

(19)
(12)(KR)
(B1)(51) 。 Int. Cl.⁷
C09K 11/06(45)
(11)
(24)2004 03 12
10-0422914
2004 03 03(21) 10-2001-0023039
(22) 2001 04 27(65) 10-2002-0083615
(43) 2002 11 04

(73)

20

(72)

107 703

LG 8 405

302 904

108 110

247-184

128 405

LG 7 403

381-42LG 8 107

(74)

:

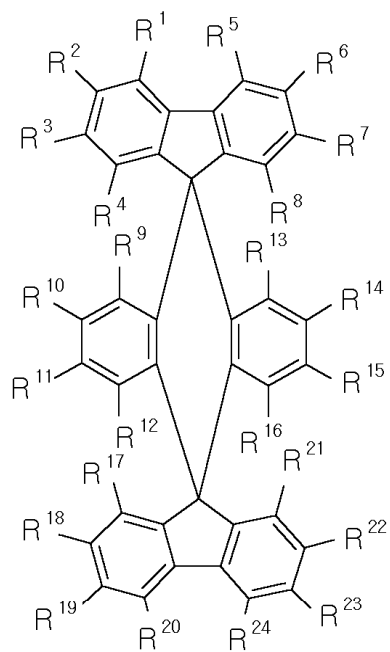
(54)

가 , (carrier) (mobility)

가

1

[1]



(double spiro) 가 1
(dopant)

1

1
2

1, 2, 3, 4, 5, 6, 7

가 (carrier) (mobility)

가

()

(full color) (shadow mask) (pixel)

4,359,507

가

가

(glass transition temperature)가

가

(group) 가

(carrier)

(trap), (pi-orbital) (overlap) (quenching site),

(molecular orbital) ?? (eximer)

(Kodak) 4,356,429 (copper phthalocyanine; CuPc)

가 가

가

(ph enyl) (naphtyl) (5,554,450).

가 4,4'- [N-(1-)-N- -] (4,4'-bis[*N*-(1-naphtyl)- *N*-phenyl-amino]biphenyl; NPB) (spiro)

(5,840,217).

가 8- (8-hydroxyquinoline aluminum salt; Alq3) 가

Alq3

5,516,577 , 5,366,811

가 가 (5,840,217). 5 (spiro)

90 (biphenyl)

(Kodak) (imidazole) (fused)

(5,150,006 , 5,645,948).

(doping) (exciton) (4,769,292).

가 (energy transfer) (band gap) (host) (band-gap)

(band-gap)

가 (excimer)

가 (pi-orbital) (perylene), (anthracene), (rubrene), (quinacridone), (coumarine), Nile Red, DCM,

3가 가 Alq

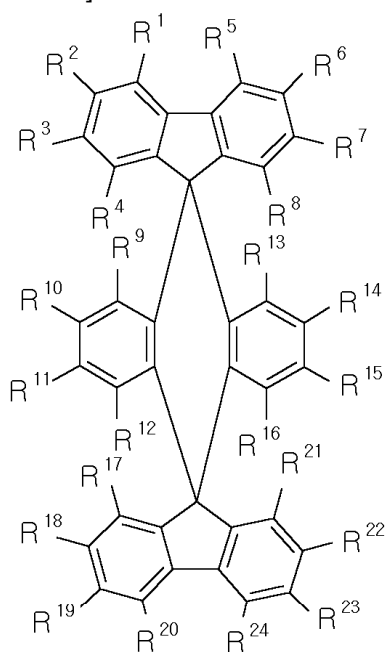
bility) , 가 , (carrier) (mo

가

가

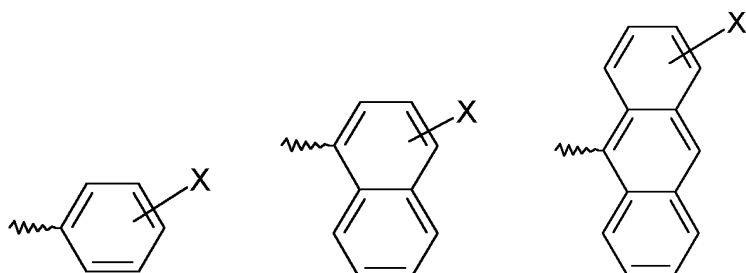
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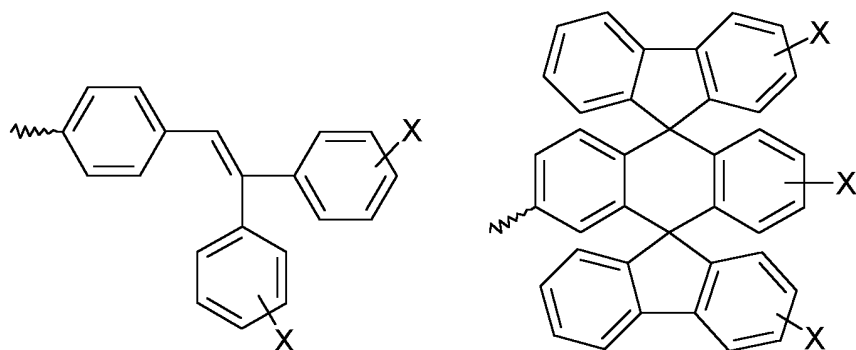
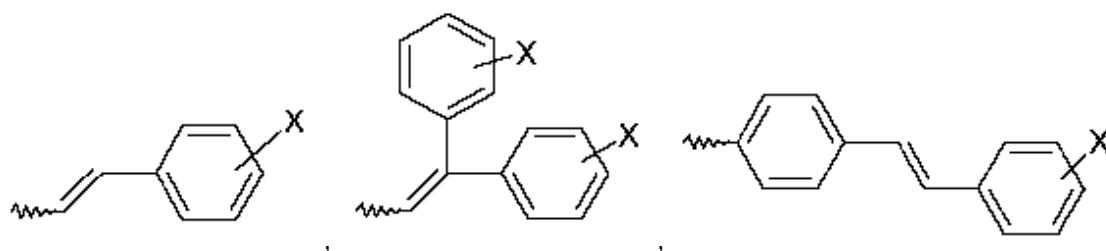
[1]



1 ,
R¹ ~ R²⁴
; (F), (Cl), (Br), (I)
; (thiazole), (oxazole), (arylamine);
; (imidazole),
, R¹ ~ R²⁴
; (nitrile, -CN);
; (thiophene)
(moiety) , R¹ ~ R²⁴ 가
; 1 20
; ; , ;

; , 1 (moiety), ; 1 20 가
 ; ; ; ; , , (moiety) ,
 R¹⁰ , R¹¹ , R¹⁴ R¹⁵ , R¹ ~ R²⁴ 1 .
 1 (1) (2) , , (2) , 가 .
 (1) (2) (1) (2) 가 .
 (2) (3) (indium tin oxide), (indium zinc oxide), (tin oxide),
 (fluorinated tin oxide) (1) (work function)
 가 가 가
 (2) (4) (4) (3) (4)
 (5) (4) (3) 가 (Al), (Mg), (Ag),
 (5) (3) (Ca), (Li) , (LiF/Al) (Mg:Ag) (Li:Al) (1 20
) (Li₂O/Al) 2 (5)
 가 가 가
 2 1 (1), (2), (3) 1 , 2 (2), (3) , (6), (4),
 (7), (5) 2 , , , , (6) (2) 2 (6)
 , 가 2 (4) (5) (7)
 가
 1 2
 1 2
 , 1
 1 , R¹ ~ R²⁴ 가 (aro
 matic carbinol) (J. Am. Chem. Soc., 52 , 2881, 1930).
 , (double spiro)
 , ,
 R¹ ~ R²⁴ 가





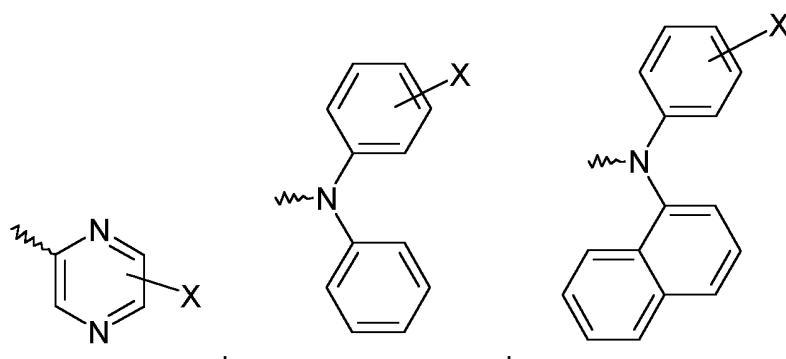
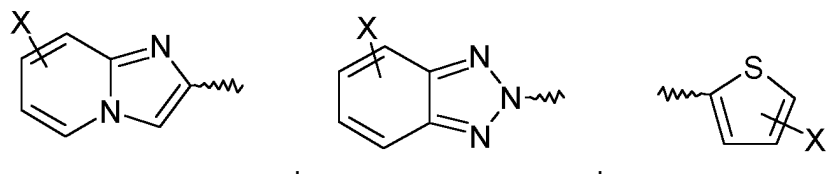
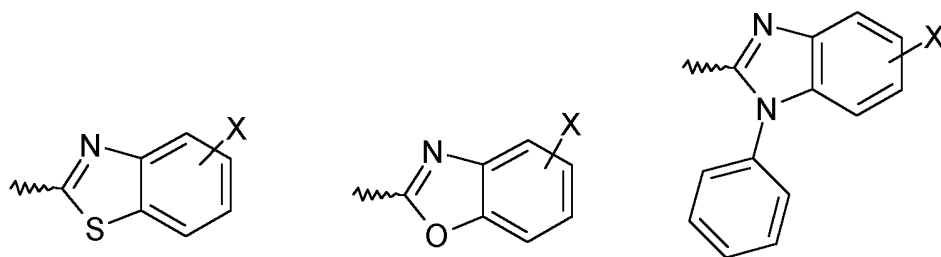
ing) R¹ ~ R²⁴ 가

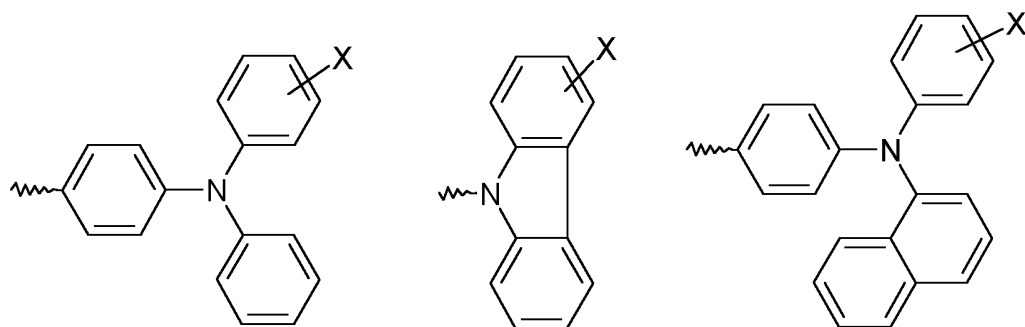
(arylamine);
(nitrile, -CN);
가

1 20
(thiazole),
(acetylene);

