

(19)  
(12)(KR)  
(A)(51) 。 Int. Cl. <sup>7</sup>  
C09K 11/06(11)  
(43)2002 - 0083615  
2002 11 04(21) 10 - 2001 - 0023039  
(22) 2001 04 27

(71) 20

(72) 107 703

LG 8 405

302 904

108 110

247 - 184

128 405

LG 7 403

381 - 42LG 8 107

(74)

:

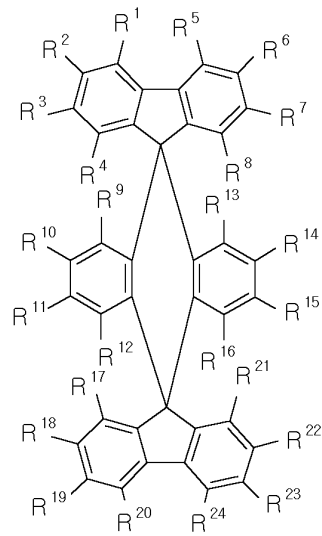
(54)

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

4

가

(glass transition temperature)가

가

(group) 가

(trap), (molecular orbital) (pi - orbital) (overlap) (carrier)

?? (quenching site), (eximer)

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

CuPc )

가 가

가 (phen

yl) (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 - hydroxyquinoli  
ne aluminum salt; Alq3 ) 가

Alq3

5,516,577 , 5,366,811

가 (spiro) 가  
가 ( 5,840,217 ). 5  
90 (biphenyl)

(Kodak)  
(imidazole) , (fused)  
( 5,150,006 , 5,645,948 ).

(doping)  
가 (exciton)  
가 (energy transfer) ( 4,769,292 ).  
(band gap) (host) (band - gap)  
(band - gap)

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

가  
가 Alq3가

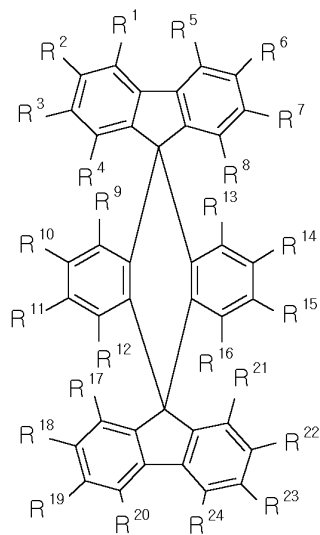
bility) , 가 , (carrier) (mo

가

가

1

[ 1]



1 ,  
 $R^1 \sim R^{24}$  ,  
 ; (F), (Cl), (Br), (I) ;  
 X  
 1 20 ; ; (arylamine); ; (nitrile, -CN)  
 ; (acetylene);  
 (thiazole), (oxazole), (imidazole), (thiophene)  
 ;  
 1 (moiety) ,  
 $R^{10}$   $R^{11}$  ,  $R^{14}$   $R^{15}$   
 ,  
 X  
 ; , , , ;  
 X  
 1 20 ; ; ; 1 ; (-CN); (moiety) ; ,  
 , , ;  
 .  
 1  
 .  
 1 .  
 1 (1) (2) , , , (2) ,  
 (1) (1) (1) (2) 가 .  
 (2) (3) ,  
 (indium tin oxide), (indium zinc oxide), (tin oxide),  
 (fluorinated tin oxide) . (1)  
 가 (work functi  
 on)가 . 가 가  
 (4) .  
 (2) (4) (3)  
 (5) . (4) (4)  
 (5) .

(3) 가 , (Al), (Mg), (Ag),  
 (Ca), (Li) , (Mg:Ag) (Li:Al) (1  
 20 ) (LiF/Al) (Li<sub>2</sub>O/Al) 2  
 가 가 (5)

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

가 2 (2) (6)  
 2 (4) (5) (7)  
 가

1 2

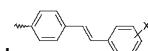
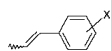
1 2

1

1

1 , R<sup>1</sup> ~ R<sup>24</sup> 가 (aromati  
 c carbinol) (J. Am. Chem. Soc., 52, 2881, 1930).  
 (double spiro)

R<sup>1</sup> ~ R<sup>24</sup> 가



X

가

(arylamine);

1

20

(thiazole),

(oxazole),

(imidazole)

; (nitrile, -CN); (acetylene); 1  
 가 , (fused) (fuse  
 d ring) .

