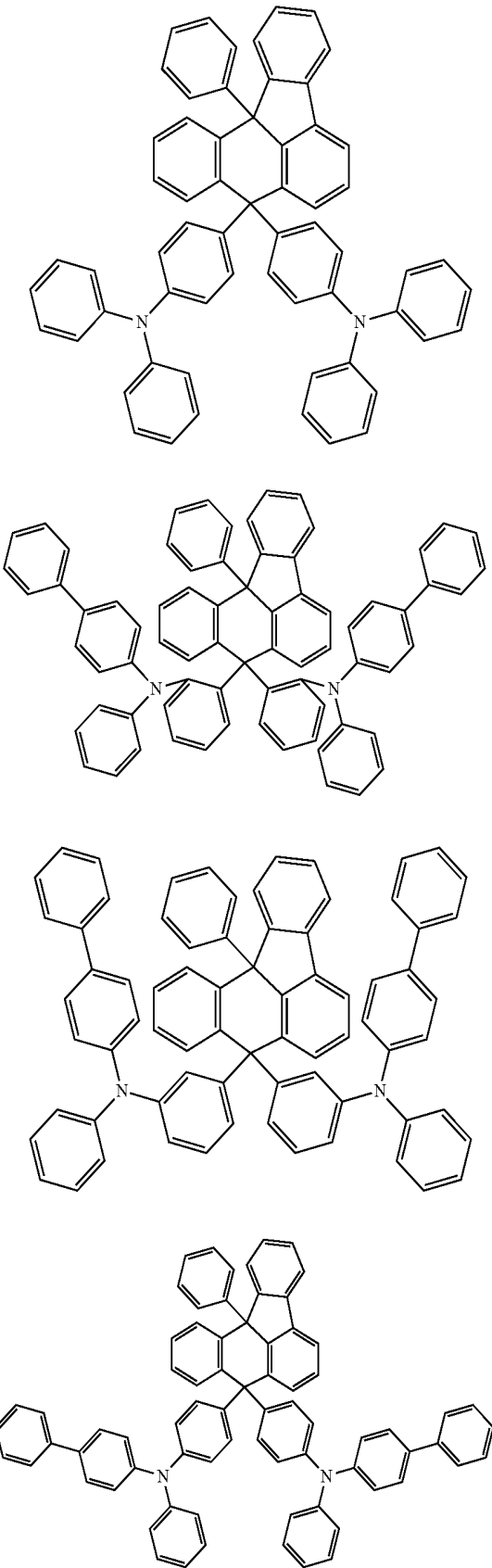
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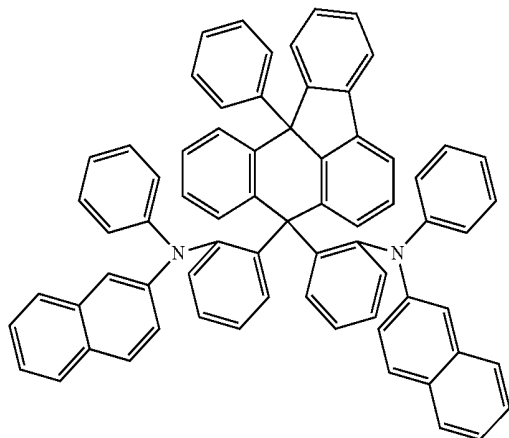
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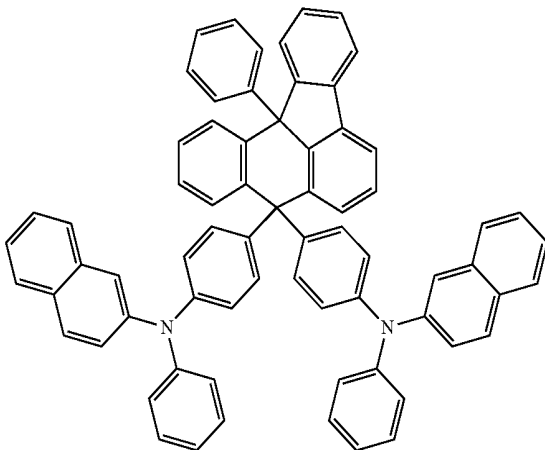
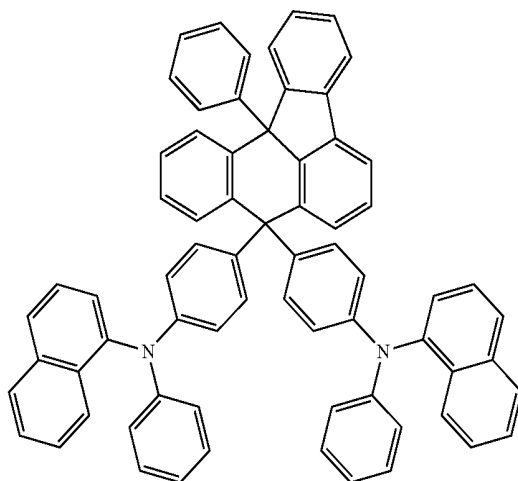
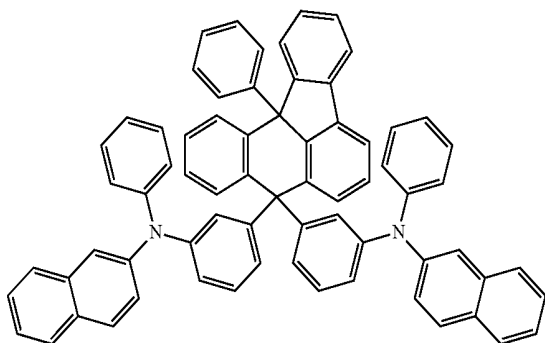
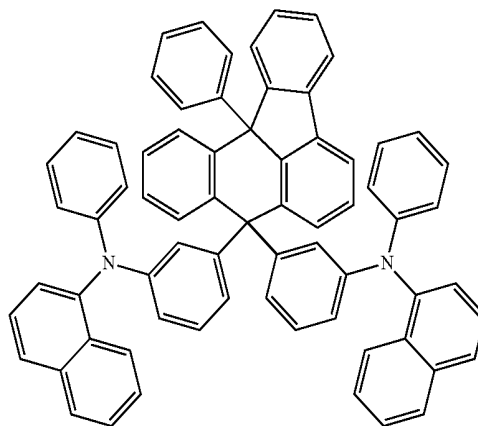
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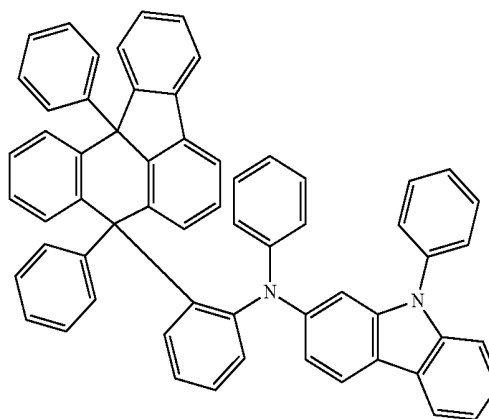
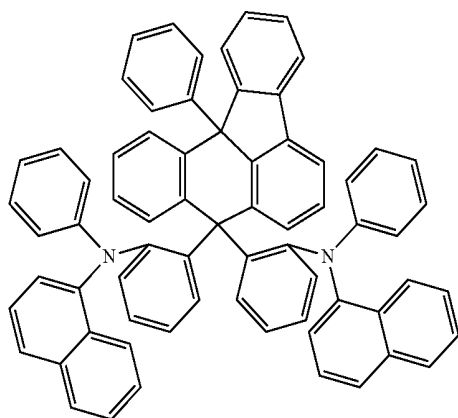
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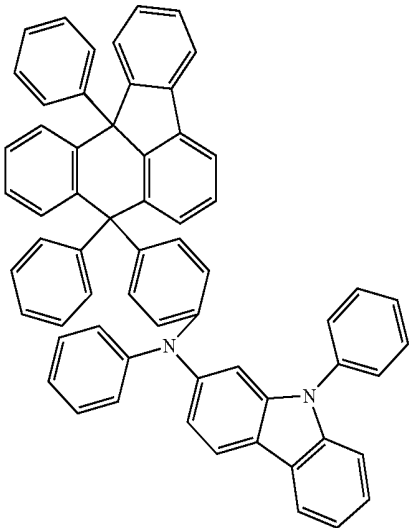
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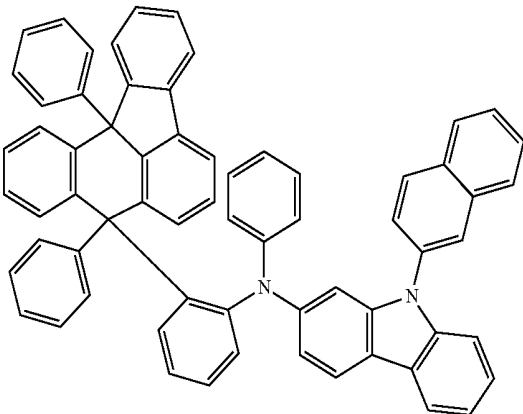
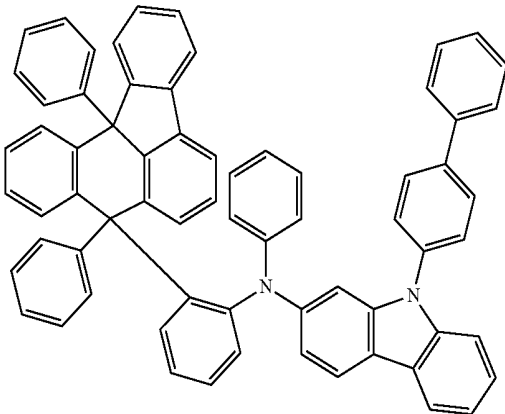
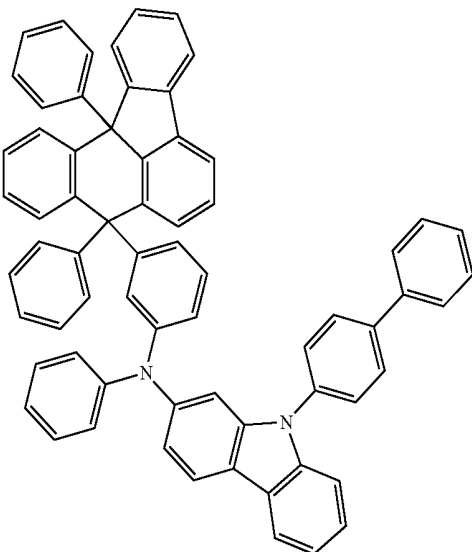
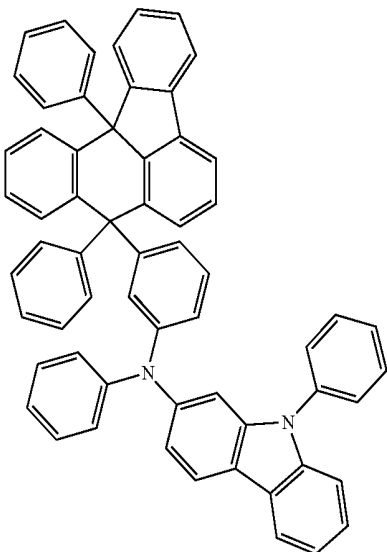
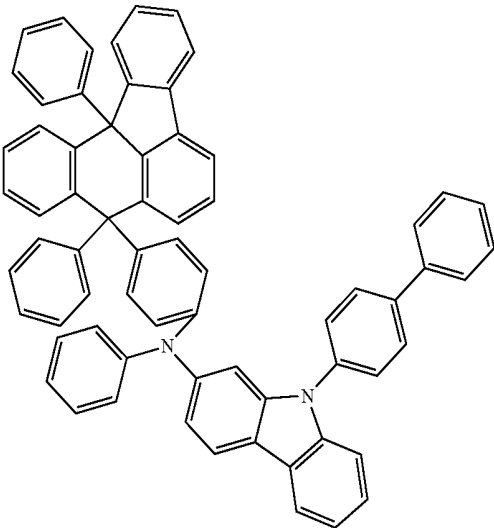
10. The compound of claim 1, wherein the compound of Chemical Formula 1 is any one selected from among the following structural formulae:



