

(19) (12) (KR) (A)

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2004 09 14
(86) PCT/JP2003/002995 (87) WO 2003/078541
(86) 2003 03 13 (87) 2003 09 25

(30) JP-P-2002-00071398 2002 03 15 (JP)

(71) 가 가 3 1 1

(72) 299-0205 가 가 1280
299-0205 가 가 1280
299-0205 가 가 1280
299-0205 가 가 1280
299-0205 가 가 1280

(74)
:

(54)

가 ;
1 ,
가 1 .
.

(EL) ,

가 EL .

EL , EL 가 .

EL 가 가 가 , 가 가 , ,

(8-) , 가 , (1996-239655 , 1995-138561 , 1991-200289).

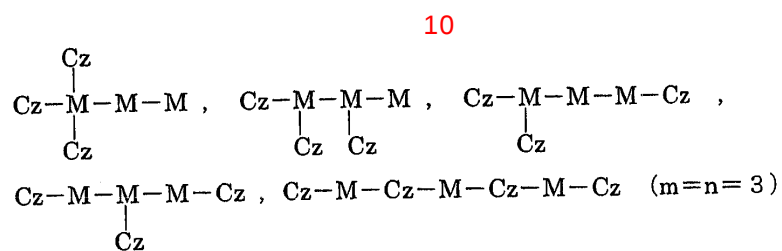
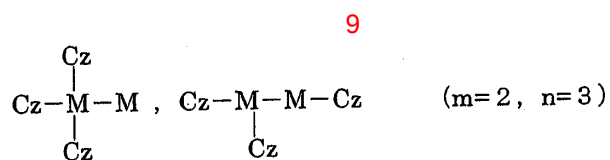
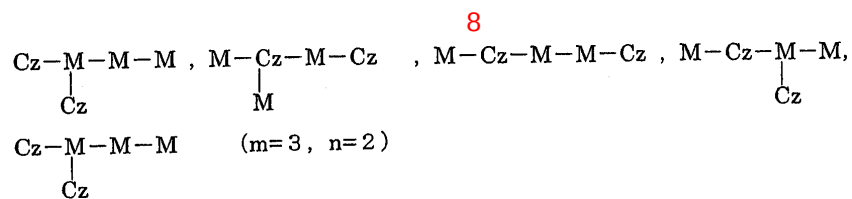
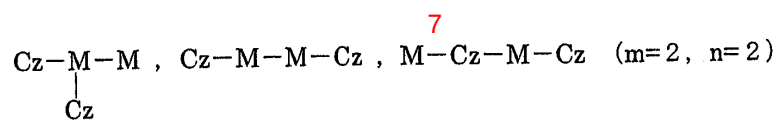
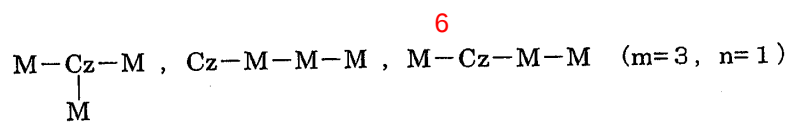
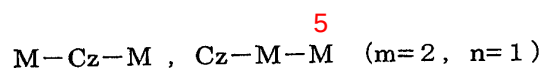
EL 가 EL 가 , .