$R^1 \sim R^{24}$  가 .



,



,



,

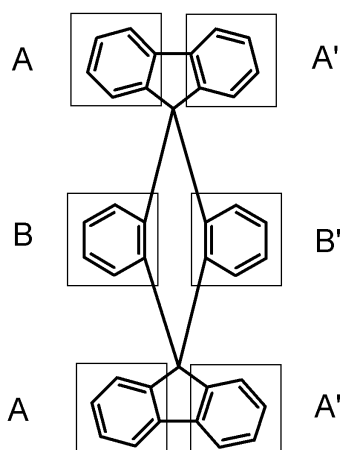


.

X X 가 ,  
 X .

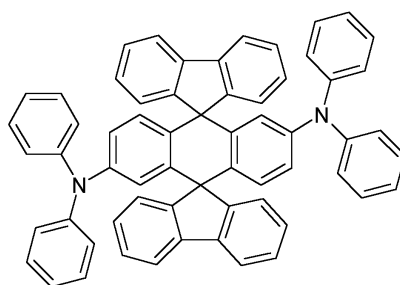
1a

[ 1a]

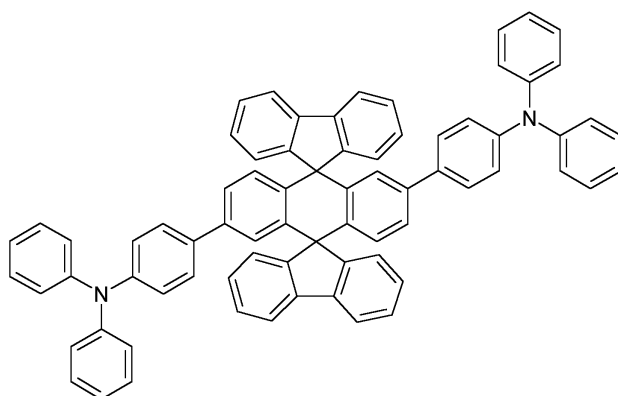


en atom)  
 가  
 (phenyl)  
 1  
 1a  
 $R^1 \sim R^{24}$  가  
 A, A', B, B'  
 (Hydrog  
 (phenyl)  
 A, A', B, B'  
 A, A'  
 A, A' 가 B, B' 가  
 (excimer)  
 A, A'  
 B, B'  
 A, A' (C<sub>1</sub> ~ C<sub>20</sub>)  
 A, A' 가  
 1  
 A, A', B, B'  
 (aryl amine)  
 (carrier)  
 (carrier mobility)  
 가  
 1  
 1a  
 A, A', B, B'  
 (carrier) (mobility)  
 가  
 (doping) (doping)  
 (band gap)  
 가  
 (eximer)  
 1  
 B, B'  
 A, A'  
 B, B'  
 B, B'  
 가  
 2 14

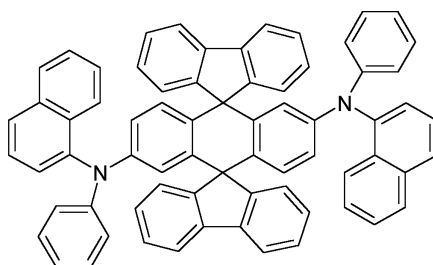
[ 2]



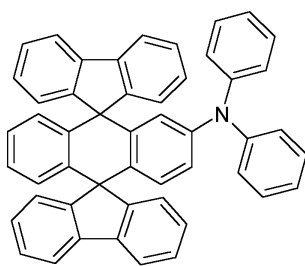
[ 3]



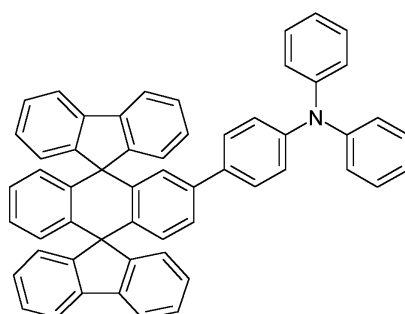
[ 4]