X
(oxazole),
1

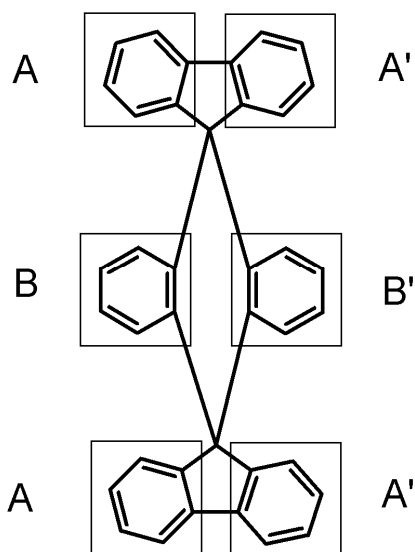
(imidazole)
(fused) (fused r





X , X 가 , 1a

[1a]



rogen atom) , 1 , 1a R¹ ~R²⁴ 가 (Hyd
yl) 가 , A, A', B, B' (phen

(phenyl)
A, A' 가 B, B' 가 , B, B'
(excimer)

A, A' B, B'
B, B' A, A' (C₁ ~C₂₀)
A, A' 가 A, A', B, B'
(aryl amine)

(carrier)

(carrier mobility)
가

1

1a

A, A', B, B'

(mobility)

(carrier)

(doping)

가

(doping)
(band gap)

가

(eximer)

1

B, B'

A, A'

B, B'

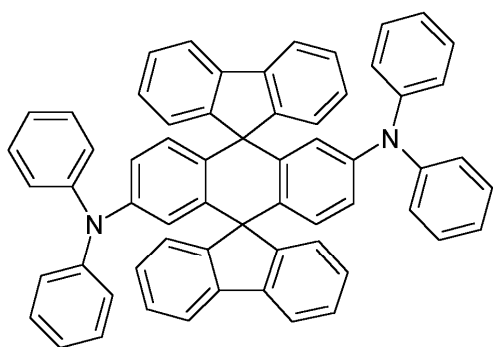
B, B'

가

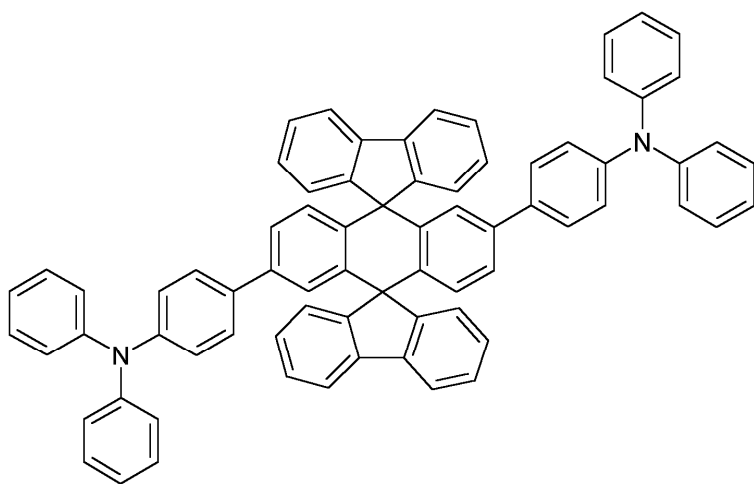
2

25

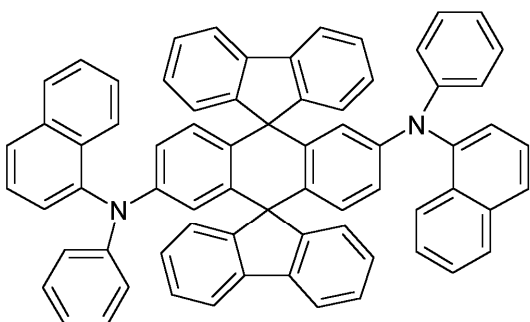
[2]



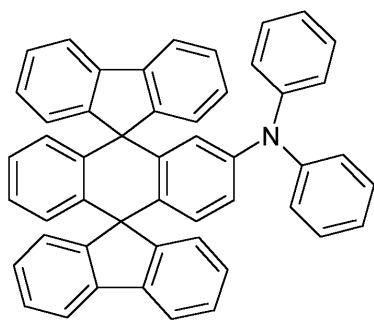
[3]



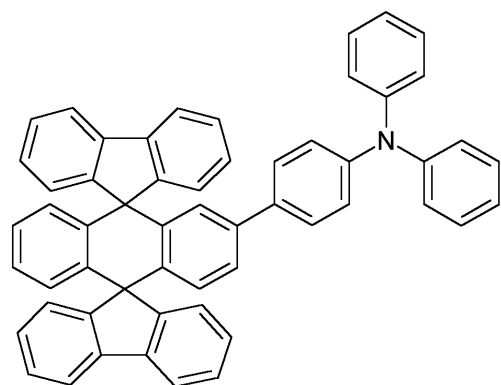
[4]



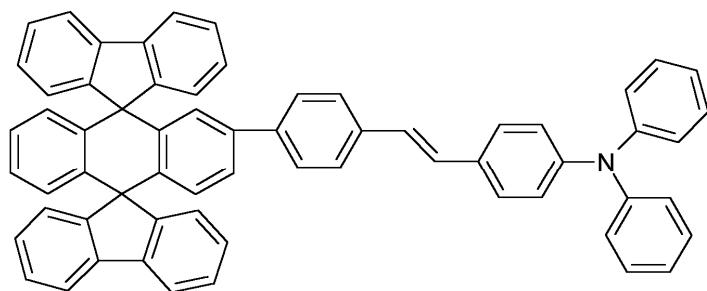
[5]



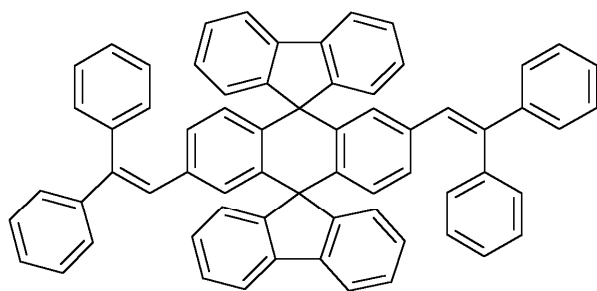
[6]



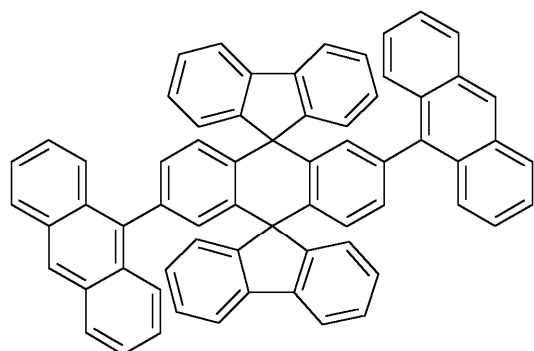
[7]



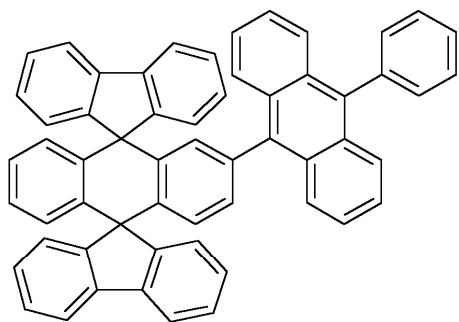
[8]



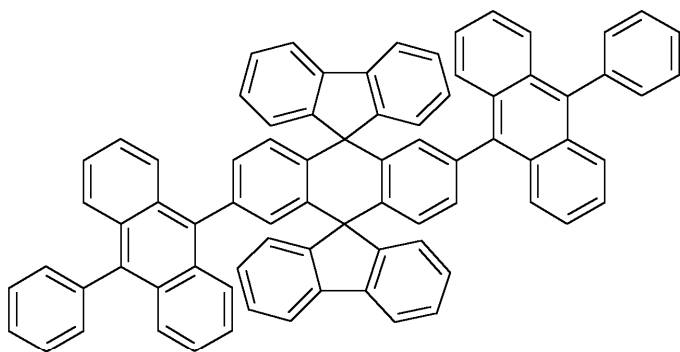
[9]



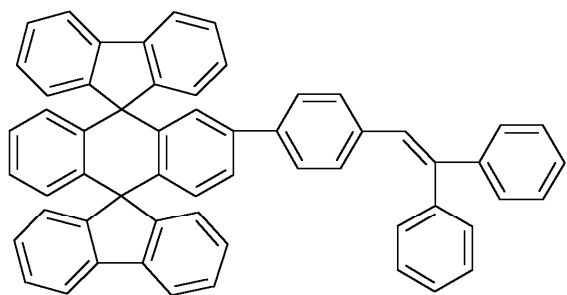
[10]



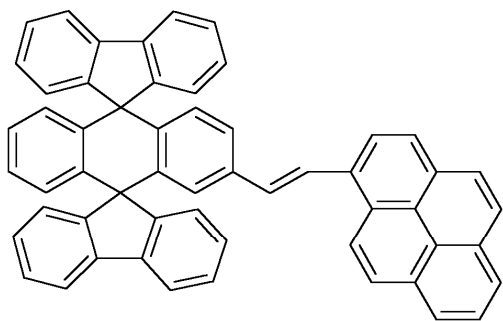
[11]



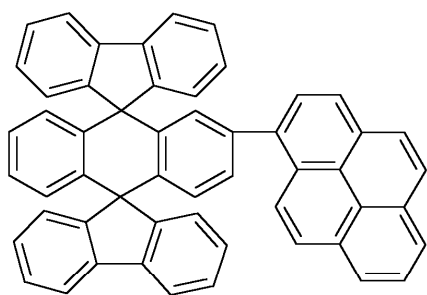
[12]



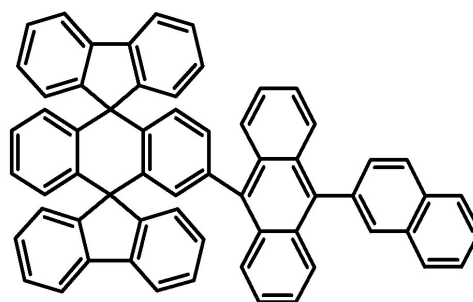
[13]



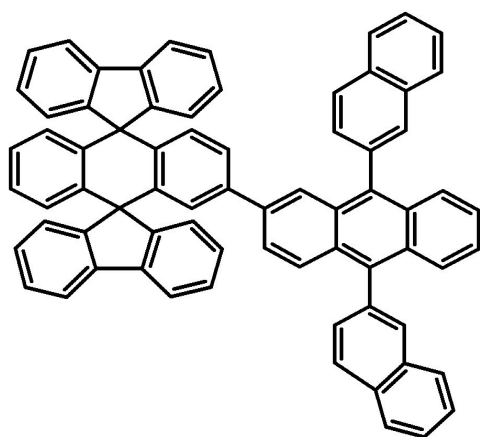
[14]