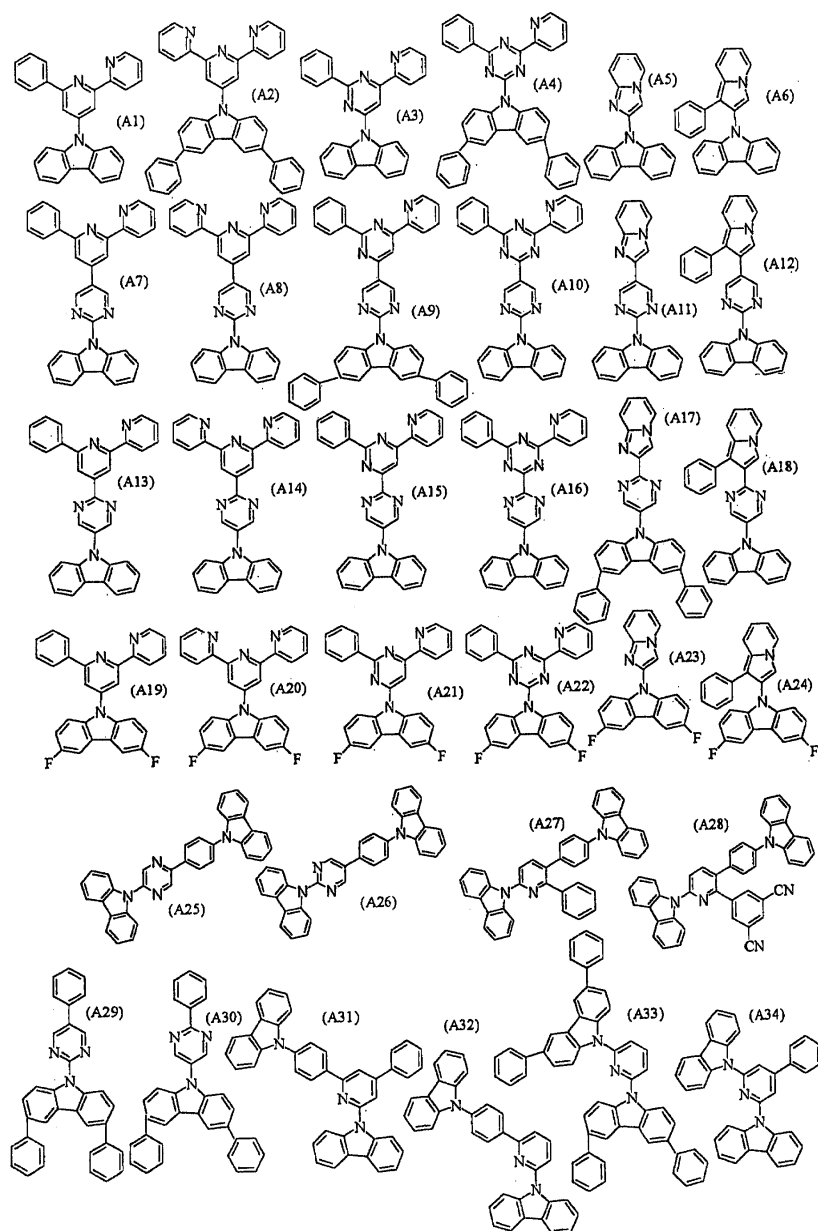
1996-12600 가 , , (8-) (Alq) , , 2001-160489 가 가 , 가