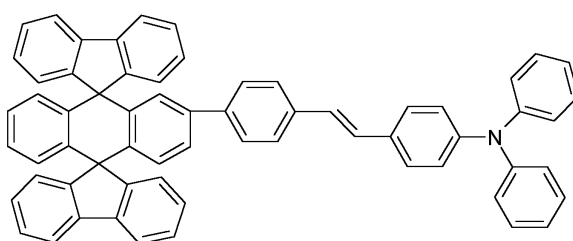
[ 5]



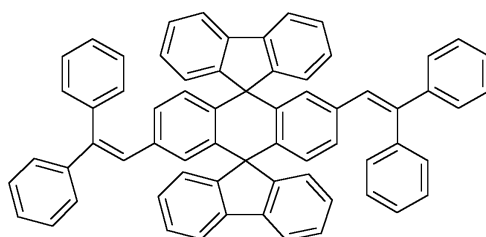
[ 6]



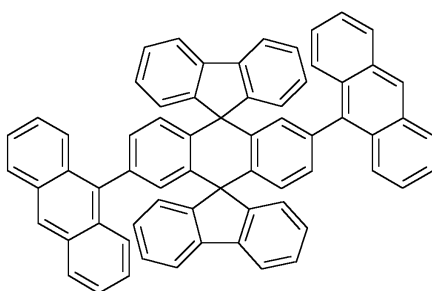
[ 7]



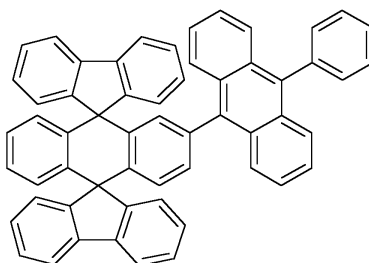
[ 8]



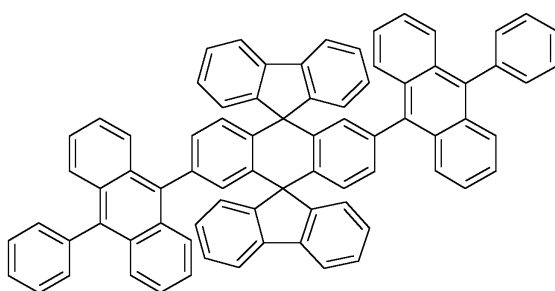
[ 9 ]



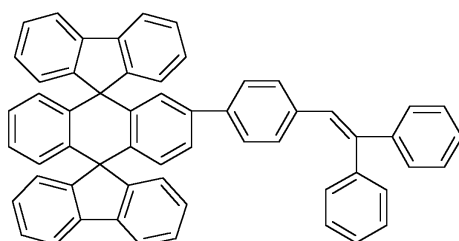
[ 10]



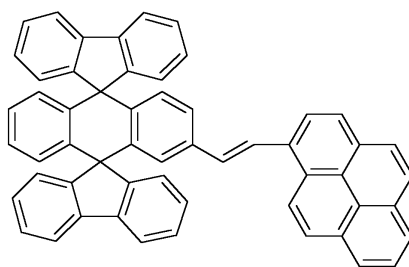
[ 11]



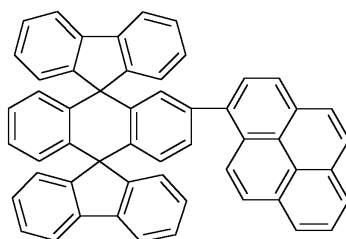
[ 12]



[ 13]

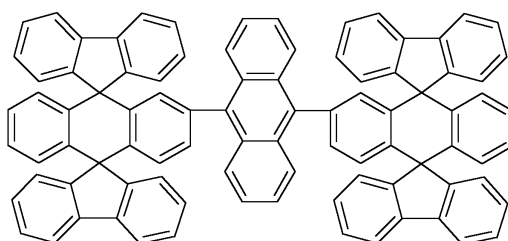


[ 14]