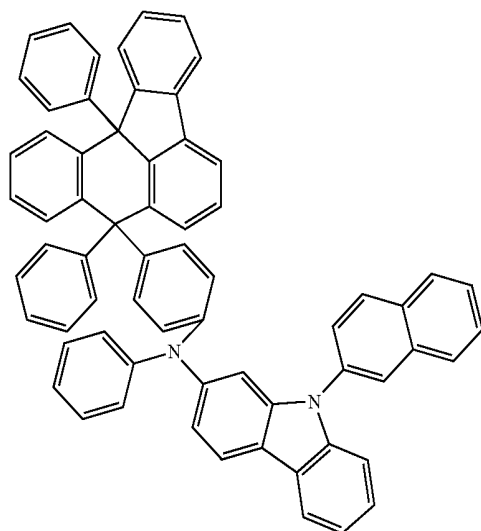
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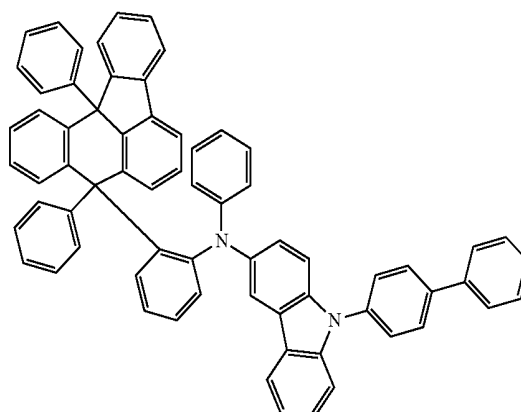
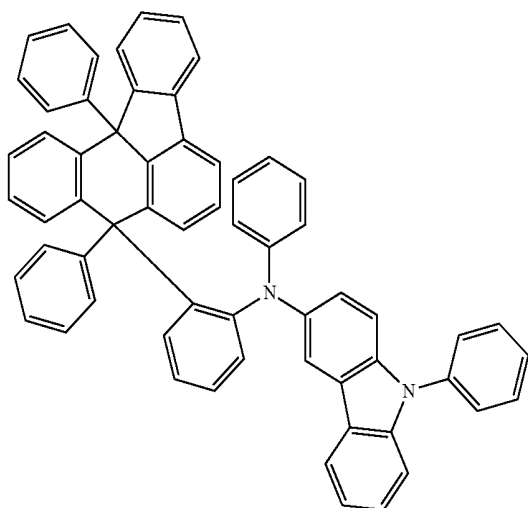
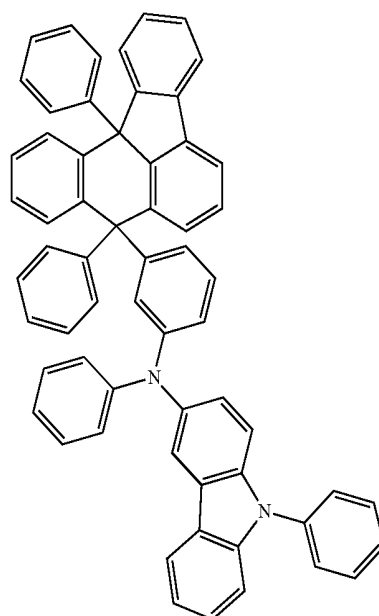
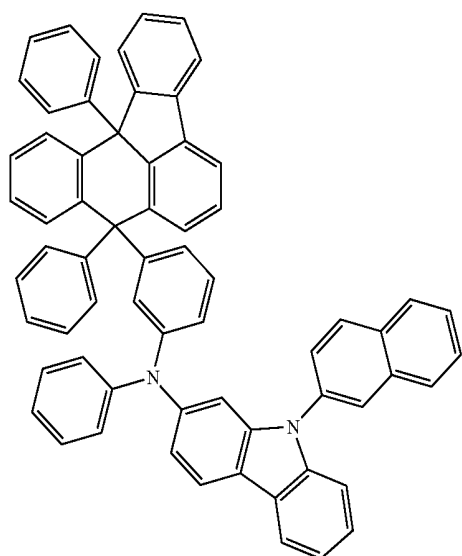
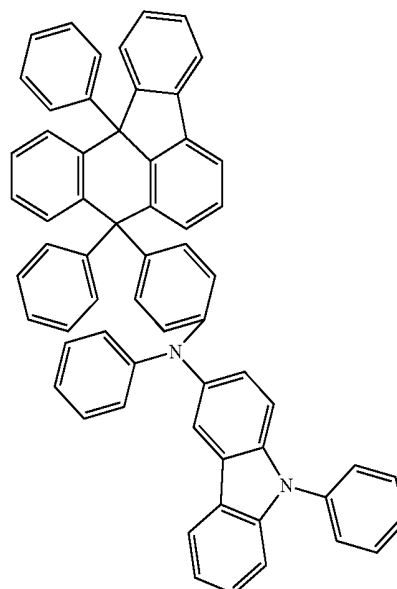
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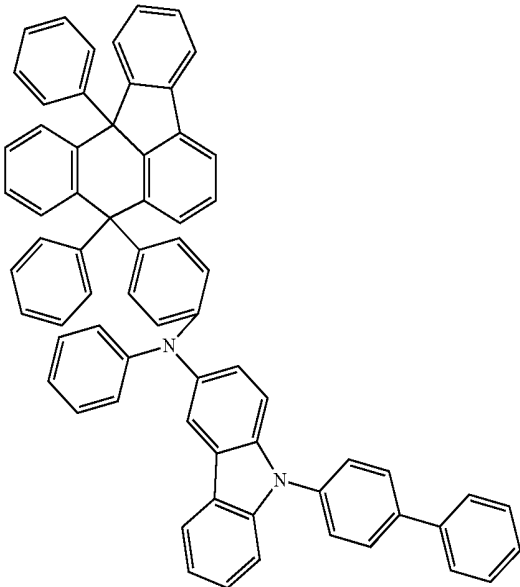
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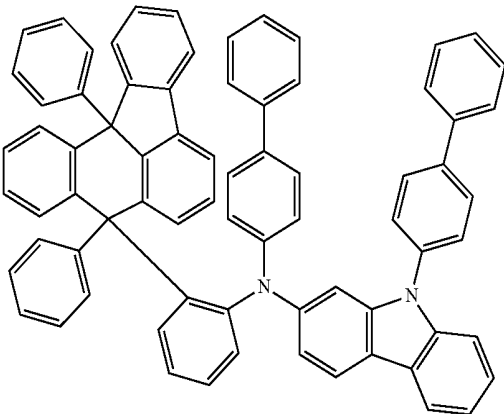
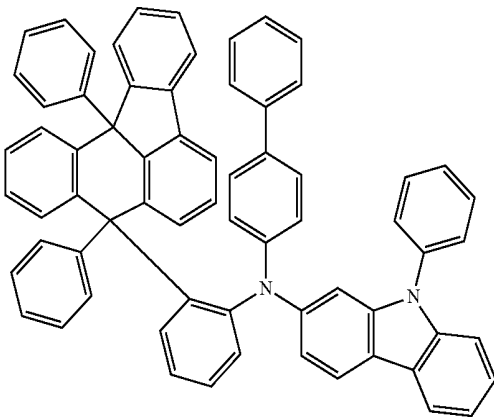
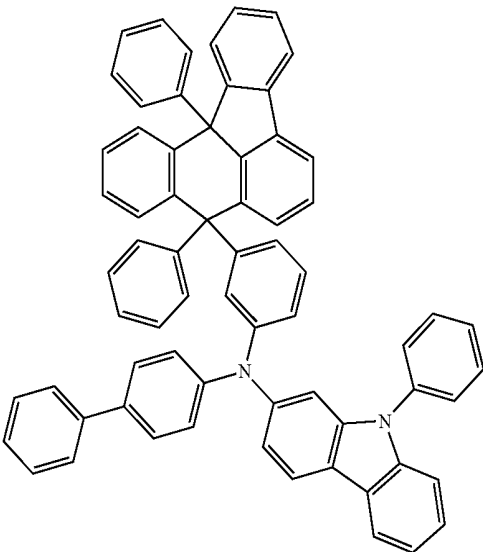
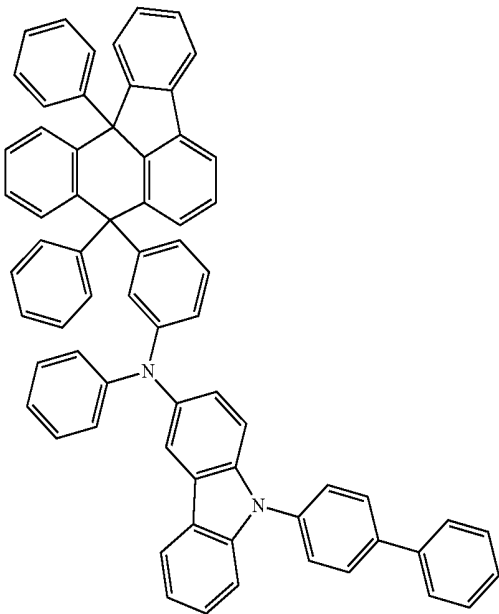
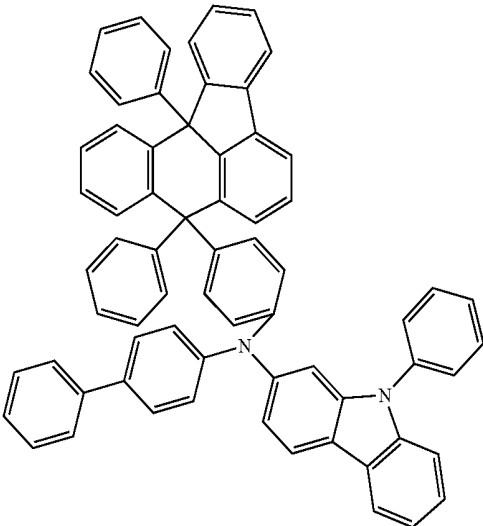
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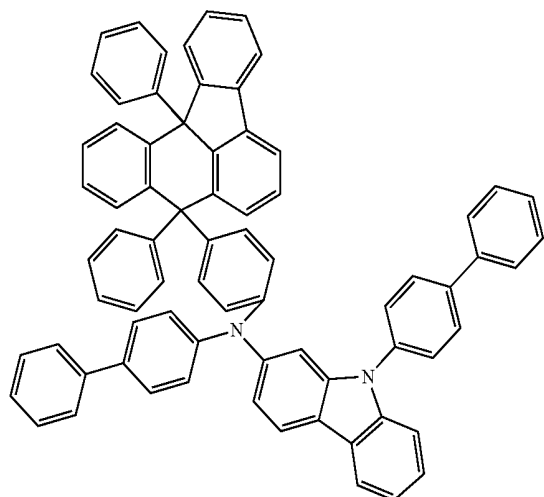
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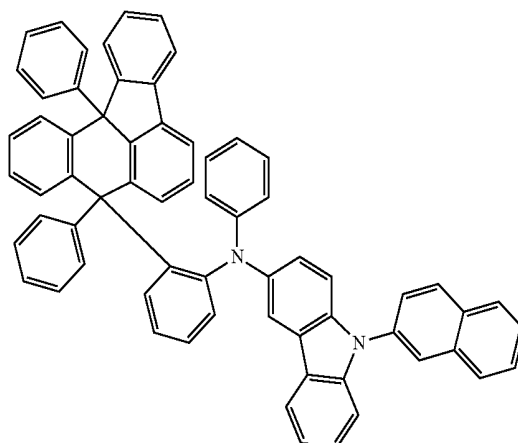
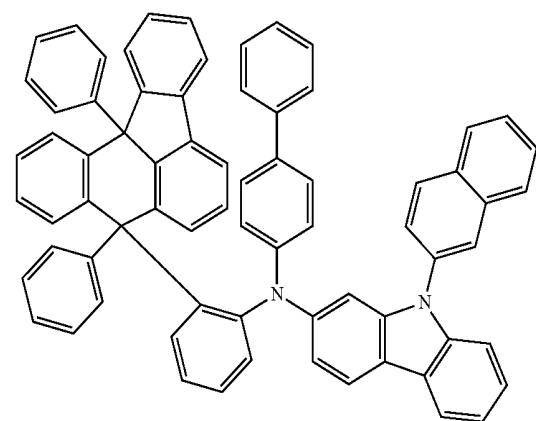
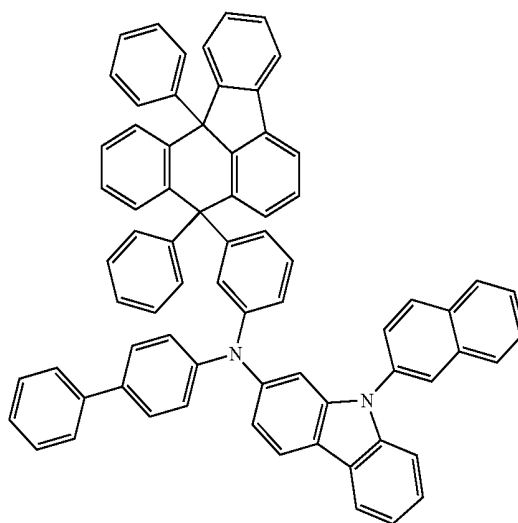
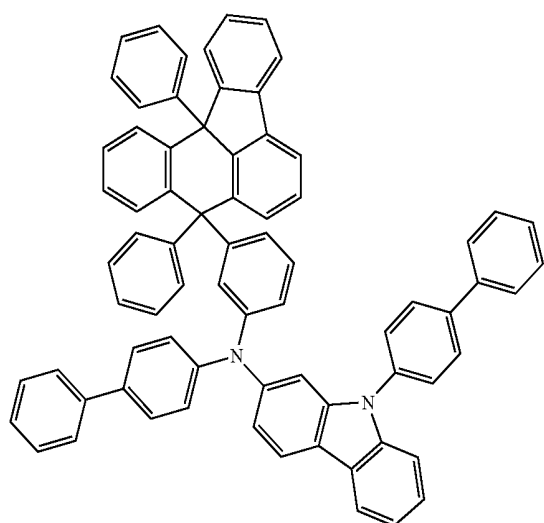
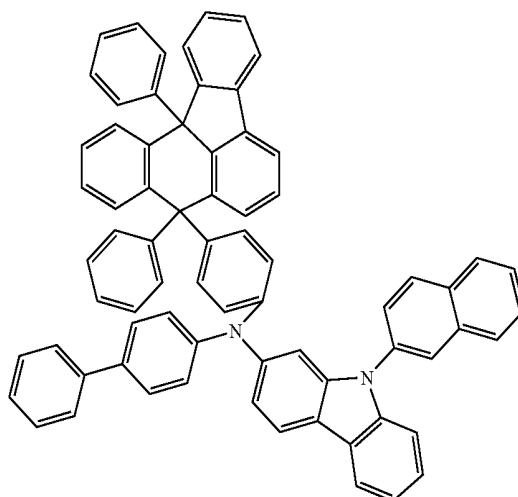
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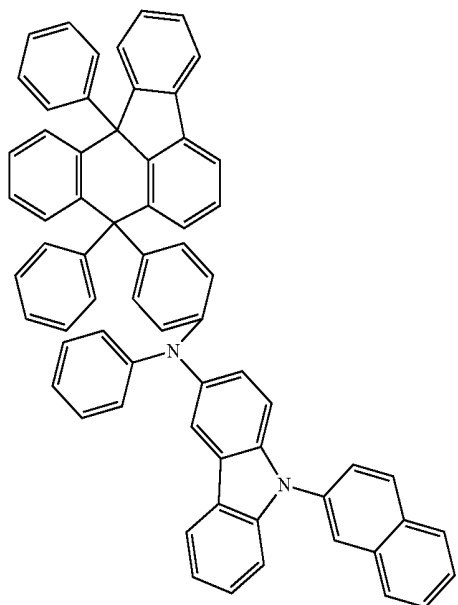