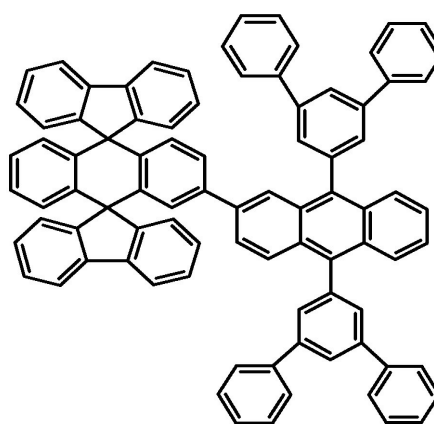
[15]



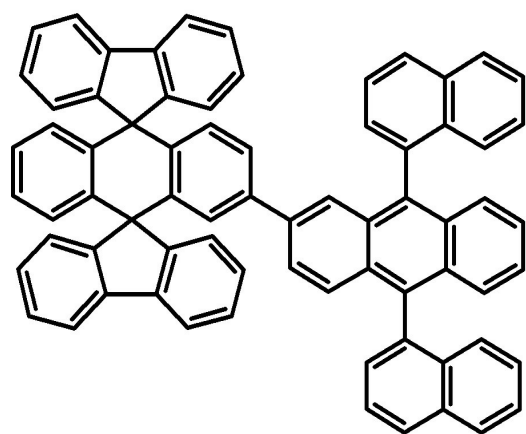
[16]



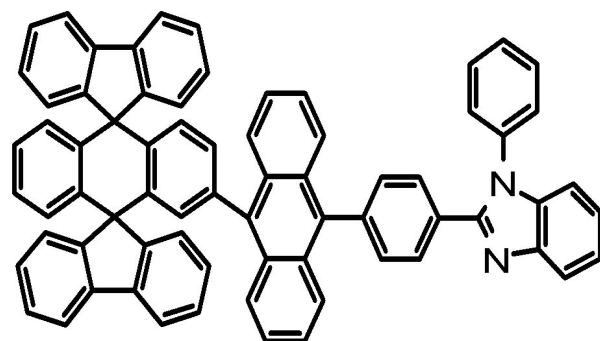
[17]



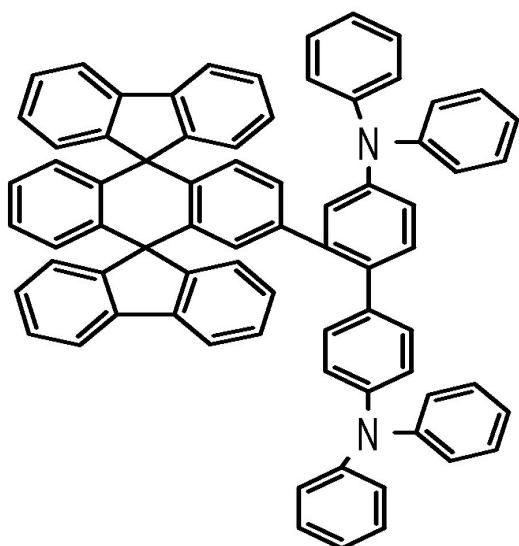
[18]



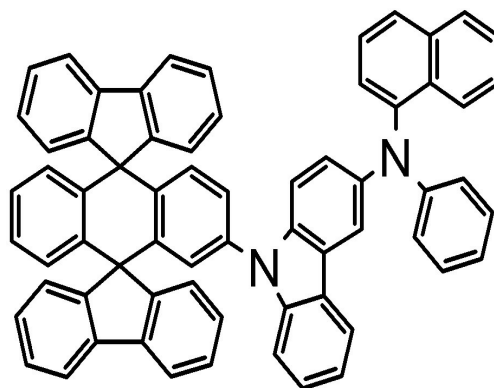
[19]



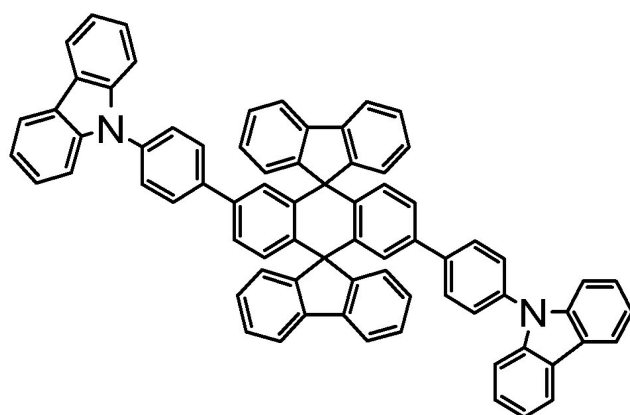
[20]



[21]

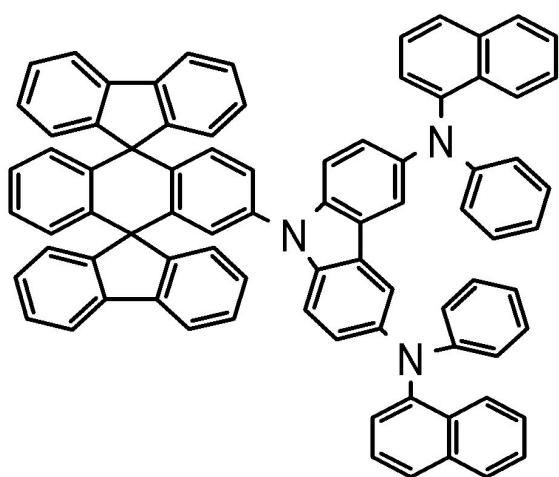


[

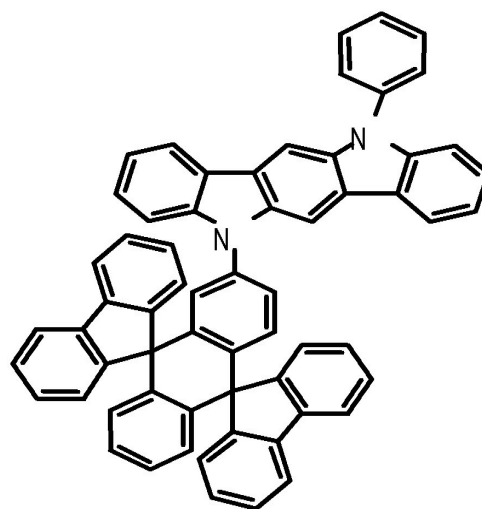


22]

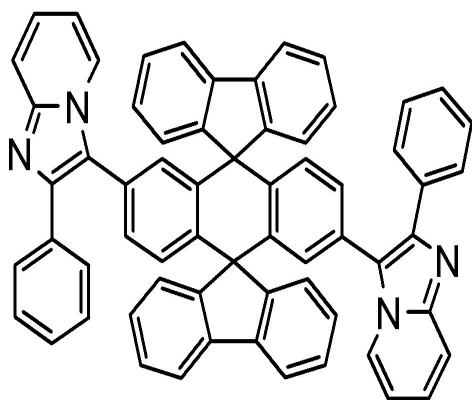
[23]



[24]



[



25]

1

2

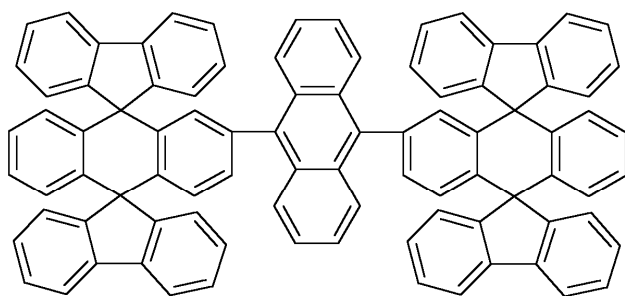
2

26,

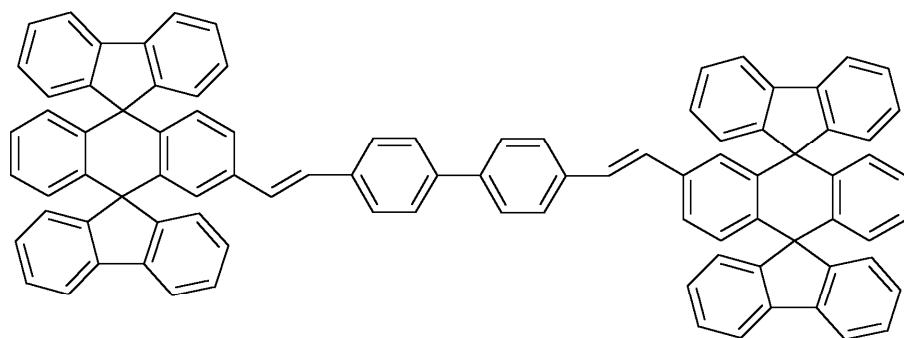
27

.

[26]



[27]



1

1a

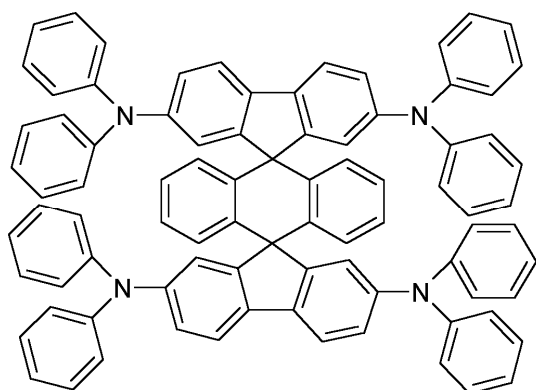
A, A'

(pi-orbital)

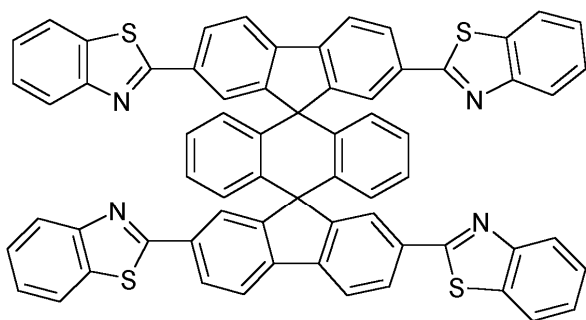
28

33

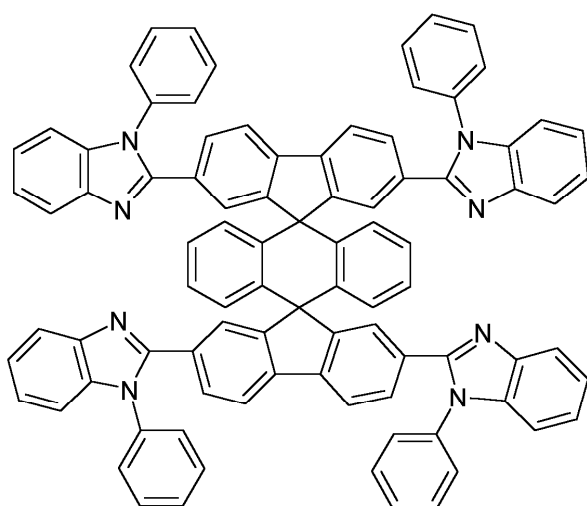
[28]