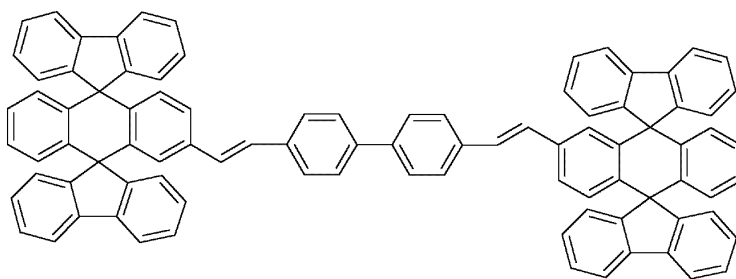


1                      2                      2                      ,  
15,                      16                      .

[ 15]



[ 16]



1

1a

,

A, A'

(pi - orbital)

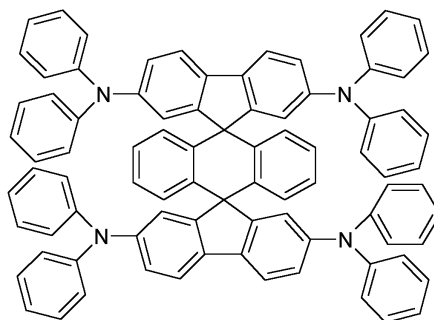
,

17

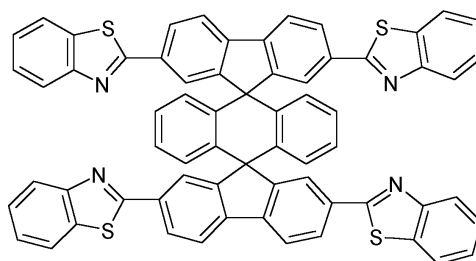
22

.

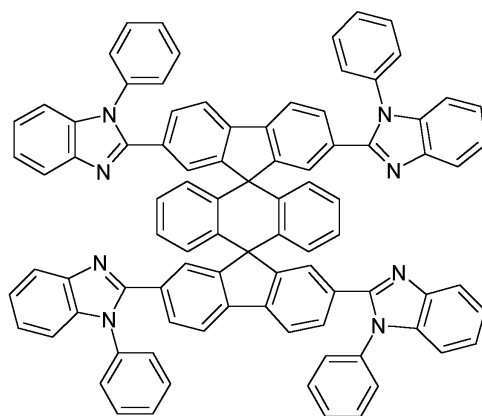
[ 17]



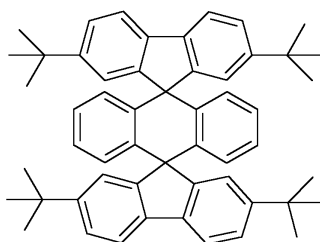
[ 18]



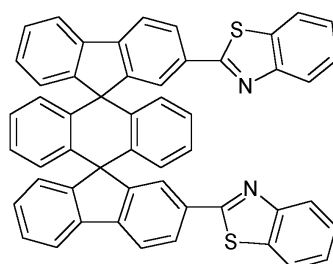
[ 19]



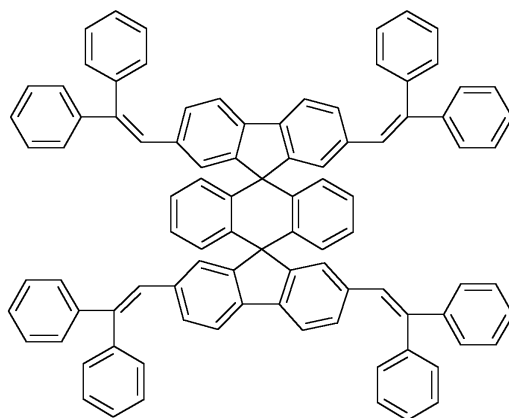
[ 20]



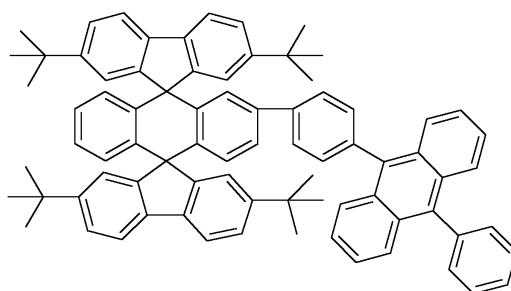
[ 21]