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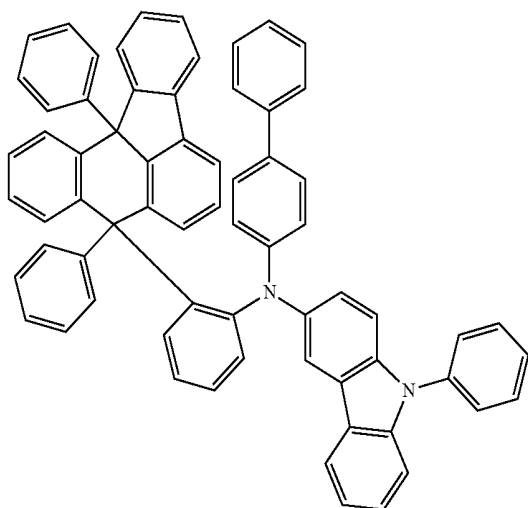
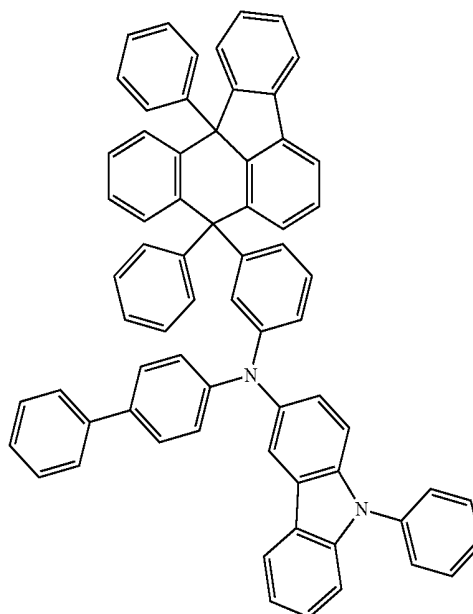
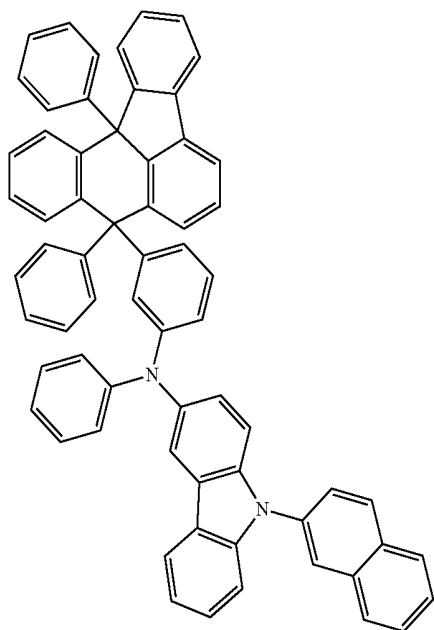
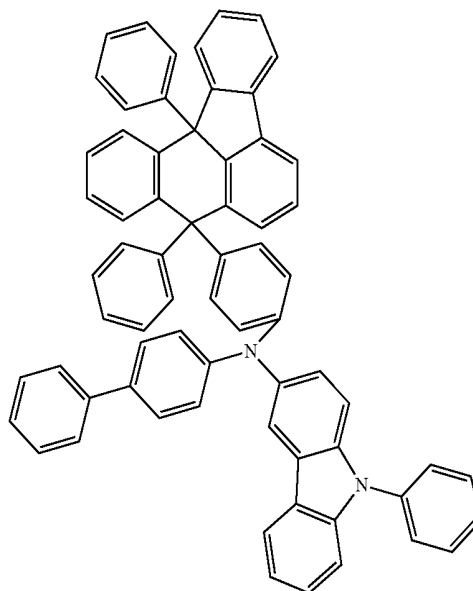
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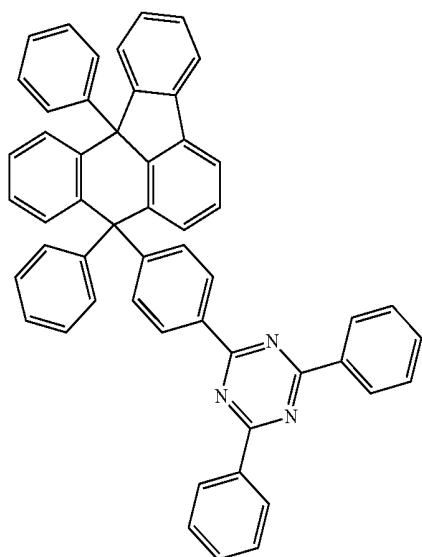
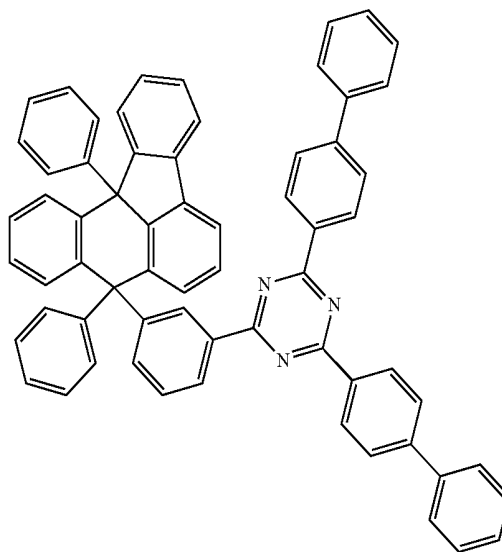
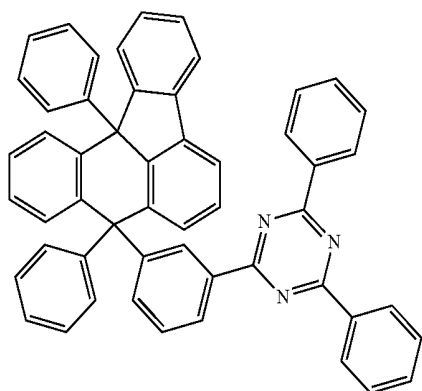
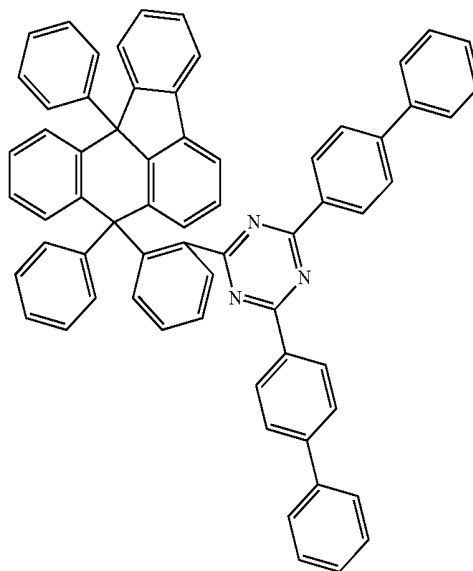
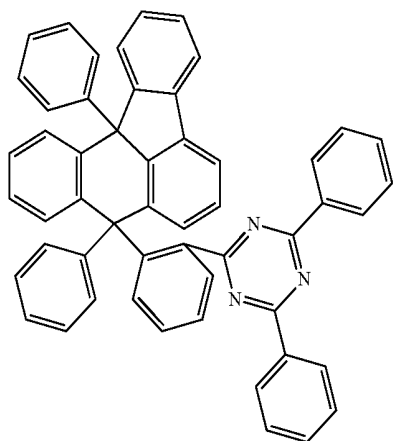
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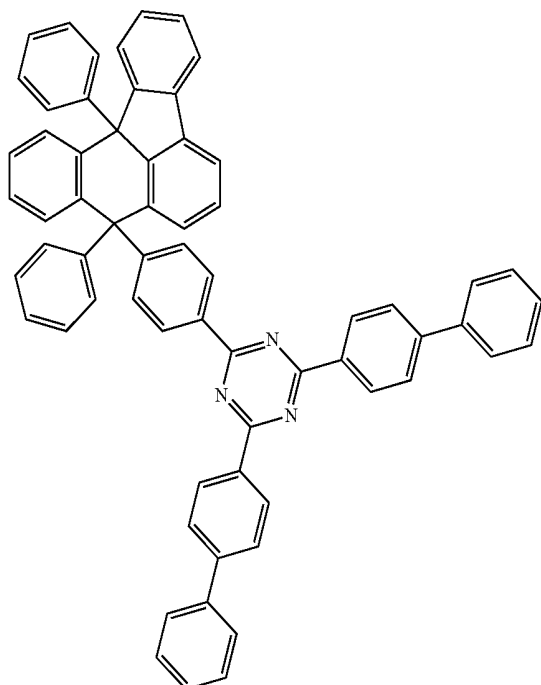
11. The compound of claim 1, wherein, in Chemical Formula 1, a is 1 or 2, at least one of R1 s is represented by -(L)m-A, L is a direct bond; or an arylene group having 6 to 20 carbon atoms, m is 1 or 2, and A is an N-containing heterocyclic group unsubstituted or substituted with an aryl group or a heterocyclic group, and herein, the N-containing heterocyclic group is a triazine group, a pyrimidine group, a pyridine group, a quinazoline group, a quinoline group, an isoquinoline group, a benzimidazole group, a carbazole group or a benzocarbazole group or