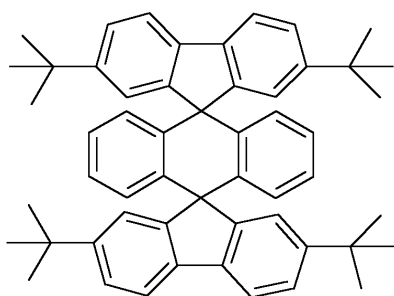
[29]



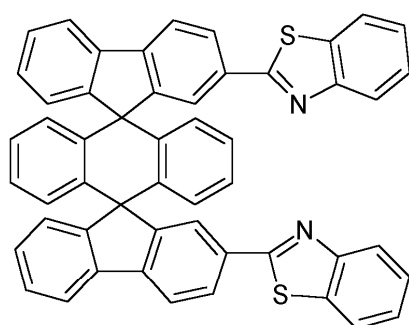
[30]



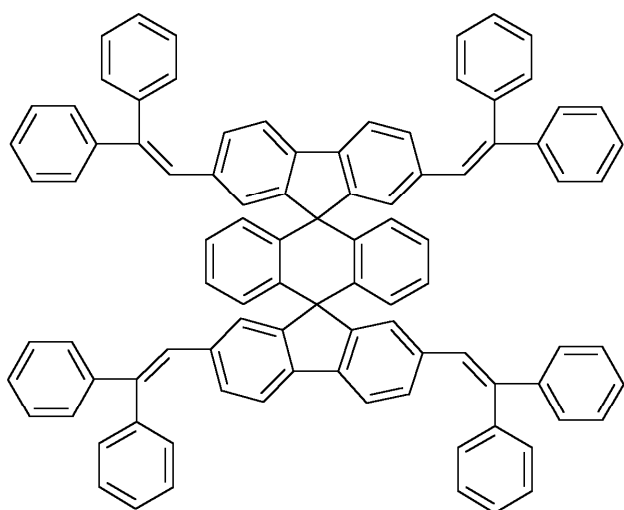
[31]



[32]



[33]



1a

, A, A'

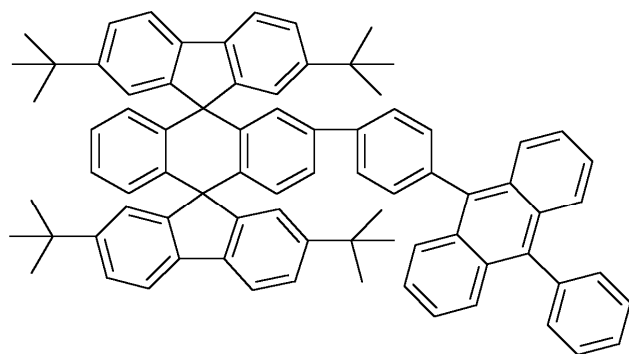
B, B'

A, A' B,

B'

34

[34]



1a

, B, B'

1

가

-coating),

(screen-printing),

(ink-jet printing)

(spin-coating),

(roll

1

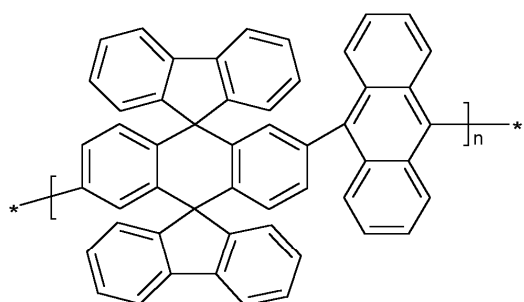
가

35

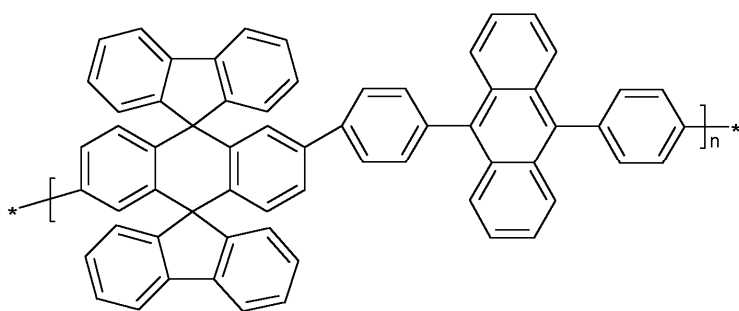
37

n 2

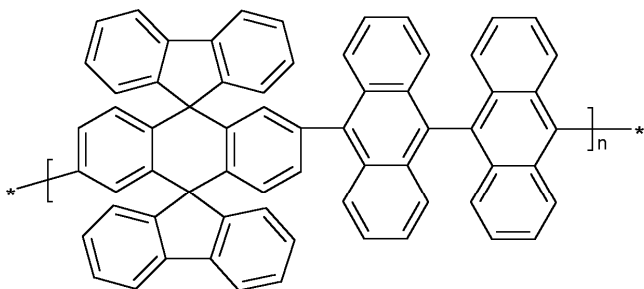
[35]



[36]



[37]



1

가

가

가

(organic solar cell),
OPC(optical photo conductor)

(solar cell),
(organic transistor)

[]

1

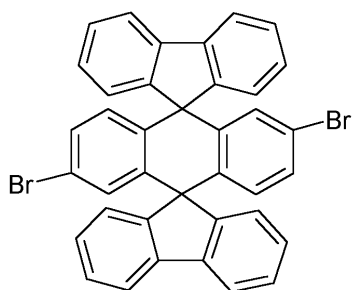
가

1
(38)

1

38

[38]



2- (2-Bromobiphenyl) 5.0 g(21.5 mmol) THF 50 Mℓ -78
(t-BuLi) 32 Mℓ(1.7 M in pentane) 가
1 2,6- (2,6-dibromoanthraquinone) 3 g(8.2 mmol) 가
30 (Diethylether) 30 Mℓ 2 N 50 Mℓ 30
(diethylether)
5.1 g 60 Mℓ (5) (35 %)
3 38
가 4.6 g (: 88 %).

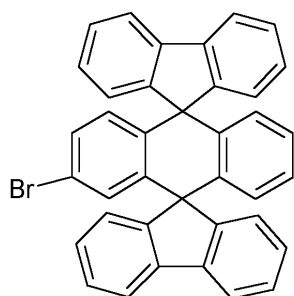
¹ H NMR (300 MHz, DMSO-d₆) δ 8.12 (4H, d), 7.52 (4H, t), 7.32 (4H, t), 7.06 (4H, d), 6.84 (2H, d), 6.28 (2H, s), 6.16 (2H, d)

2

(39 1)

39

[39]



THF 35 Mℓ 2.68 g(11.5 mmol) 2- (2-bromobiphenyl) , -78
 (t-BuLi) 16.9 Mℓ(1.7 M in pentane) 가 40
 1.44 g(5 mmol) 2- (2-bromoanthraquinone) 가
 3
 (Diethylether) 15 Mℓ 2 N 25 Mℓ 30
 (diethylether)
 2.5 g 50 Mℓ (10) 3
 2.2 g (: 79 %). 39 가

¹ H NMR (300 MHz, CDCl₃) δ 7.9 (4H, m), 7.5-7.4 (4H, m), 7.3 (4H, t), 7.2 (4H, m), 6.9 (1H, d), 6.8 (2H, m), 6.5 (1H, s), 6.3 (2H, m), 6.2 (1H, d)

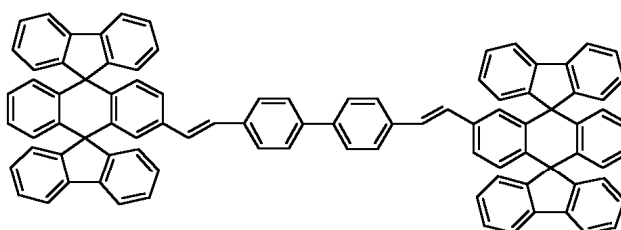
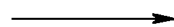
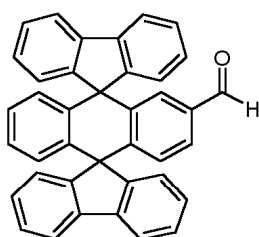
1

1

40

27

[40] [27]



40 1.34 g(2.6 mmol) 4,4'- () -1,1'- (4,4'-di-(
 diethylphosphorylmethyl)-1,1'-biphenyl) 0.5 g(1.3 mmol) 80 Mℓ DMF
 lithium ethoxide) 2.8 Mℓ(1 M in ethanol) 가 12

27

(train sublimation)

27

- : C (94.9 %), H (5.02 %) / C (94.4 %), H (5.12 %)

- : 1162 / : 1163 [M+H]⁺

2

1

1

38

8

2,2- (2,2-Diphenylvinylboronic acid) 1.34 g(6 mmol), 1 38
 가 0.36 g(0.75 mmol), Pd (PPh₃)₄ 0.086 g(0.075 mmol), 2 N K₂CO₃ 10 Mℓ,
 20 Mℓ 24

8 가 2 Mℓ 가 4.2 g
 (: 75 %).