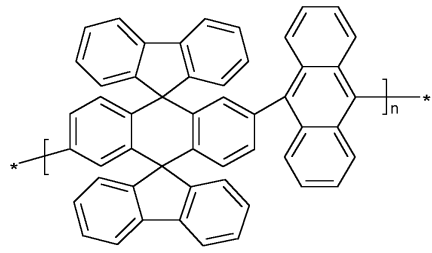
[ 22]



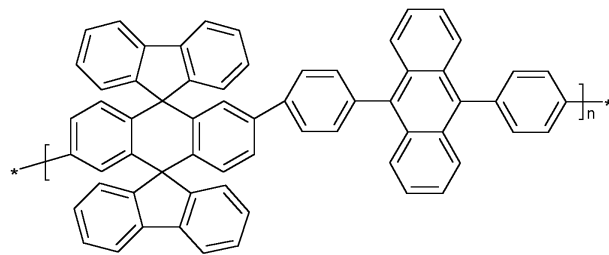
$B'$  1a, A, A' B, B' 23 A, A' B, [ 23]



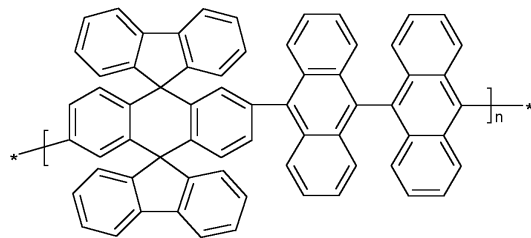
1a, B, B' 1 가  
 (spin - coating), (ro  
 II - coating), (screen - printing), (ink - jet printing)  
 24 26 1 가  
 24 26 n 2  
 [ 24]



[ 25]



[ 26]



1

가

가

가

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

(solar cell),  
(organic transistor)

1

[ 1 ]

1

가

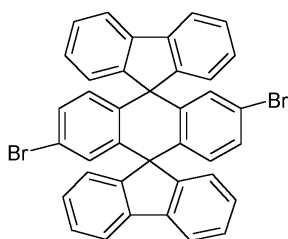
1

( 27 )

1

27

[ 27 ]



2 - (2 - Bromobiphenyl) 5.0 g(21.5 mmol) THF 50 Mℓ - 78 , -  
 (t - BuLi) 32 Mℓ(1.7 M in pentane) 가 .

가 30 1 , 2,6 - (2,6 - dibromoanthraquinone) 3 g(8.2 mmol)  
 4 .

(Diethylether) 30 Mℓ 2 N 50 Mℓ 30  
 (diethylether) .

3 5.1 g 60 Mℓ , (5 ) (35 % )  
 4.6 g ( : 88 %). 27 가

27 NMR .

<sup>1</sup>H NMR (300 MHz, DMSO - d<sub>6</sub>) 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)

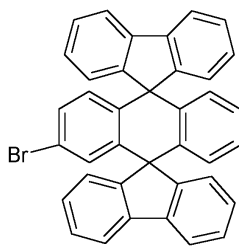
2

( 28 )

1

28

[ 28 ]



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 %). 28 가

28 NMR

$^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3$ ) 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)

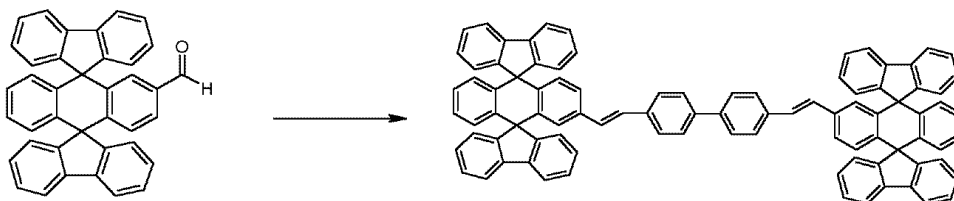
1

1

29

16

[ 29] [ 16]



29 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 .