wherein the compound of Chemical Formula 1 is any one selected from among the following structural formulae:

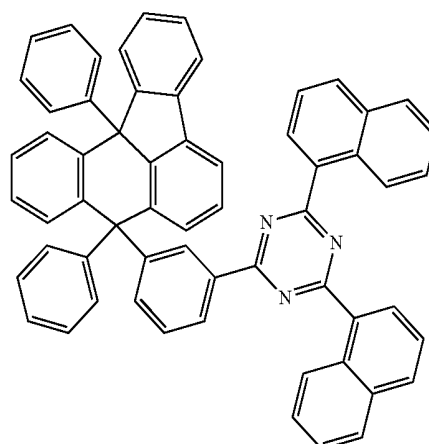
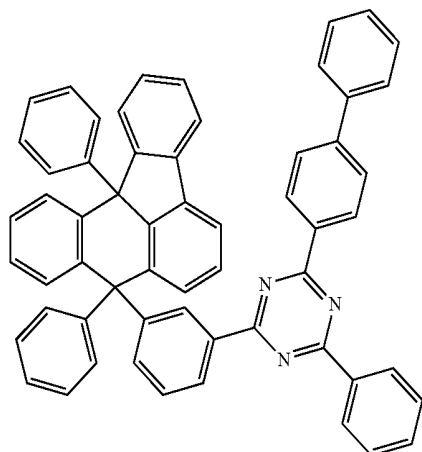
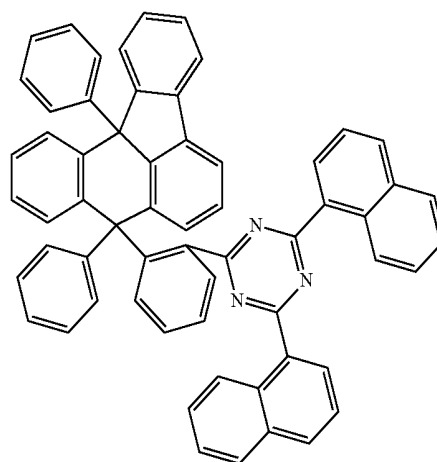
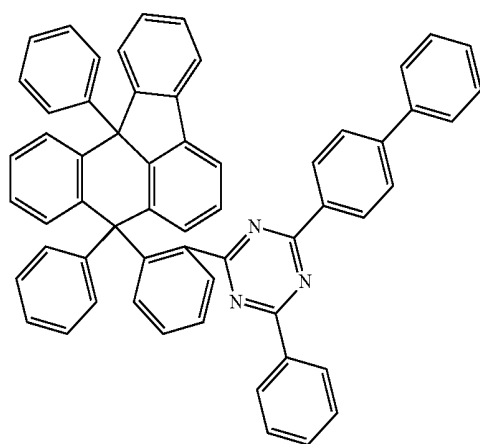
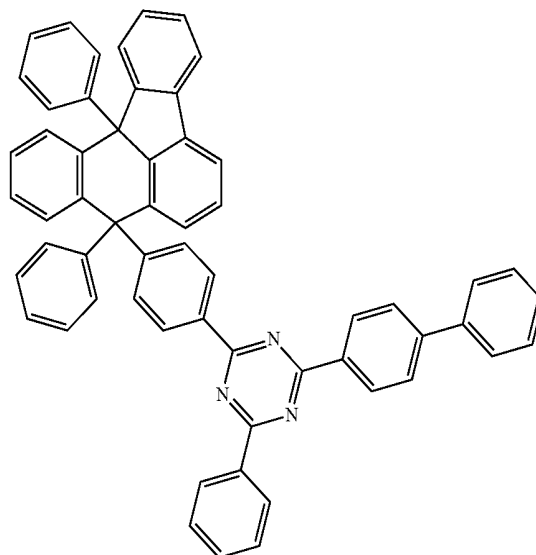
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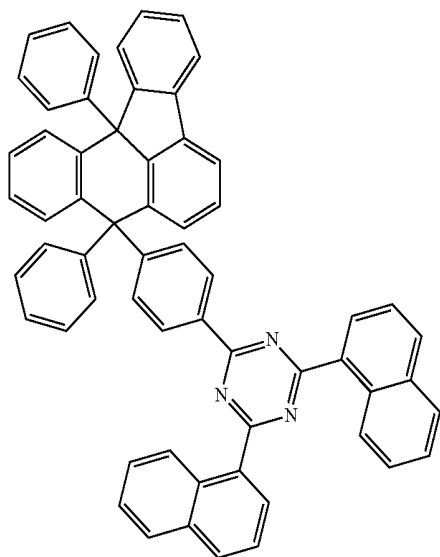
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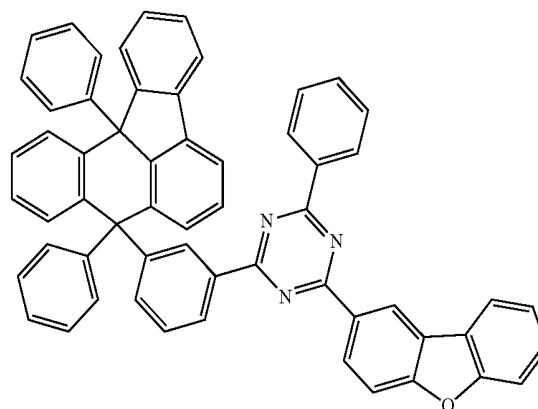
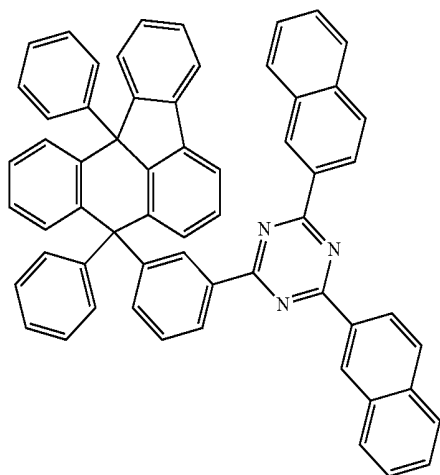
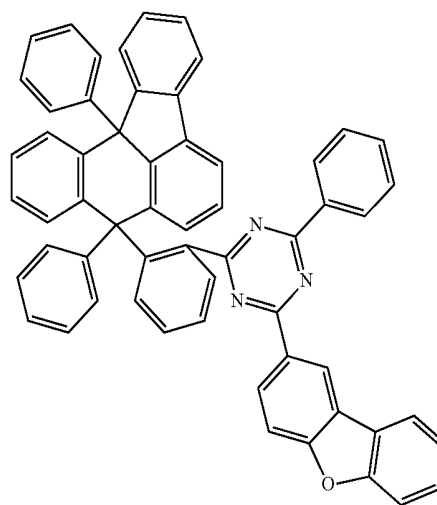
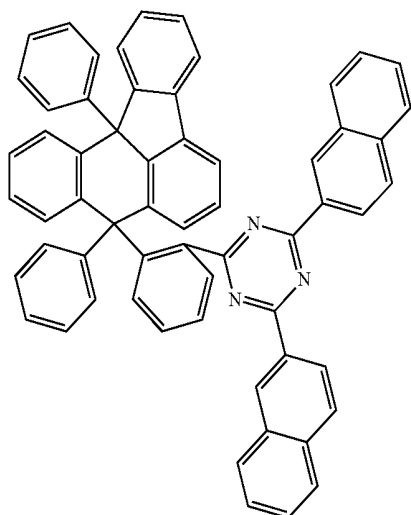
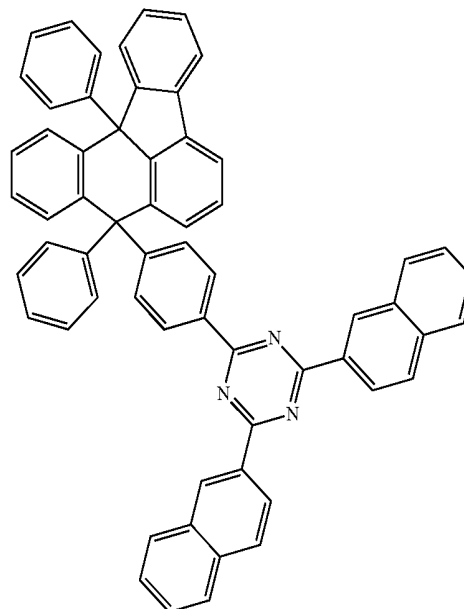
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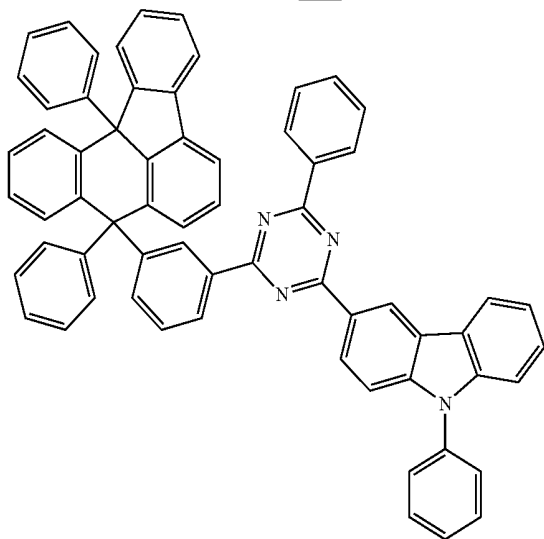
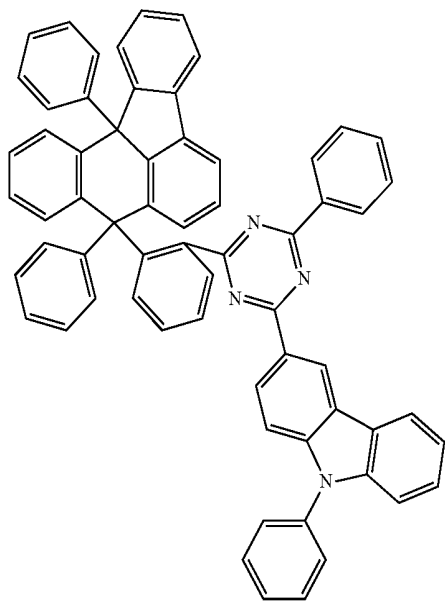
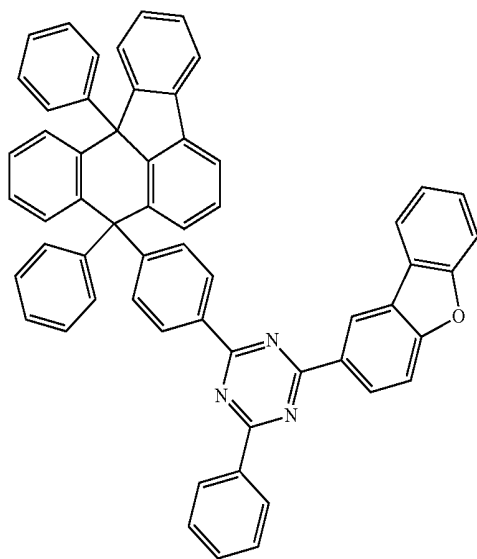
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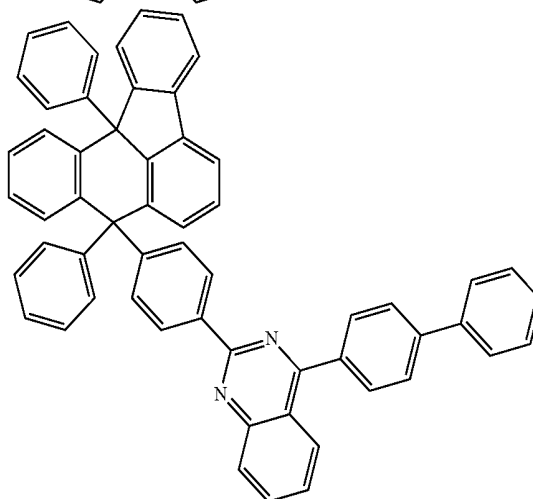
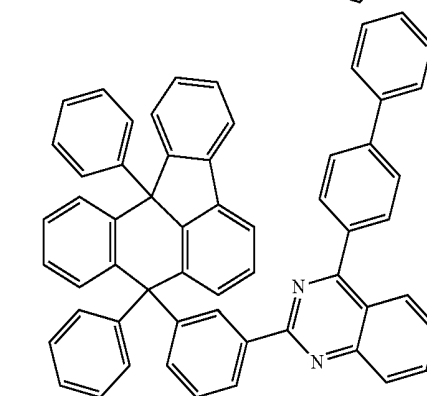
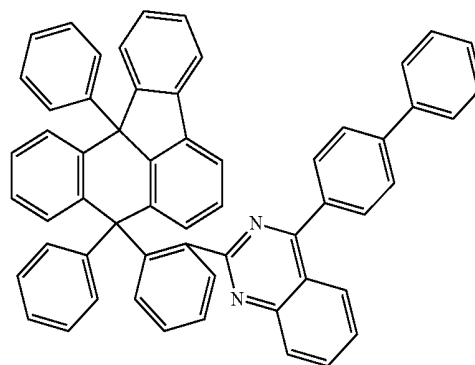
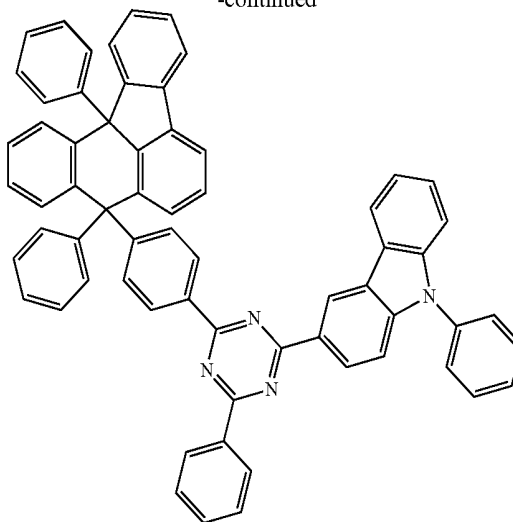
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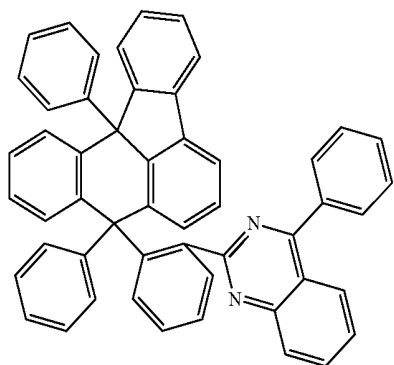
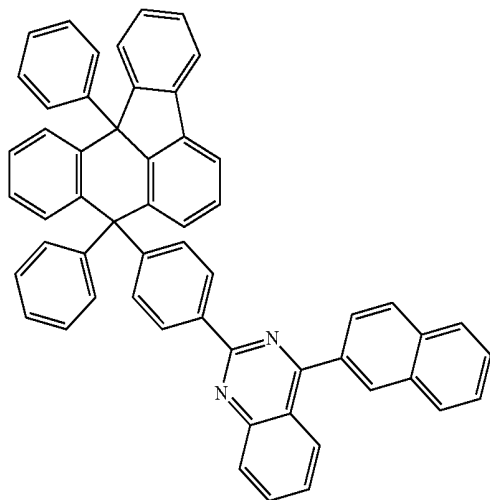
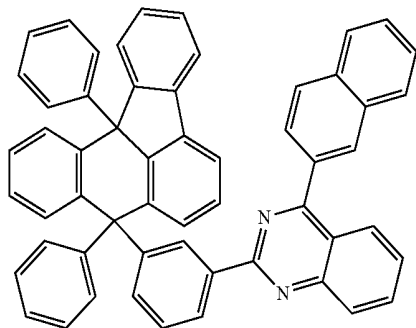
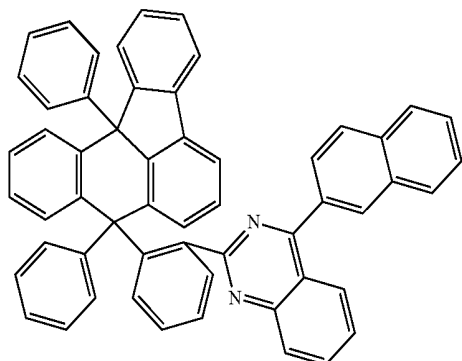