8

- : C (94.70 %), H (5.30 %) / C (94.3 %), H (5.4 %)

- :
: 836 / : 837 [M+H]⁺
- : 387.7
3

1 2 39 26

39 가 5.6 g(10.0 mmol) 60 Mℓ THF , 78
- (t-BuLi; t-butyl lithium 17.6 Mℓ(1.7 M in pentane) 가
4.5 Mℓ (trimethylborate) 가 3
1 N 150 Mℓ 가 1.5

0.16 g K₃PO₄, 0.2 g DMF 0.06 g 9,10- (9,10-dibromoanthracene),
12 mg Pd(PPh₃)₄ 가 60 18
20 Mℓ 가 30
50 Mℓ NMP
가 26 0.16 g (: 41 %), (train sublimation)

26
- :
C (95.2 %), H (4.79 %) / C (94.9 %), H (4.70 %)
- :
: 1134 / : 1135 [M+H]⁺
4

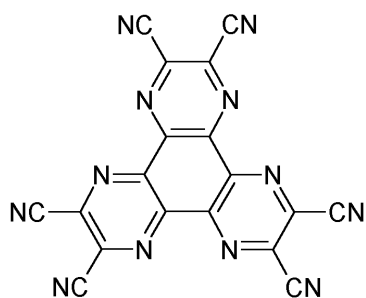
1 2 39 10

39 가 5.6 g 60 Mℓ THF 78 -
(t-BuLi; t-butyl lithium 17.6 Mℓ(1.7 M in pentane) 가
4.5 Mℓ (trimethylborate) 가
3 1 N 150 Mℓ 가 1.5

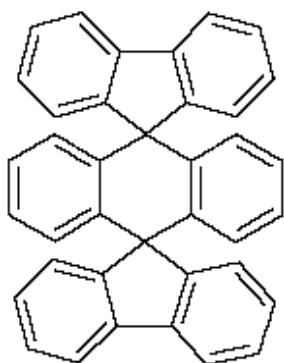
0.52 g 10 Mℓ DMF 0.3 g 9- -10-
(9-bromo-10-phenylanthracene), 0.42 g K₃PO₄, 35 mg Pd(PPh₃)₄ 가
60 12 20 Mℓ 가 30
150 Mℓ
0.26 g 10 (: 35 %), (train sub
limation)
10

- :
C (95.0 %), H (4.95 %) / C (94.9 %), H (4.83 %)
- :
: 732 / : 733 [M+H]⁺
1, 5 7 1

1
ITO(indium tin oxide)가 1500
5
ITO
41 (hexanitride hexaazatriphenylene, HNHATP) 50
0
[41]



(1 R¹~R²⁴ 가 NPB(600) , 42 가
Alq3(400)) 150 .
[42]



() 5 (LiF) 2500
sec 3~7 /sec 1 /sec , 0.2 /
dinate 10.1 V 가 , 10 mA/cm² 1931 CIE color coor
x=0.218, y=0.301 57 nit
5
ITO(indium tin oxide)가 1500

ITO CuPc(copper phthalocyanine) 150
7 가 400 NPB(600) 2
Alq3(200)
() 5 (LiF) 2500
ec 3~7 /sec 1 /sec , 0.2 /s
nate 9.1 V 가 , 10 mA/cm² 1931 CIE color coordi
x=0.159, y=0.089 126 nit
6
ITO(indium tin oxide)가 1500

ITO 41 HNHATP 500
26 가 300 NPB(400) , 3
Alq3 (300
() 5 (LiF) 2500
ec, 3~7 /sec 1 /sec , 0.2 /s
nate 6.6 V 가 , 10 mA/cm² 1931 CIE color coordi
x=0.184, y=0.242 254 nit
7

ITO(indium tin oxide)가 1500

ITO 41 HNHATP 500
NPB(400) , 4
10 가 200 Alq3(300
) 5
(LiF) 2500
() 1 /sec , 0.2 /s
ec, 3~7 /sec
6.7 V 가 , 10 mA/cm² 1931 CIE color coordi
nate x=0.172, y=0.156 168 nit
8
1 가

ITO(indium tin oxide)가 1500

ITO 41 HNHATP 500
4 가 400 ,
, 5 , Alq3 600
(LiF) 2500 ()
1 /sec , 0.2 /sec, 3~7 /sec
7.8 V 가 , 10 mA/cm² 1931 CIE color coordi
nate x=0.326, y=0.550 464 nit

(double spiro) 가 1

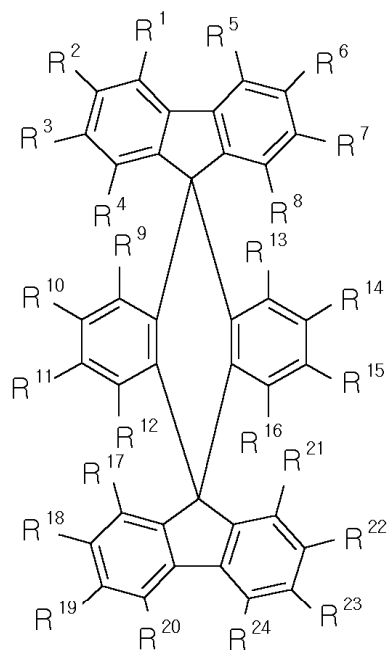
(dopant)

(57)

1.

1

[1]

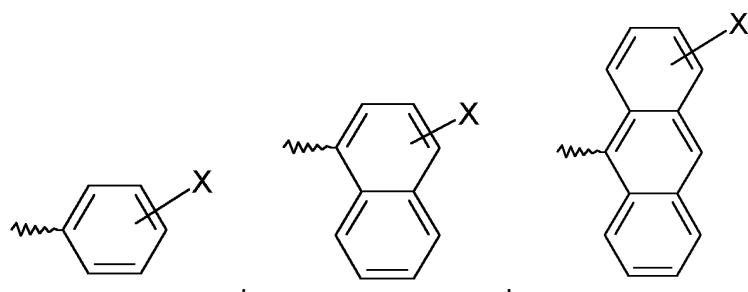


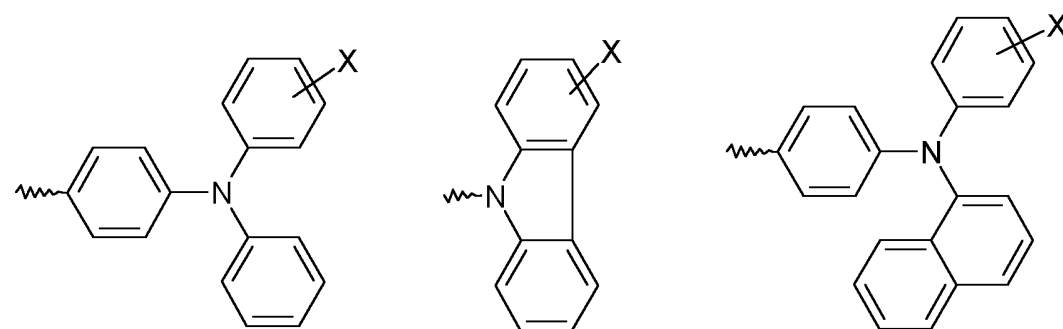
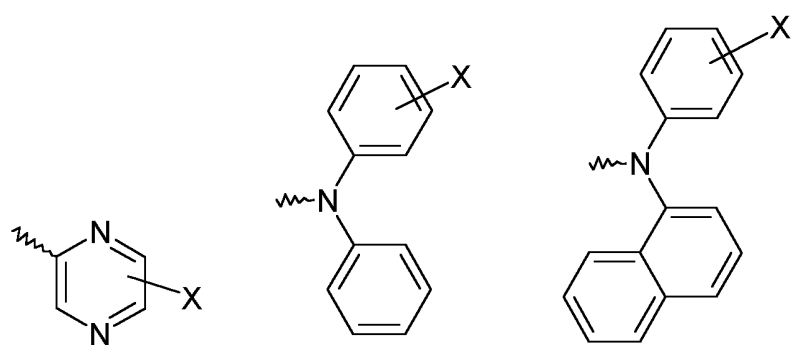
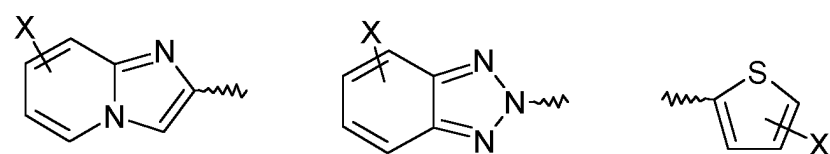
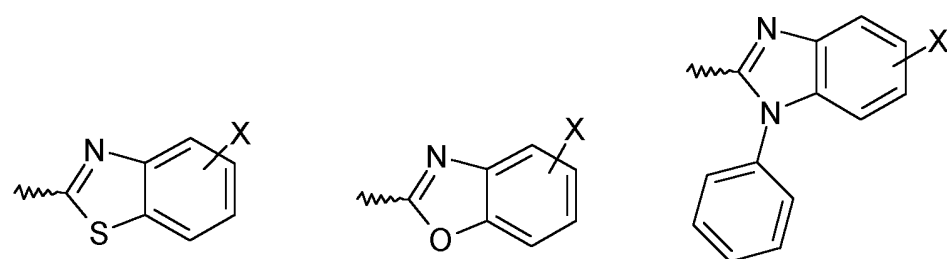
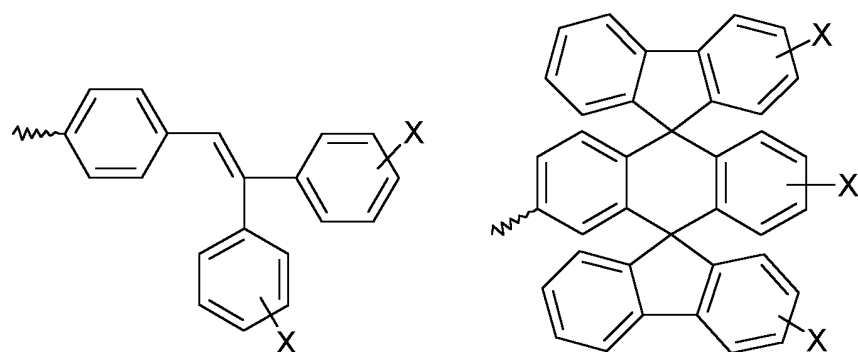
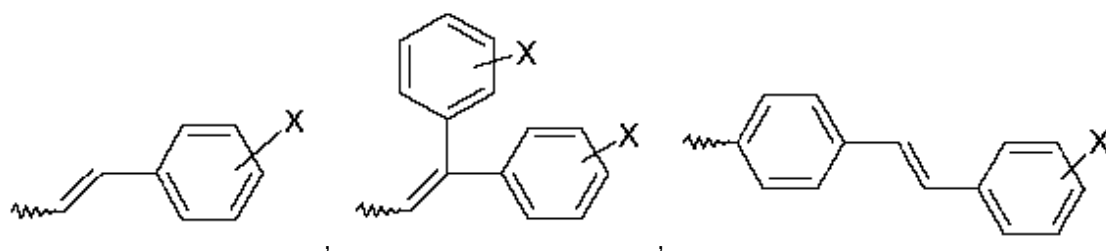
R¹ ~ R²⁴,
; (F), (Cl), (Br), (I);
; ; (arylamine); ; (nitrile, -CN);
(thiazole), (oxazole), (imidazole), (thiophene)
; ,
R¹ ~ R²⁴ 가 , R¹ ~ R²⁴
;
; , , ;
; ; ; ; ; , ,
; ; ; , (moiety),
가 , ; , ;
20 ; ; ; , ,
; , 1 (moiety)
R¹⁰ R¹¹, R¹⁴ R¹⁵
; , R¹ ~ R²⁴.

2.