16

(train sublimation)

16

- :

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

- :

: 1162 / : 1163 [M+H]<sup>+</sup>

2

1

1

27

8

2,2 - (2,2 - Diphenylvinylboronic acid) 1.34 g(6 mmol), 1 27  
 가 0.36 g(0.75 mmol), Pd (PPh<sub>3</sub>)<sub>4</sub> 0.086 g(0.075 mmol), 2 N K<sub>2</sub>CO<sub>3</sub> 10 Mℓ,  
 20 Mℓ 24 .

가 2 Mℓ 가 가 4.2 g 8  
 ( : 75 %).

8

- :

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

- :

: 836 / : 837 [M+H]<sup>+</sup>

- : 387.7

3

1

2

28

15

28 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  $K_3PO_4$ , 12 mg  $Pd(PPh_3)_4$  0.2 g DMF 0.06 g 9,10 - (9,10 - dibromoanthracene),  
 가 . 60 18  
 20 Mℓ 가 30  
 50 Mℓ NMP 가  
 15 0.16 g ( : 41 %), (train sublimation)

15

- :

C (95.2 %), H (4.79 %) / C (94.9 %), H (4.70 %)

- :

: 1134 / : 1135 [M+H]<sup>+</sup>

4

1

2

28

10

28 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  $K_3PO_4$ , 35 mg  $Pd(PPh_3)_4$  가 .  
 60 12 20 Mℓ 가 30  
 150 Mℓ  
 0.26 g 10 ( : 35 %), (train sublimati  
 on)

10

- :

C (95.0 %), H (4.95 %) / C (94.9 %), H (4.83 %)

- :

: 732 / : 733 [M+H]<sup>+</sup>

1,

5

7

1

,

5

ITO(indium tin oxide)가 1500

5

ITO

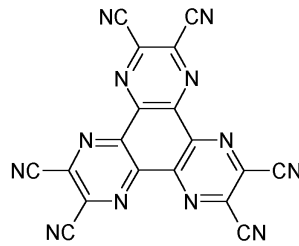
30

(hexanitrile hexaazatriphenylene,

HNHATP )

500

[ 30]



NPB(600 )

31

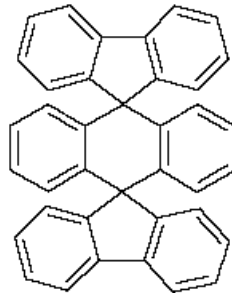
가

( 1 R<sup>1</sup> ~R<sup>24</sup> 가

) 150

Alq3(400 )

[ 31]



5

(LiF) 2500

1 /sec

0.2 /s

( )

ec 3~7 /sec

10.1 V

가

, 10 mA/cm<sup>2</sup>

1931 CIE color coor

dinate

x=0.218, y=0.301

57 nit

6

ITO(indium tin oxide)가 1500

5

ITO CuPc(copper phthalocyanine) 150  
 NPB(600 ) 1

6 가 400 Alq3(200 )

( ) 5 (LiF) 2500  
 1 /sec , 0.2 /sec  
 3~7 /sec

9.1 V 가 , 10 mA/cm<sup>2</sup> 1931 CIE color coord  
 inate x=0.159, y=0.089 126 nit

7

ITO(indium tin oxide)가 1500

5

ITO 30 HNHATP 500  
 NPB(400 ) , 3  
 15 가 300 Alq3 (300  
 nm)

( ) 5 (LiF) 2500  
 1 /sec , 0.2 /sec,  
 3~7 /sec

6.6 V 가 , 10 mA/cm<sup>2</sup> 1931 CIE color coord  
 inate x=0.184, y=0.242 254 nit

8

ITO(indium tin oxide)가 1500

5

ITO 30 HNHATP 500  
 NPB(400 ) , 4  
 10 가 200 Alq3(300 )

( ) 5 (LiF) 2500  
 1 /sec , 0.2 /sec,  
 3~7 /sec

inate 6.7 V 가 , 10 mA/cm<sup>2</sup> 1931 CIE color coord  
x=0.172, y=0.156 168 nit .