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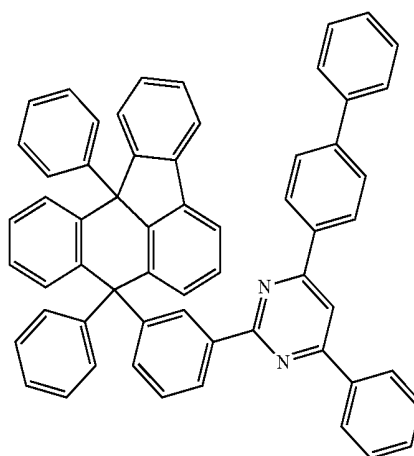
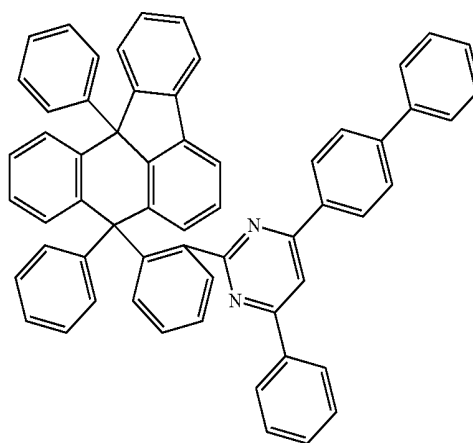
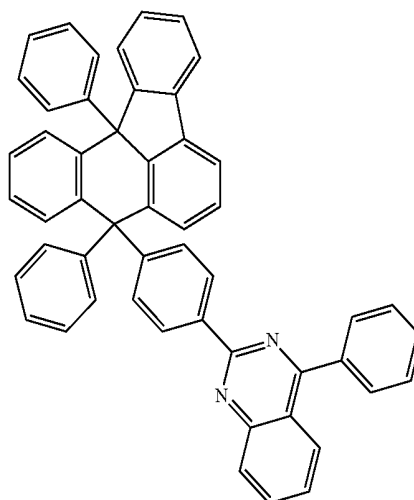
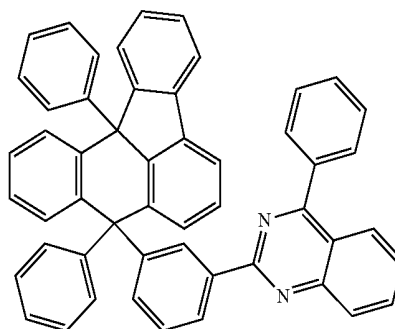
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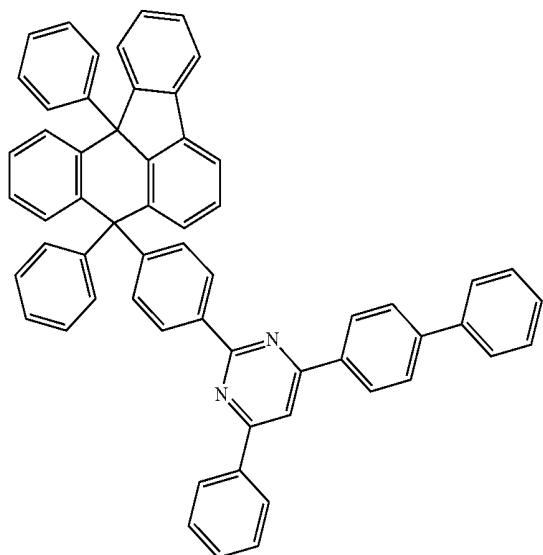
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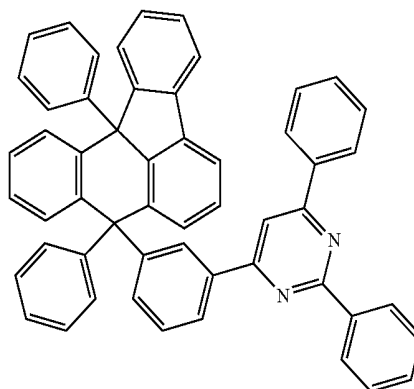
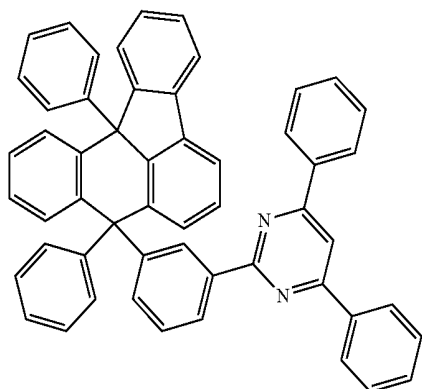
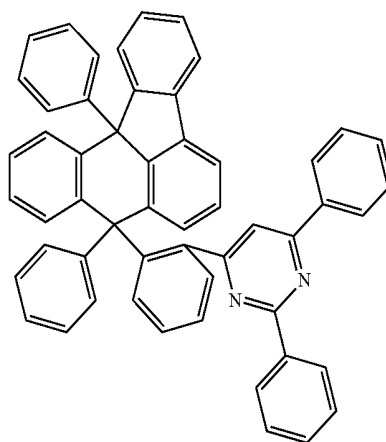
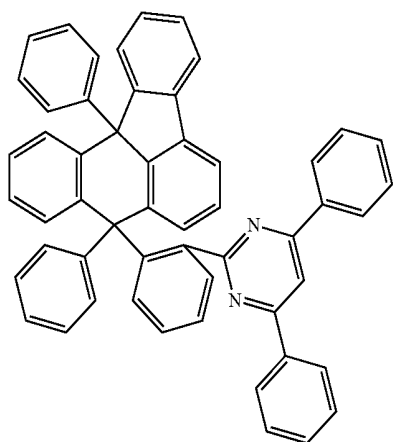
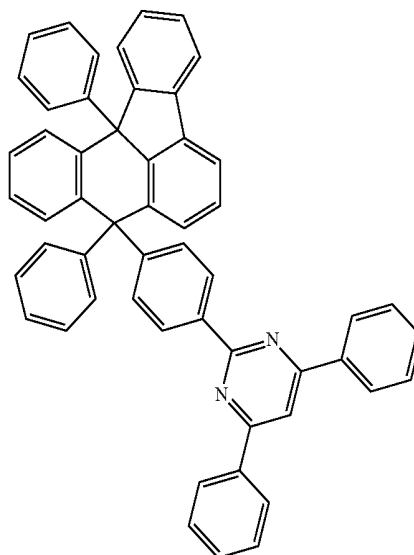
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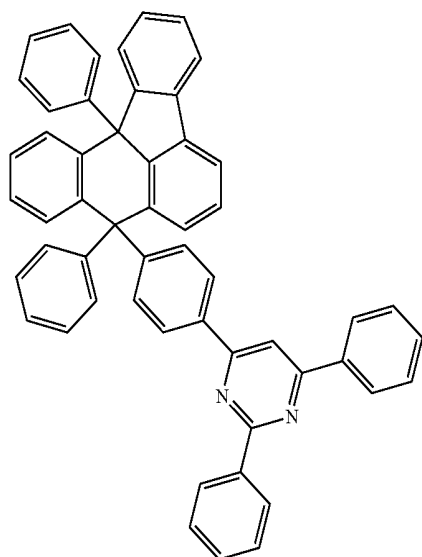
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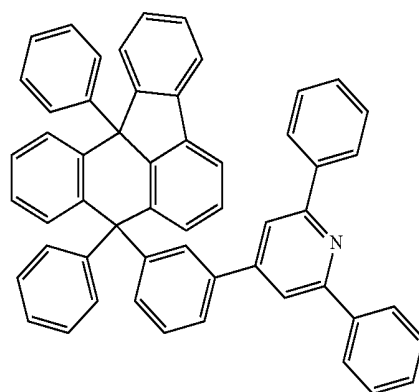
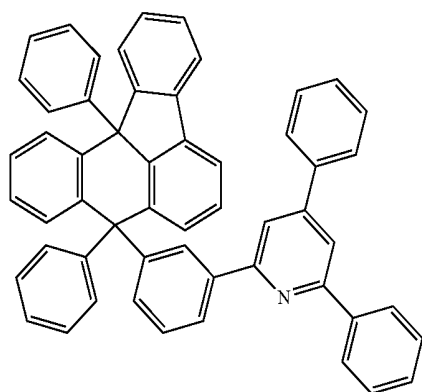
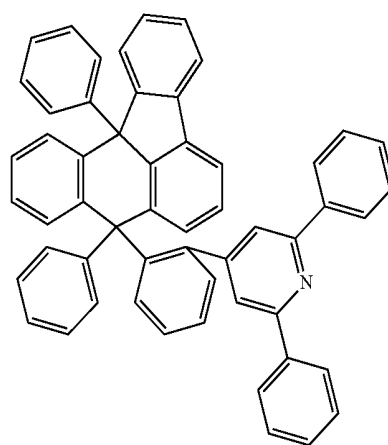
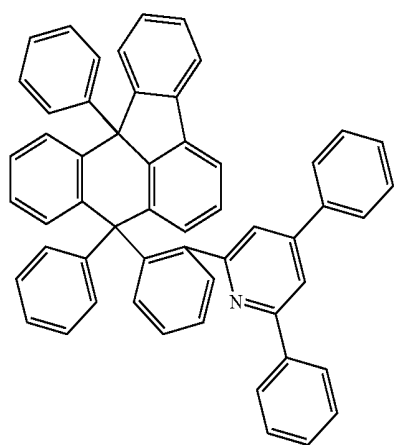
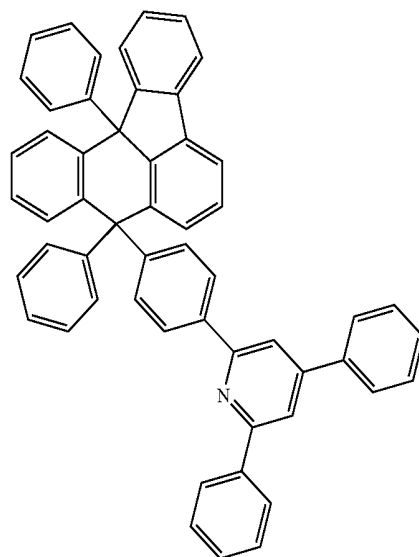
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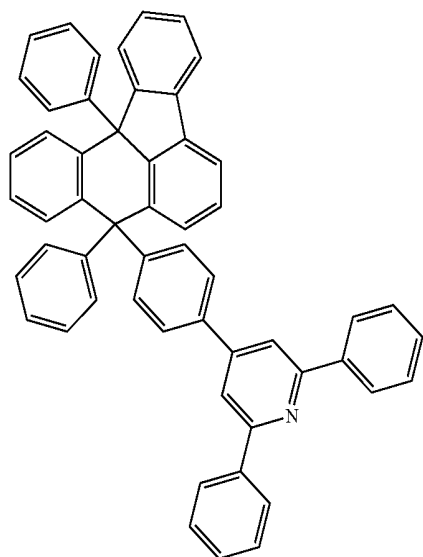
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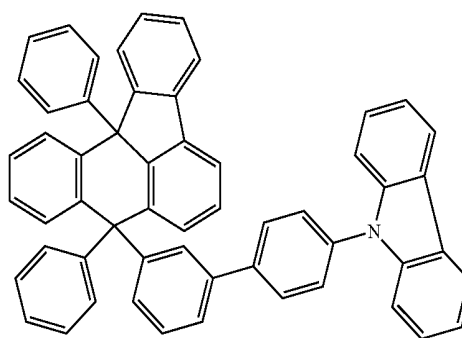
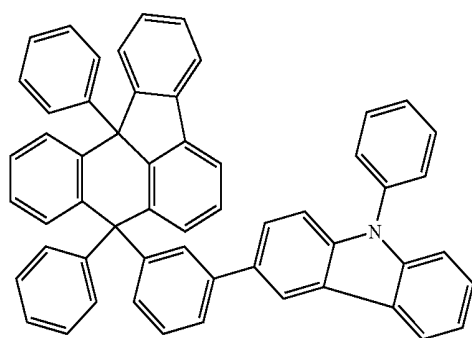
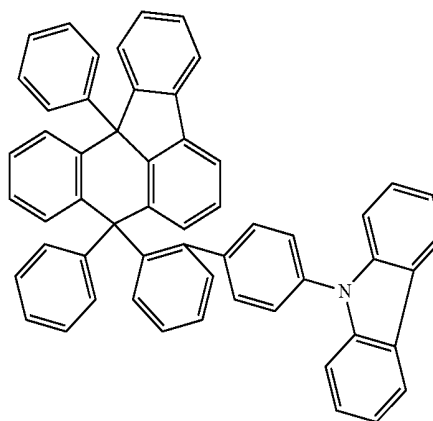
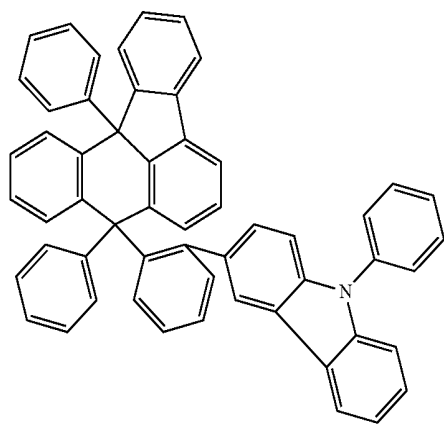
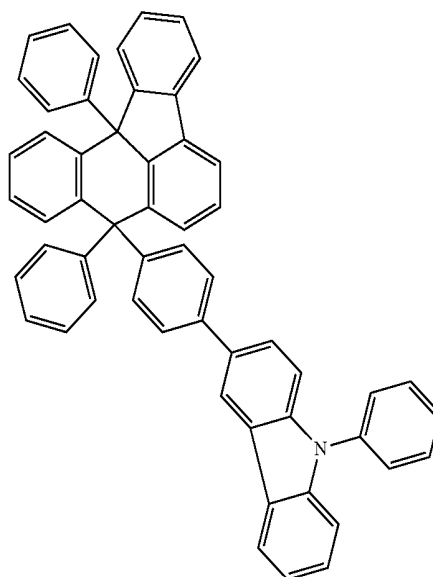