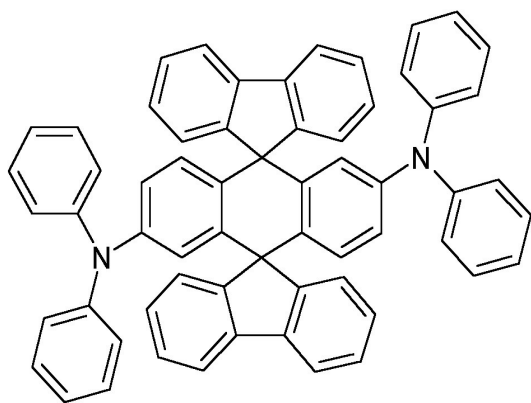
$$\begin{matrix} 1 \\ \vdots \\ 1 \end{matrix}, \begin{matrix} R^1 \sim R^{24} \\ \vdots \end{matrix}$$

가



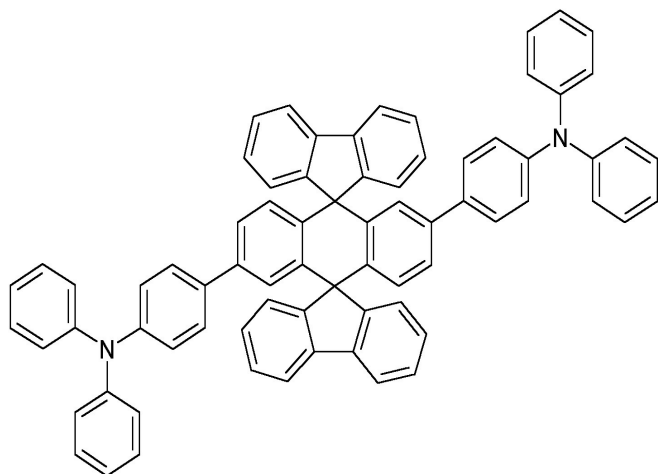


(moiety) , 가 , ; , 1
; ; , 1 20 ; ; ; ; ;
1 (moiety)
(fused) (fused ring)
3.
1 ,
1
4.
3 ,
1 1
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1 ,
1
6.
1 ,
1
7.
1 ,
1
8.
1 ,
1
9.
1 1
10.
9 ,
가 (organic solar cell)
11.
9 ,
가 OPC(optical photo conductor)
12.
9 ,
가 (organic transistor)
13.
9 ,
가 (solar cell)
14.
1 ,
2 :
[2]



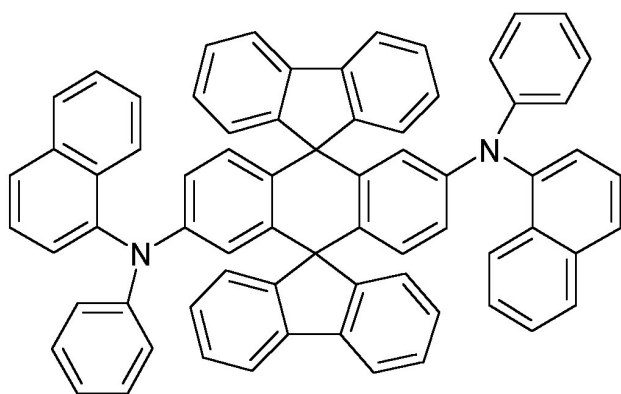
1 15.

[3] 3 :



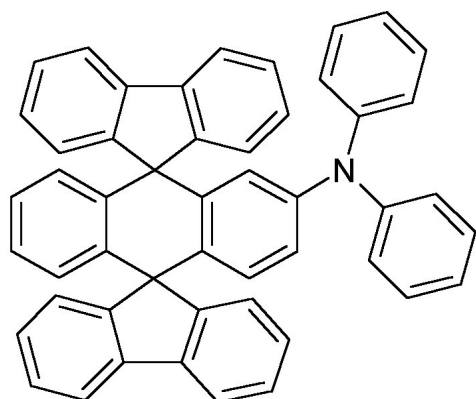
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1 , 4 :



17.

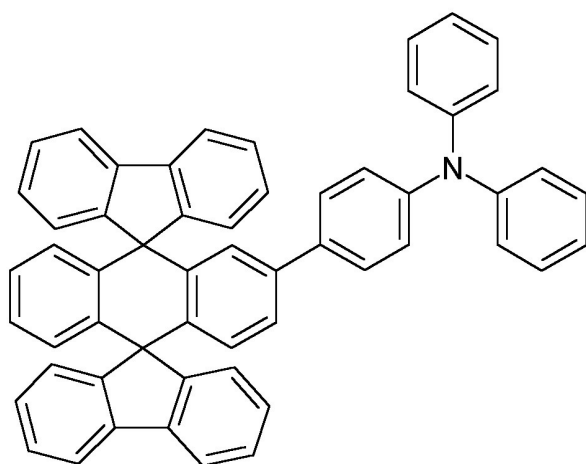
1 , 5 :



18.

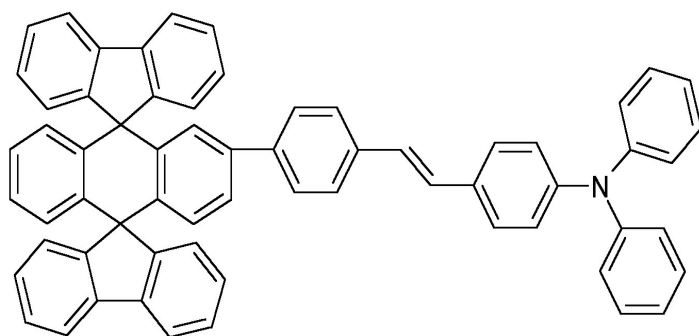
1 , 6 :

[6]

**19.**

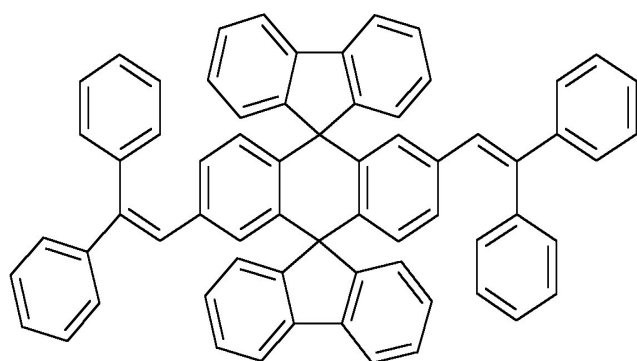
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[7]

**20.**

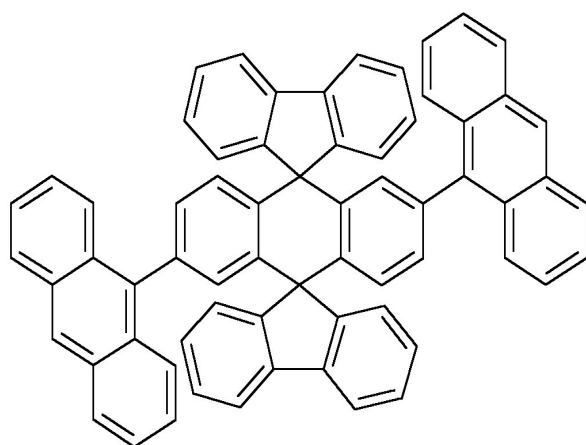
1 , 8 :

[8]

**21.**

1 , 9 :

[9]

**22.**

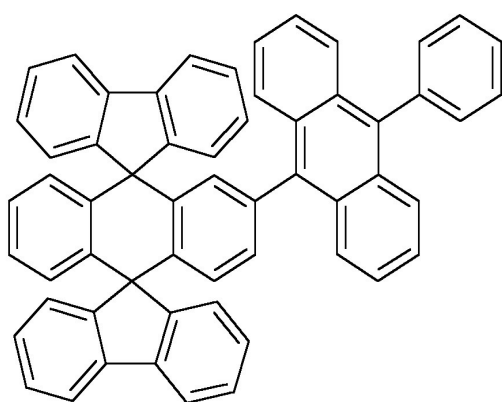
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[10]

**23.**

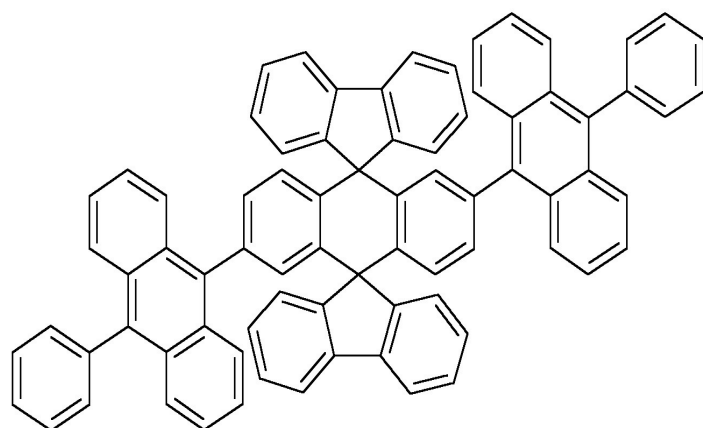
1

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11

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[11]

**24.**

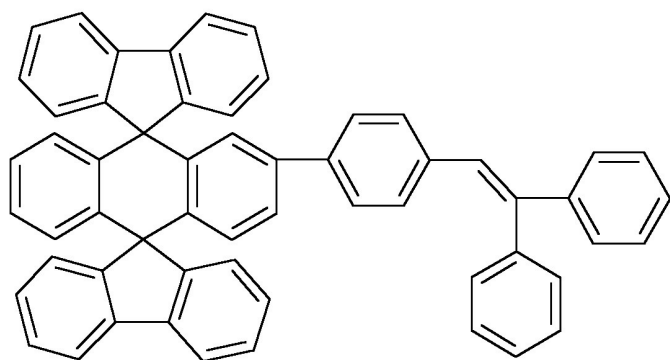
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12

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[12]



25.

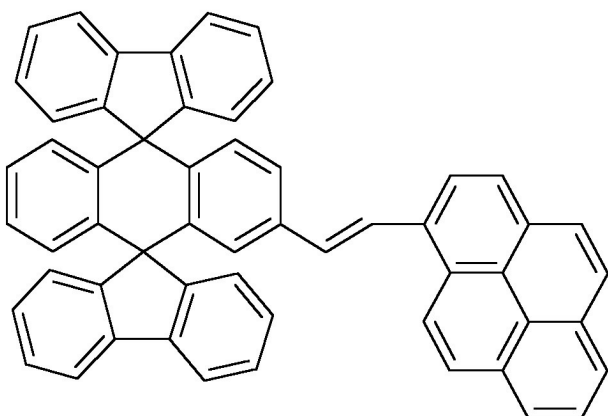
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13

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[13]



26.

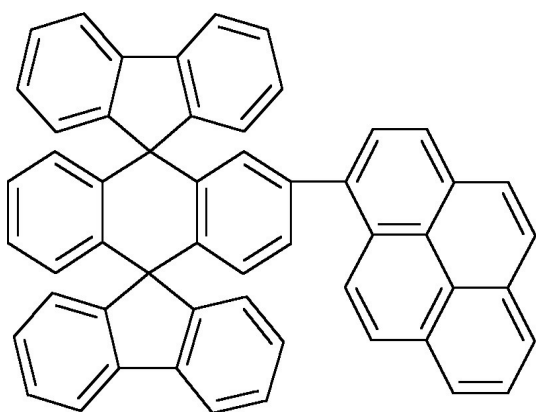
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14

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[14]



27.