9

1

가

ITO(indium tin oxide)가 1500

5

ITO 30 HNHATP 500  
4 가 400 , ,  
5 Alq3 600  
(LiF) 2500 ( )  
1 /sec , 0.2 /sec, 3~7 /sec

inate 7.8 V 가 , 10 mA/cm<sup>2</sup> 1931 CIE color coord  
x=0.326, y=0.550 464 nit .

(double spiro) 가 1

(dopant)

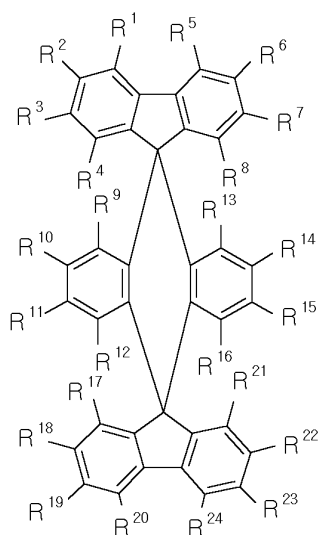
(57)

1.

1

:

[ 1]



1 ,

$R^1 \sim R^{24}$

; (F), (Cl), (Br), (I) ;

X

1 20 ; ; (arylamine); ; (nitrile, -CN);  
; (acetylene);

(thiazole), (oxazole), (imidazole), (thiophene)  
;

1 (moiety) ,

$R^{10}$   $R^{11}$  ,  $R^{14}$   $R^{15}$

,

X

; , , , ;

X

1 20 ; ; ; 1 ; (-CN); ; ,  
, , ; (moiety) .

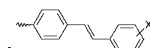
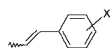
2.

1 ,

1  $R^1 \sim R^{24}$  가  
:



,



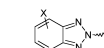
,



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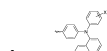
,



,



,



,

;  
 (imidazole)  
 (fused ring)  
 ;  
 ;  
 X  
 (arylamine);  
 ;  
 (nitrile, -CN);  
 ;  
 1  
 20  
 ;  
 (thiazole),  
 (acetylene);  
 ;  
 (oxazole),  
 1  
 (fused)

3.

1 ,

1

.

4.

3 ,

1 1 .

5.

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 ,

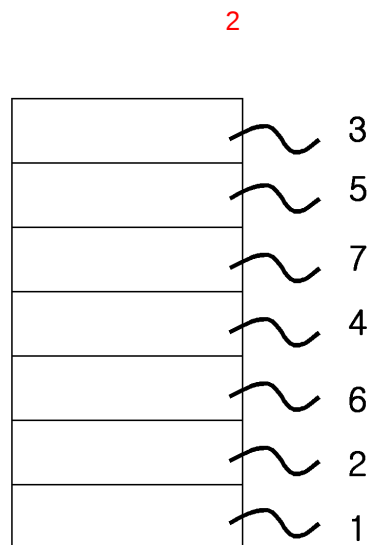
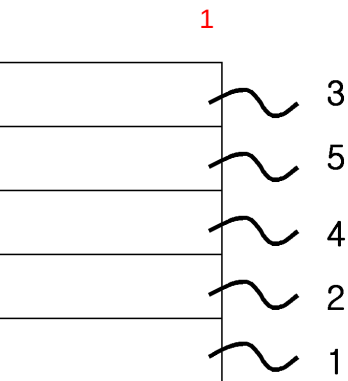
가 (organic transistor) .

13.

9

,

가 (solar cell)



|                |                                                                                                                                                                             |         |            |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|------------|
| 专利名称(译)        | 一种含有双螺旋型有机材料的电子器件                                                                                                                                                           |         |            |
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| 代理人(译)         | KIM , JAE MAN                                                                                                                                                               |         |            |
| 其他公开文献         | KR100422914B1                                                                                                                                                               |         |            |
| 外部链接           | <a href="#">Espacenet</a>                                                                                                                                                   |         |            |

#### 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，其包含由下式（1）表示的双螺环化合物：- 1 - [化学式1] 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，其表现出高的熔点，以输出从式（1）导出的衍生物，并通过引入适当的取代基的空穴输送材料，发光材料，电子传输材料或发光层并且当使用这种材料制造器件时，可以改善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