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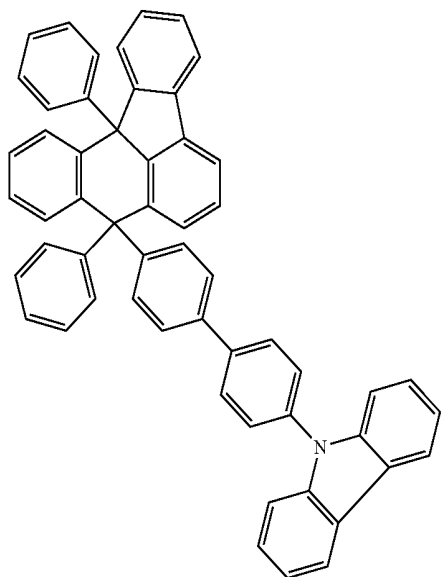
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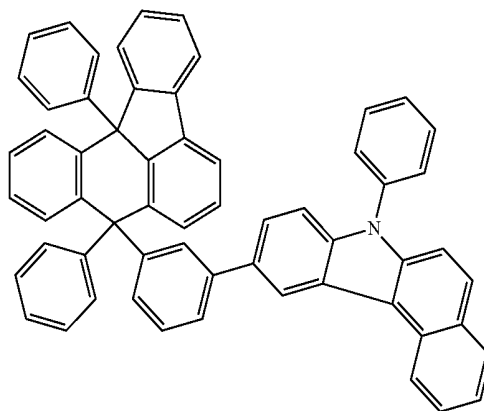
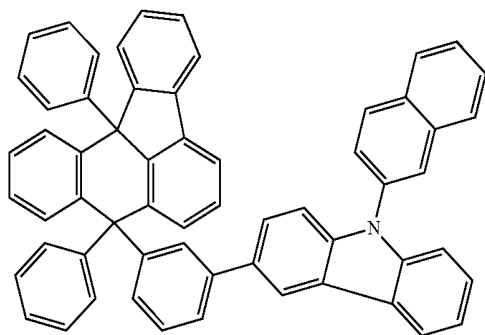
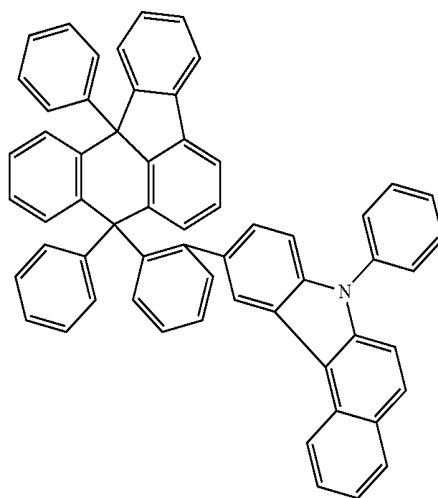
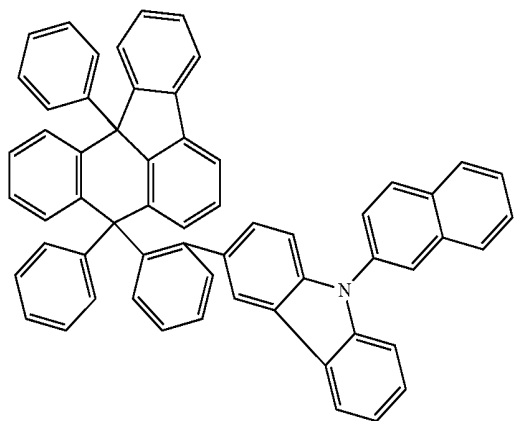
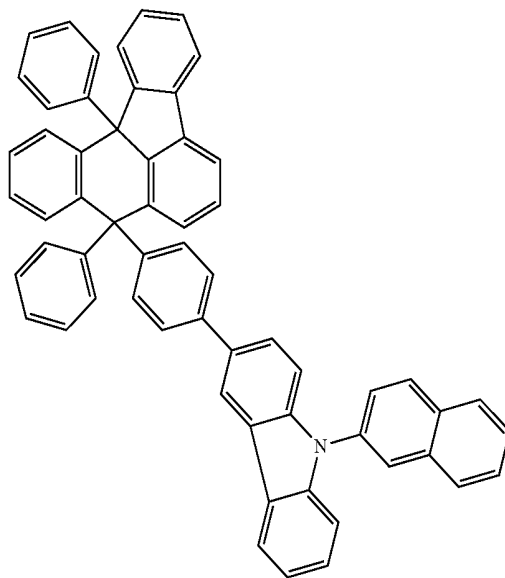
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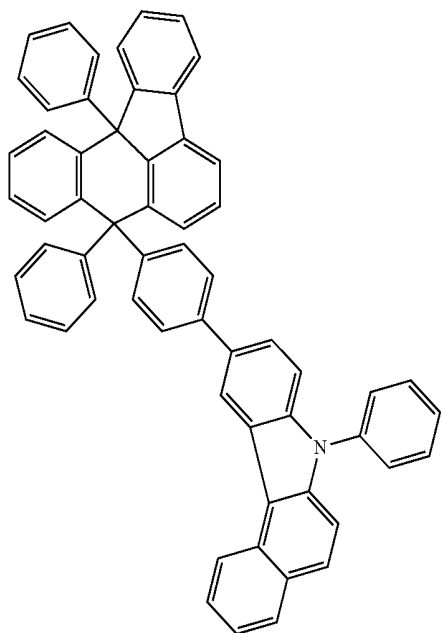
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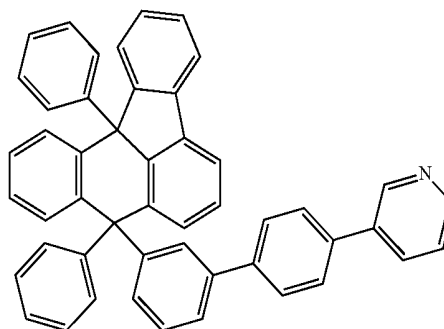
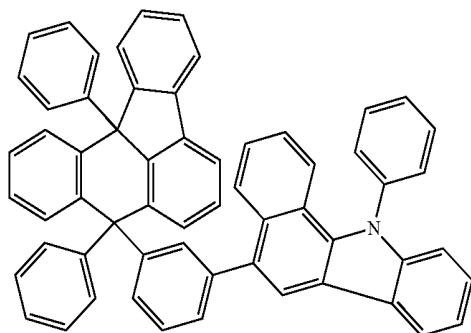
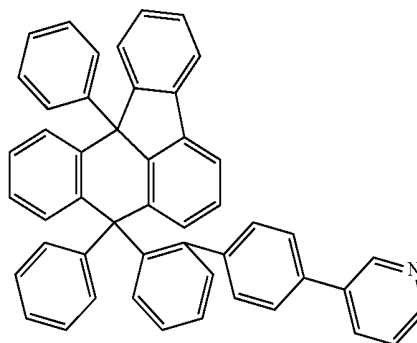
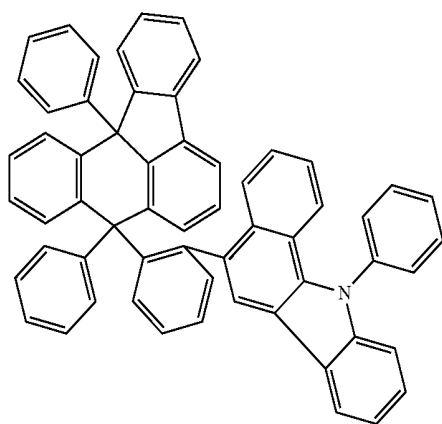
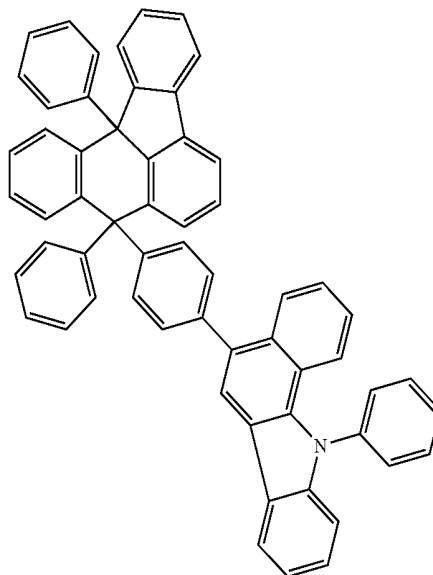
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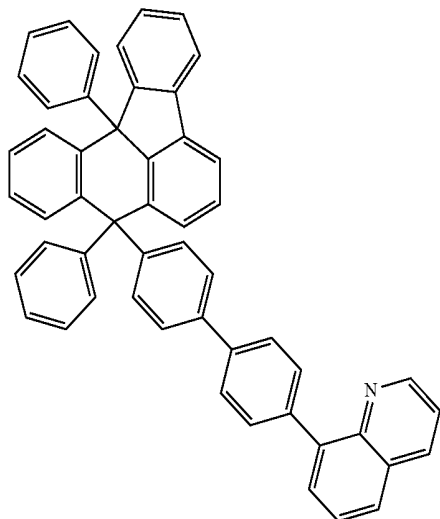
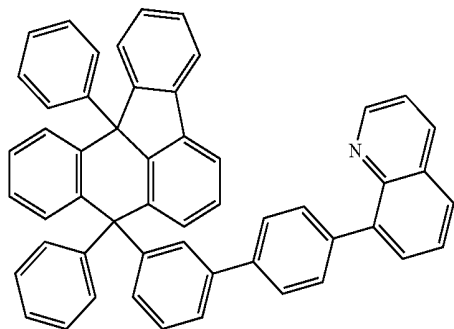
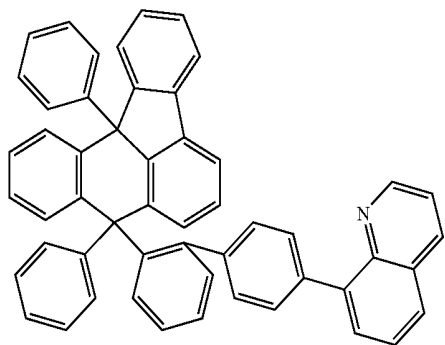
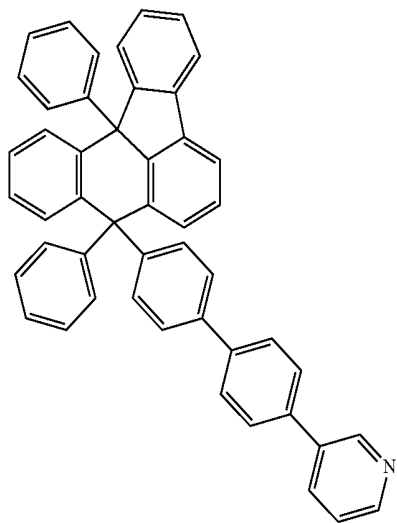
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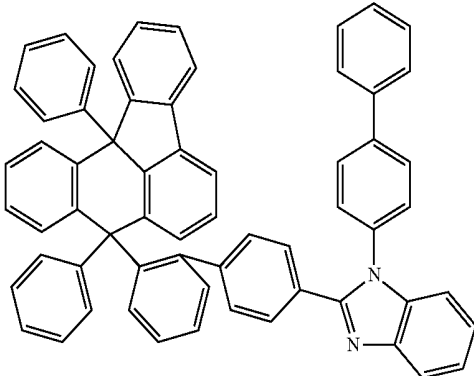
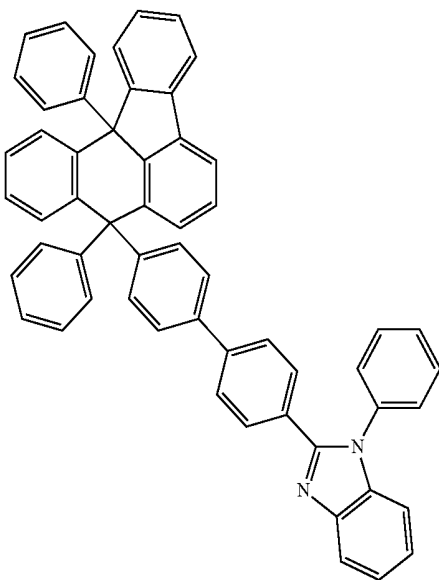
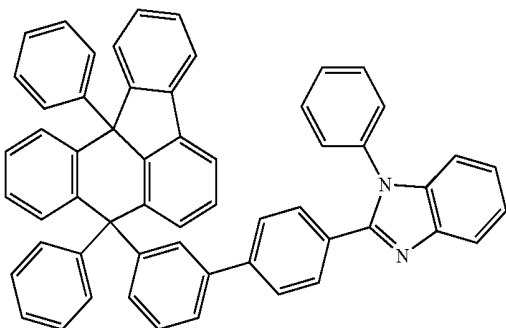
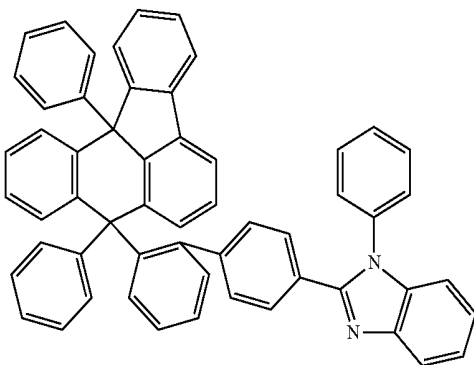
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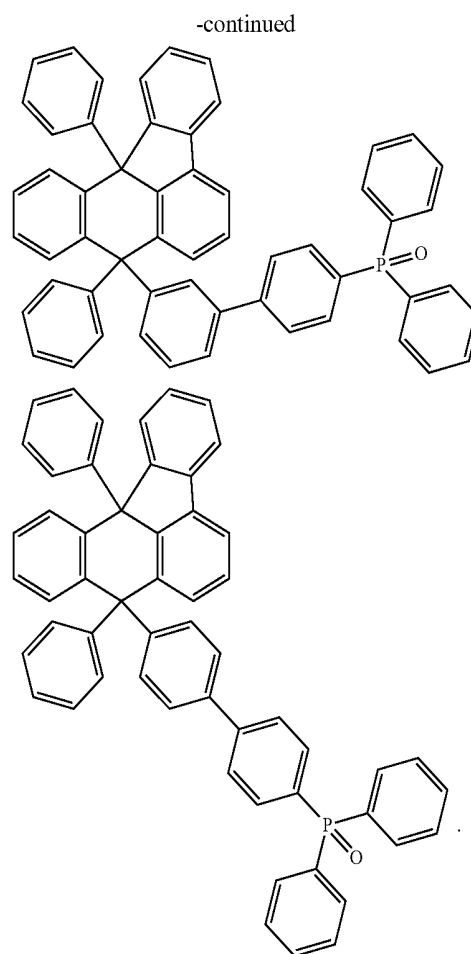
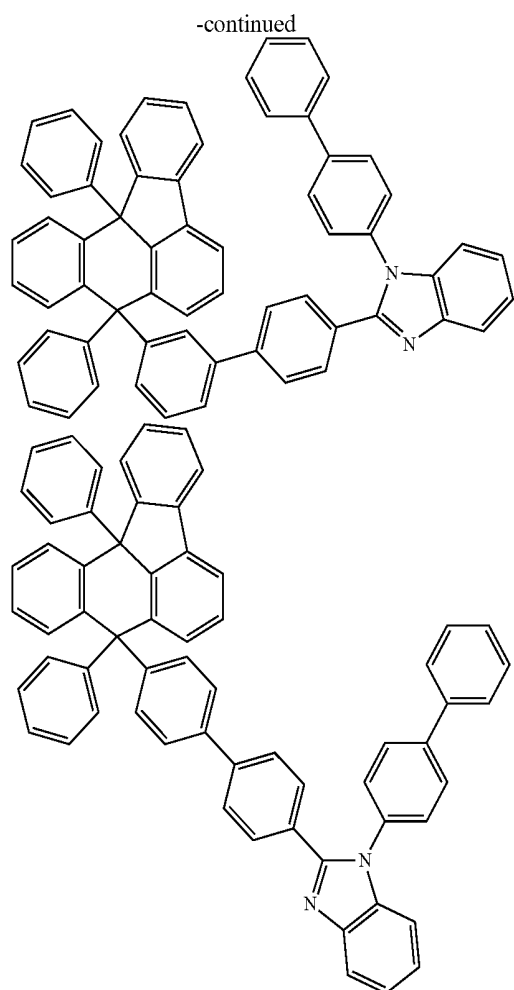