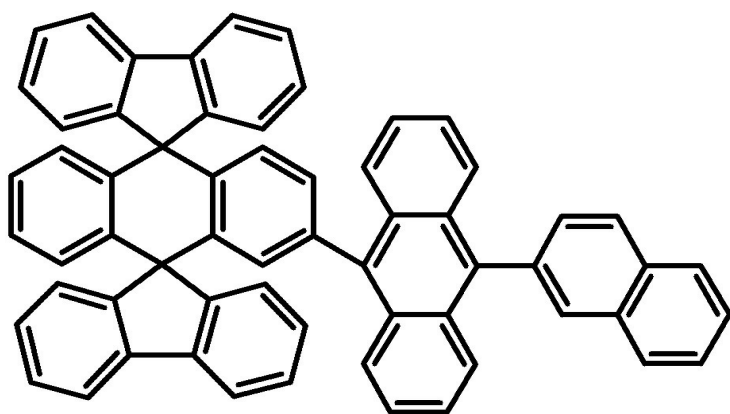
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15

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[15]



28.

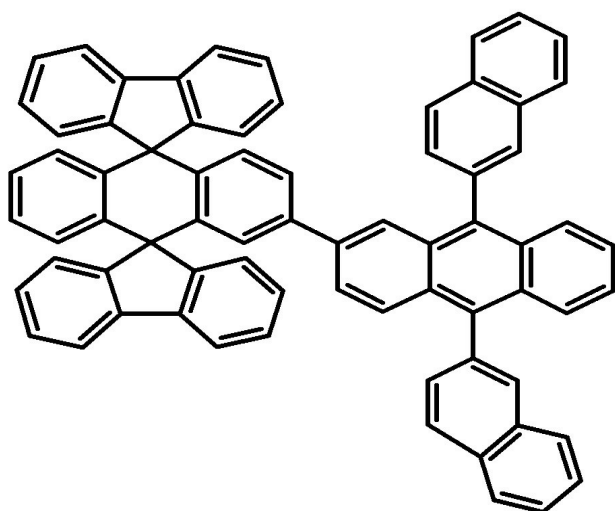
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16

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[16]



29.

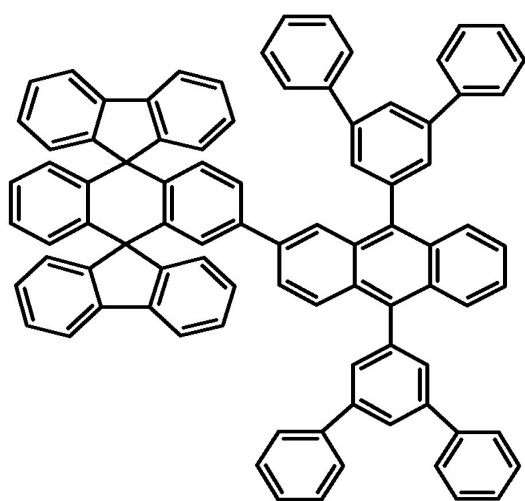
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17

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[17]

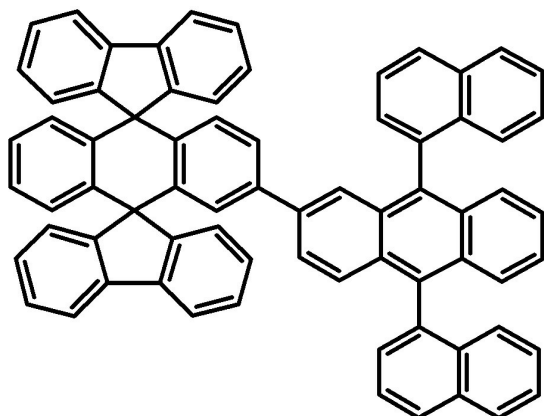


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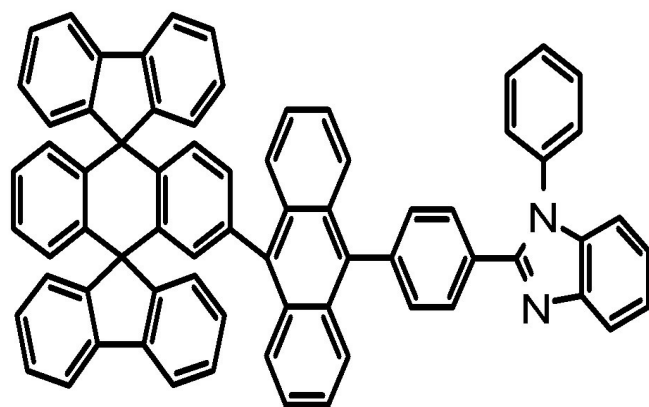
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31.

1 , 19 :

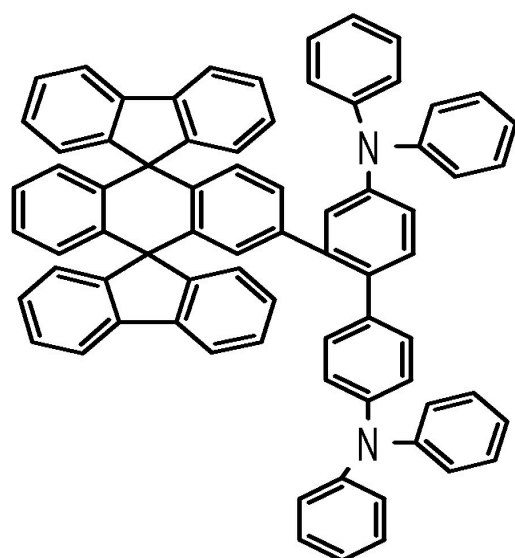
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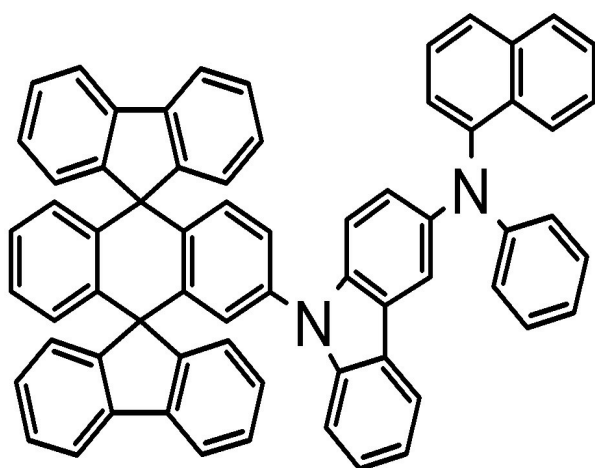
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[20]



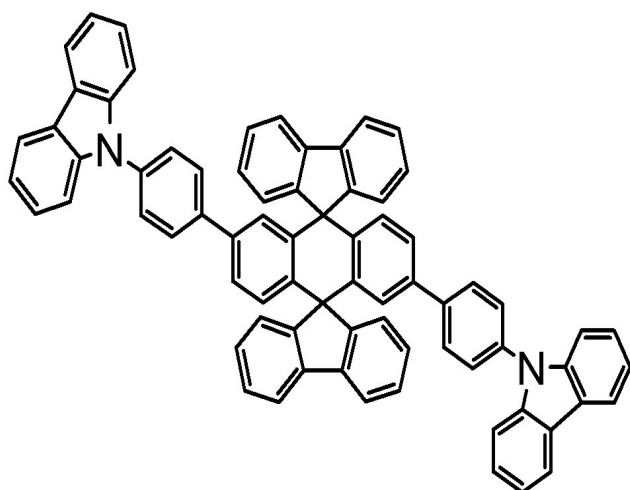
33.

1 , 21 :
[21]



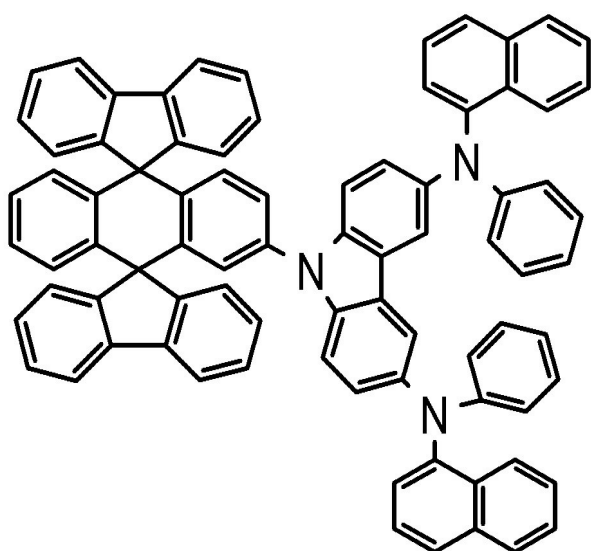
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1 , 22 :
[22]



35.

1 , 23 :
[23]



36.

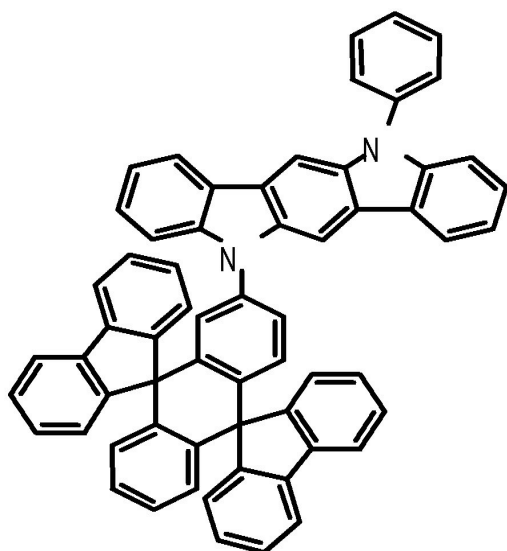
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24

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[24]



37.

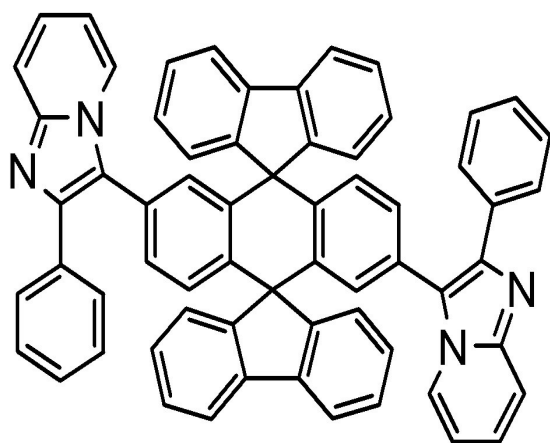
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25

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[25]



38.

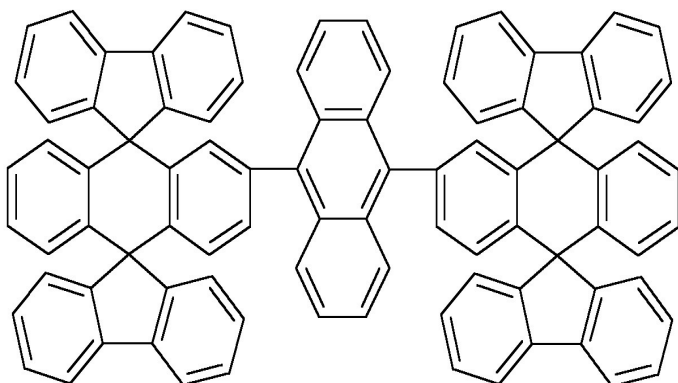
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[26]



39.