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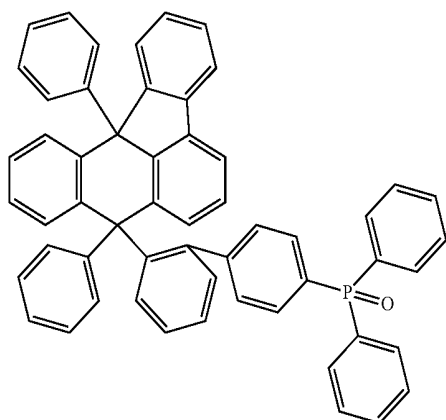




12. (canceled)

13. The compound of claim 1, wherein, in Chemical Formula 1, a is 1 or 2, at least one of R1 s is represented by -(L)m-A, L is a direct bond; or an arylene group having 6 to 20 carbon atoms, m is 1 or 2, A is $\text{—P(=O)R}_5\text{R}_6$, and R5 and R6 are the same as or different from each other and each independently an aryl group having 6 to 20 carbon atoms, or

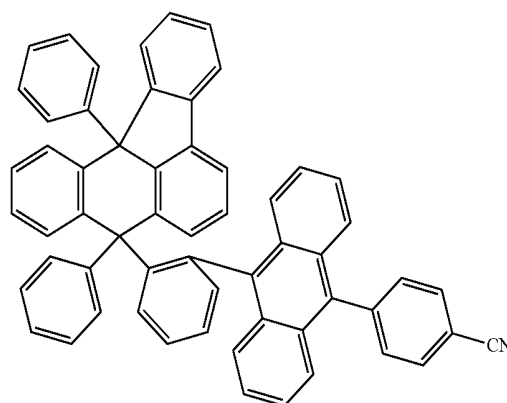
wherein the compound of Chemical Formula 1 is any one selected from among the following structural formulae:



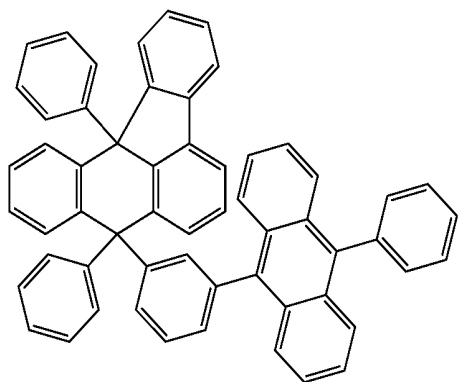
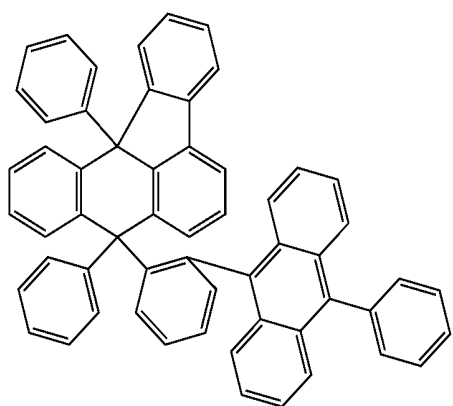
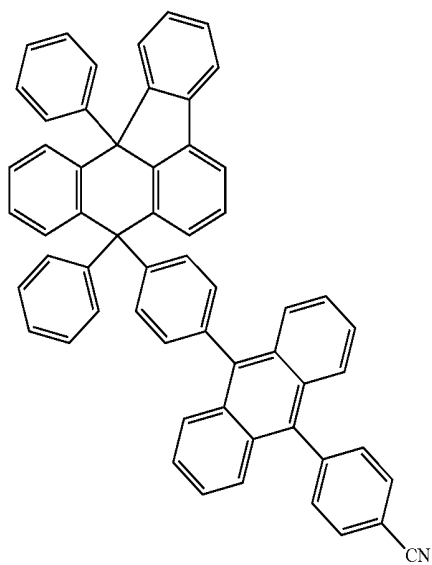
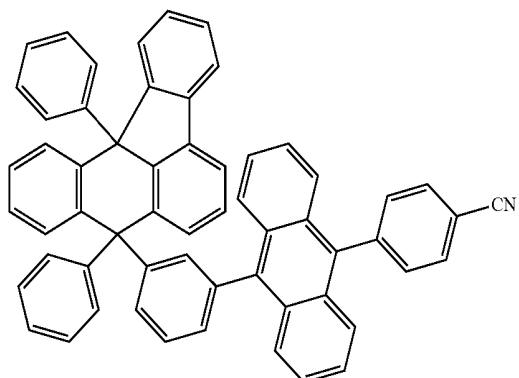
14. (canceled)