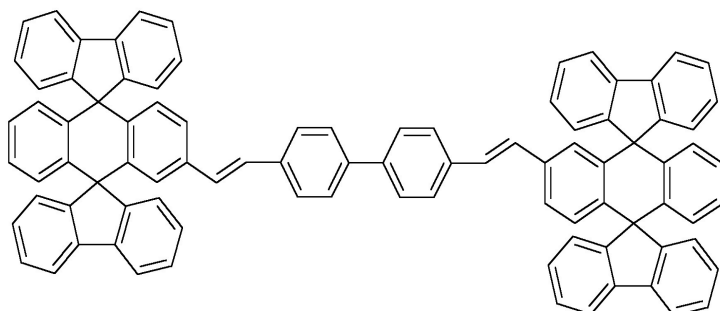
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[27]



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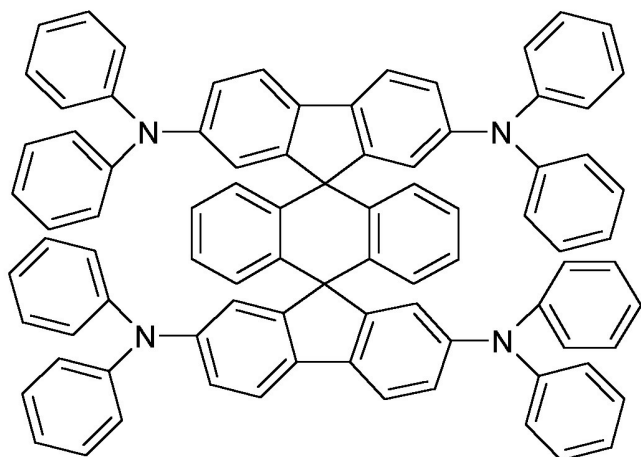
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[28]



41.

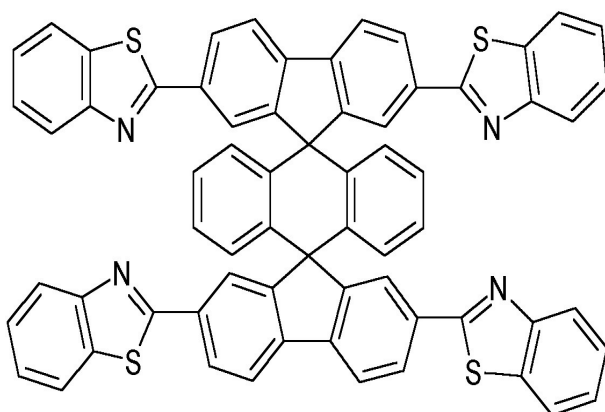
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[29]



42.

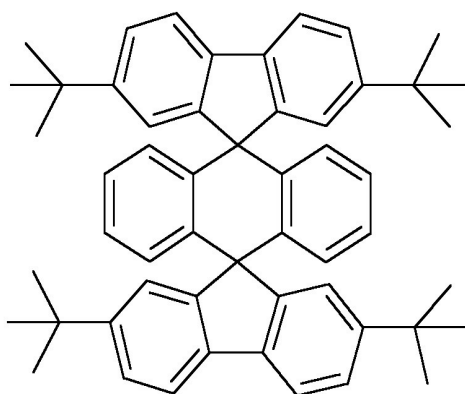
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[30]



43.

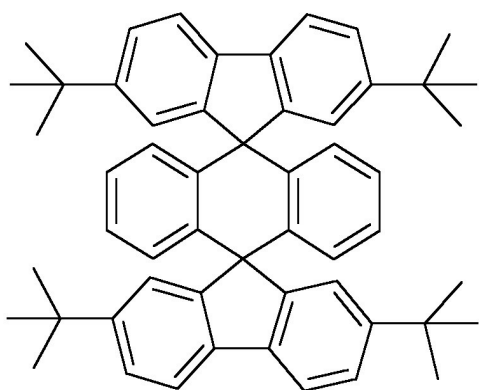
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[31]



44.

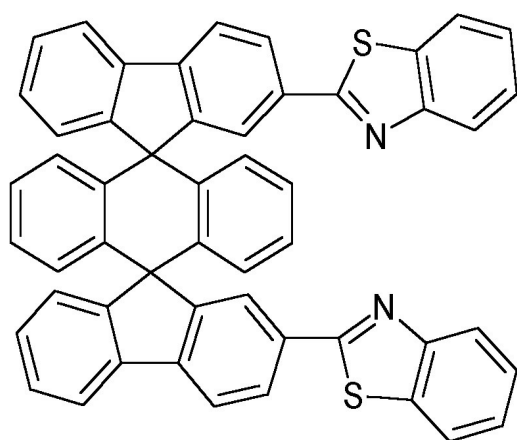
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[32]



45.

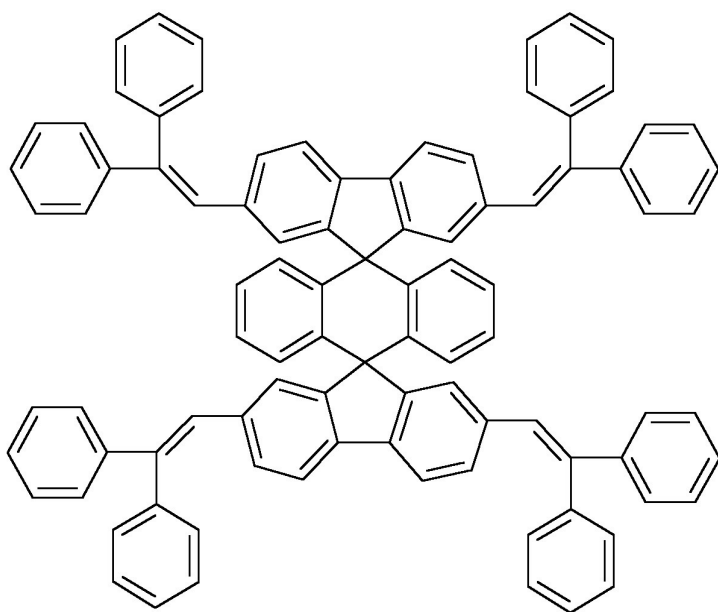
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[33]



46.

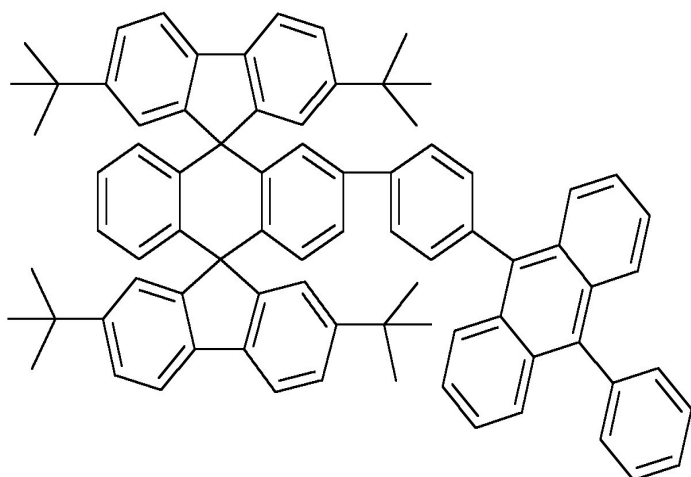
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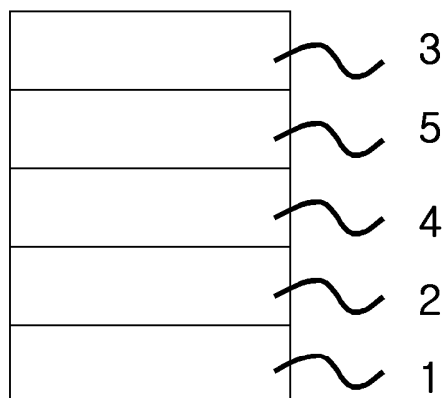
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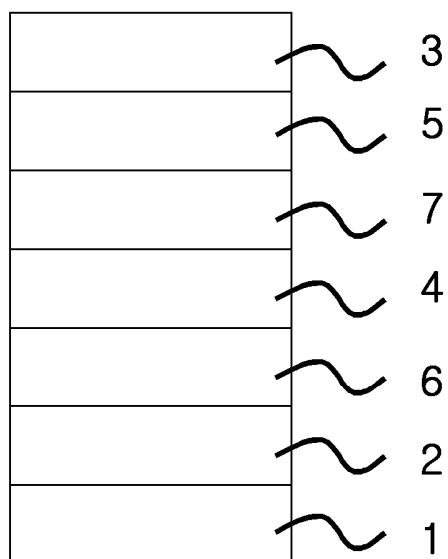
[34]



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2



专利名称(译)	一种含有双螺旋型有机材料的电子器件		
公开(公告)号	KR100422914B1	公开(公告)日	2004-03-12
申请号	KR1020010023039	申请日	2001-04-27
[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	KIM KONGKYEUM 김공겸 SON SEHWAN 손세환 YOON SEOKHEE 윤석희 BAE JAESOOON 배재순 LEE YOUNGU 이윤구 IM SUNGGAP 임성갑 KIM JIEUN 김지은 LEE JAECHOL 이재철		
发明人	김공겸 손세환 윤석희 배재순 이윤구 임성갑 김지은 이재철		
IPC分类号	C09K11/06		
CPC分类号	C09K11/06 C09K2211/1011 C09K2211/1014 C09K2211/1022 C09K2211/1029 H01L51/0071 H01L51/5056 H01L51/5072 H05B33/14 Y10S428/917		
代理人(译)	KIM , JAE MAN		
其他公开文献	KR1020020083615A		
外部链接	Espacenet		

摘要(译)

空穴传输材料本发明的具有特别高的熔点涉及具有高量子效率的电气部件，有可能控制载流子（载体）的移动速度（移动性），构成有机电致发光元件，例如有机发光器件，发光材料，荧光染料和电子传输材料。为此，本发明提供一种电子器件，其包含由下列通式（1）表示的双螺环化合物 包含在本发明的电动设备的有机化合物是一个双螺（双螺）结构是高的，并且表现出的熔点，通过引入适当的取代基的空穴输送材料，发光材料，电子传输材料，或它们的衍生物，是根据式（1）导出可以赋予在发光层中使用的荧光掺杂剂特性，并且当使用这种材料制造器件时，可以提高器件的驱动寿命和热稳定性。1 指数方面 双螺，有机发光器件，高熔点，升华，空穴传输，电子转移，量子效率，荧光掺杂剂，有机太阳能电池，鸦片鼓，有机晶体管