15. The compound of claim 1, wherein, in Chemical Formula 1, a is 1 or 2, at least one of R1 s is represented by -(L)m-A, L is a direct bond; an arylene group; or a heteroarylene group, m is 1 or 2, and A is an anthracene group substituted with an aryl group unsubstituted or substituted with a halogen group or a nitrile group; or an aryl group substituted with a halogen group or a nitrile group, or

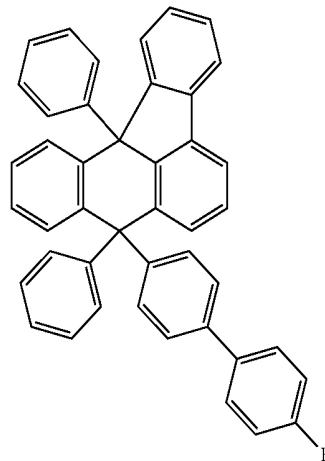
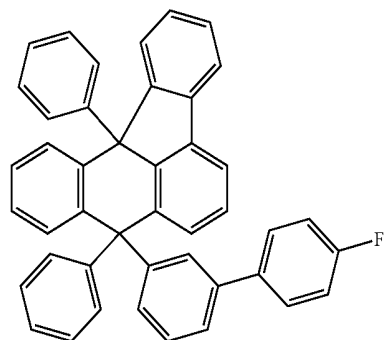
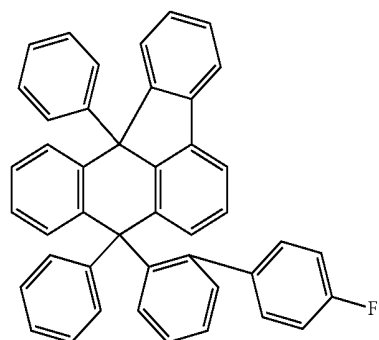
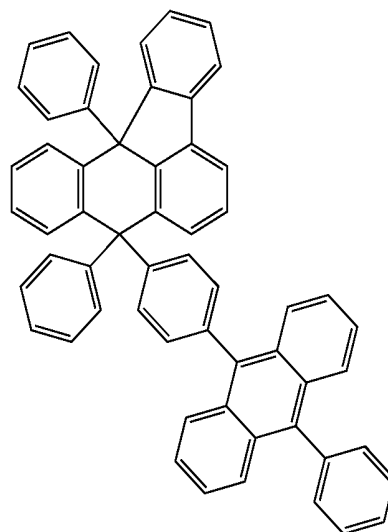
wherein the compound of Chemical Formula 1 is any one selected from among the following structural formulae:

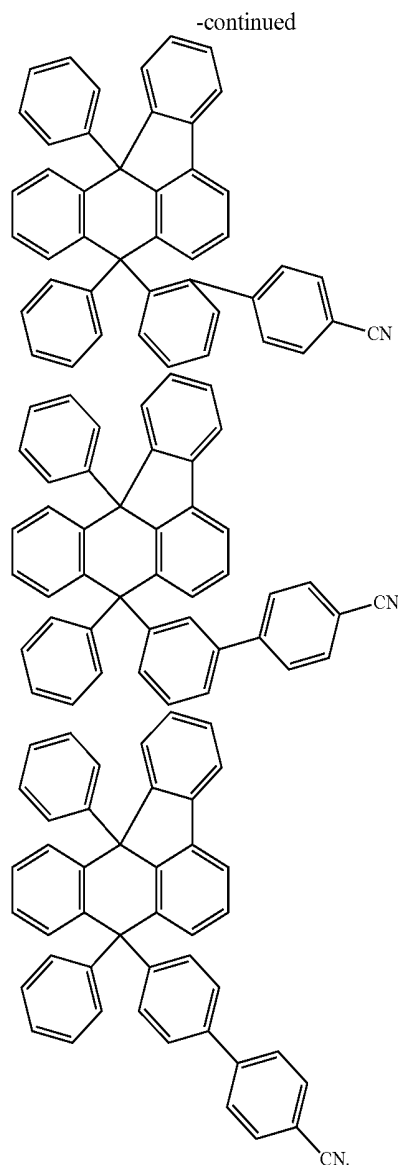


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16. (canceled)

17. An organic light emitting device comprising:
a first electrode;

a second electrode provided opposite to the first electrode; and

one or more organic material layers provided between the first electrode and the second electrode,
wherein one or more layers of the organic material layers include the compound of claim 1.

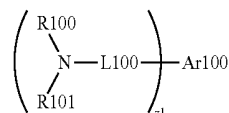
18. The organic light emitting device of claim 17 wherein the organic material layer includes at least one layer of a hole injection layer, a hole transfer layer, an electron suppression layer, a light emitting layer, a hole suppression layer, an electron transfer layer and an electron injection layer.

19. The organic light emitting device of claim 17, wherein the organic material layer includes a light emitting layer, and the light emitting layer includes the compound.

20. The organic light emitting device of claim 17, wherein the organic material layer includes an electron suppression layer, and the electron suppression layer includes the compound.

21. The organic light emitting device of claim 17, wherein the organic material layer includes a light emitting layer, and the light emitting layer includes a compound represented by the following Chemical Formula 15:

[Chemical Formula 15]



wherein, in Chemical Formula 15,

$z1$ is an integer of 1 or greater, and when $z1$ is an integer of 2 or greater, structures in the parentheses are the same as or different from each other,

Ar100 is a substituted or unsubstituted monovalent or higher benzofluorene group; a substituted or unsubstituted monovalent or higher fluoranthene group; a substituted or unsubstituted monovalent or higher pyrene group; or a substituted or unsubstituted monovalent or higher chrysene group,

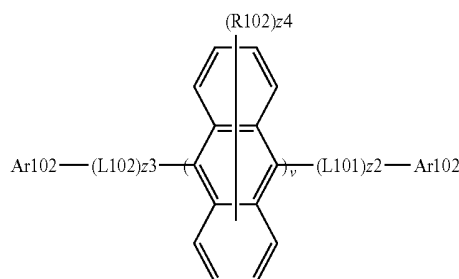
L100 is a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group, and

R100 and R101 are the same as or different from each other, and each independently a substituted or unsubstituted aryl group; a substituted or unsubstituted alkyl group; a substituted or unsubstituted silyl group; a substituted or unsubstituted arylalkyl group; or a substituted or unsubstituted heterocyclic group, or bond to each other to form a substituted or unsubstituted ring.

22. (canceled)

23. The organic light emitting device of claim 17, wherein the organic material layer includes a light emitting layer, and the light emitting layer includes a compound represented by the following Chemical Formula 16:

[Chemical Formula 16]



wherein, in Chemical Formula 16,

Ar101 and Ar102 are the same as or different from each other, and each independently a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group,

L101 and L102 are the same as or different from each other, and each independently a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group,

R102 is hydrogen; deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or

unsubstituted amine group; a substituted or unsubstituted silyl group; a substituted or unsubstituted boron group; a substituted or unsubstituted alkyl group; a substituted or unsubstituted cycloalkyl group; a substituted or unsubstituted alkoxy group; a substituted or unsubstituted aryloxy group; a substituted or unsubstituted alkylthioxy group; a substituted or unsubstituted arylthioxy group; a substituted or unsubstituted alkylsulfoxy group; a substituted or unsubstituted arylsulfoxy group; a substituted or unsubstituted alkenyl group; a substituted or unsubstituted aralkyl group; a substituted or unsubstituted aralkenyl group; a substituted or unsubstituted alkylaryl group; a substituted or unsubstituted alkylamine group; a substituted or unsubstituted aralkylamine group; a substituted or unsubstituted heteroarylamine group; a substituted or unsubstituted arylamine group; a substituted or unsubstituted arylheteroarylamine group; a substituted or unsubstituted arylphosphine group; a substituted or unsubstituted phosphine oxide group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group,

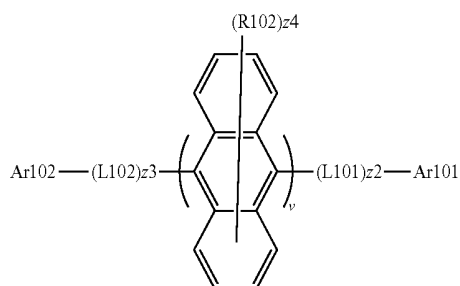
z2 and z3 are the same as or different from each other and each independently an integer of 1 or 2, z4 is an integer of 0 to 8, and when z2 to z4 are 2 or greater, substituents in the parentheses are the same as or different from each other, and

v is an integer of 1 or greater, and when v is an integer of 2 or greater, substituents in the parentheses are the same as or different from each other.

24. (canceled)

25. The organic light emitting device of claim 21, wherein the light emitting layer includes a compound represented by the following Chemical Formula 16:

[Chemical Formula 16]



wherein, in Chemical Formula 16,

Ar101 and Ar102 are the same as or different from each other, and each independently a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group,

L101 and L102 are the same as or different from each other, and each independently a direct bond; a substituted or unsubstituted arylene group; or a substituted or unsubstituted heteroarylene group,

R102 is hydrogen; deuterium; a halogen group; a nitrile group; a nitro group; a hydroxyl group; a carbonyl group; an ester group; an imide group; a substituted or unsubstituted amine group; a substituted or unsubstituted silyl group; a substituted or unsubstituted boron group; a substituted or unsubstituted alkyl group; a substituted or unsubstituted cycloalkyl group; a substituted or unsubstituted alkoxy group; a substituted or unsubstituted aryloxy group; a substituted or unsubstituted alkylthioxy group; a substituted or unsubstituted arylthioxy group; a substituted or unsubstituted alkylsulfoxy group; a substituted or unsubstituted arylsulfoxy group; a substituted or unsubstituted alkenyl group; a substituted or unsubstituted aralkyl group; a substituted or unsubstituted aralkenyl group; a substituted or unsubstituted alkylaryl group; a substituted or unsubstituted alkylamine group; a substituted or unsubstituted aralkylamine group; a substituted or unsubstituted heteroarylamine group; a substituted or unsubstituted arylamine group; a substituted or unsubstituted arylheteroarylamine group; a substituted or unsubstituted arylphosphine group; a substituted or unsubstituted phosphine oxide group; a substituted or unsubstituted aryl group; or a substituted or unsubstituted heterocyclic group,

z2 and z3 are the same as or different from each other and each independently an integer of 1 or 2, z4 is an integer of 0 to 8, and when z2 to z4 are 2 or greater, substituents in the parentheses are the same as or different from each other, and

v is an integer of 1 or greater, and when v is an integer of 2 or greater, substituents in the parentheses are the same as or different from each other.

* * * * *

专利名称(译)	螺环型化合物和包含其的有机发光元件		
公开(公告)号	US20170365787A1	公开(公告)日	2017-12-21
申请号	US15/543372	申请日	2016-10-12
[标]申请(专利权)人(译)	乐金化学股份有限公司		
申请(专利权)人(译)	LG化学有限公司.		
当前申请(专利权)人(译)	LG化学有限公司.		
[标]发明人	CHA YONGBUM KIM JIN JOO SUH SANG DUK KIM JUNGBUM		
发明人	CHA, YONGBUM KIM, JIN JOO SUH, SANG DUK KIM, JUNGBUM		
IPC分类号	H01L51/00 C07C211/61 C07D209/86 C07D213/16 C07F9/28 C07D251/24 C07C211/54 C07D239/26 H01L51/50 H01L51/52		
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优先权	1020150149014 2015-10-26 KR 1020160130731 2016-10-10 KR		
其他公开文献	US9960357		
外部链接	Espacenet USPTO		

摘要(译)

本说明书提供了具有化学式1的螺结构的化合物，以及包含该化合物的有机发光装置。