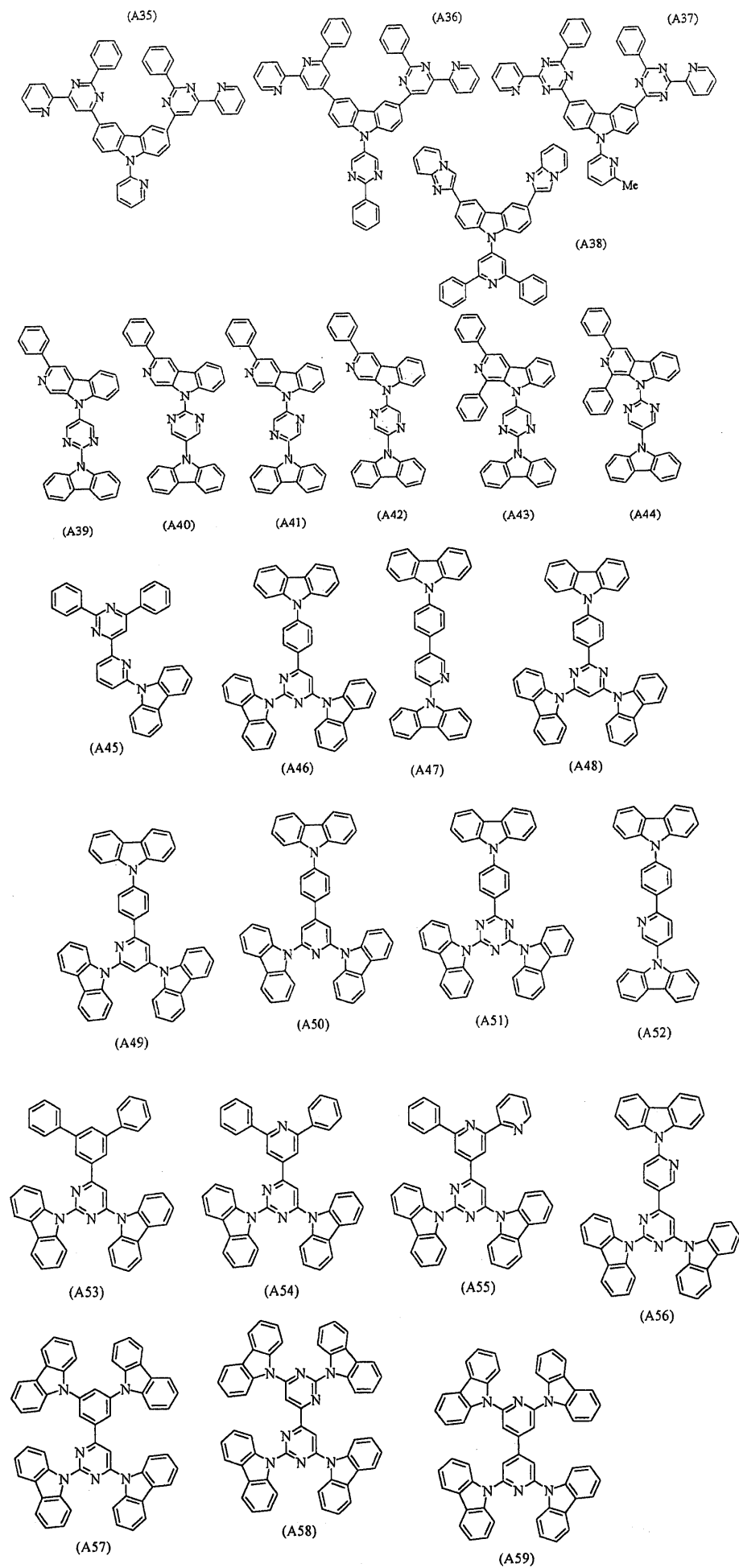
EL , 가 EL 가 EL , 가 EL : 1 EL

¹
(Cz-) n M m

Cz ;
M 2 40 ;
n m 1 3 ;
n 2 3 Cz , m 2 3 M , n 3 m 1
M 가 .
1 EL







1 1 2.8 38eV , 2.9 3.6eV .

EL 1 1 EL EL

EL 1 1 EL EL

EL 1 , 가 (0.12, 0.11) (0.16, 0.19) .

EL 3 .

EL 가 EL , ,

1 1 2.8 3.8eV , 3 2.5 3.3eV

3 7 11 1 가

EL 3 1 3 가 , 1 ,

3 EL 1:3 3 1 , 3 , 3

3 EL 3

3

3 7 11 가 , 3 (Tg: 80

160) 가 , / ,

EL 1

. 1 , ,

가 , / /) (/ / EL /) , (/ / /) , (

1 가 EL , , ,

2

EL , , 가 , ,

EL

1

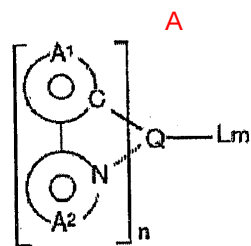
EL

1

가

A

:



[

A¹

A²

A¹

7,8-

Q 7 11

L

β -

m n
n=2 m=1 .] , Q가 2가

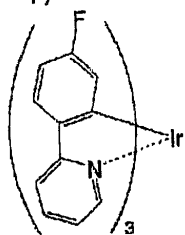
n=2 m=0 , Q가 3가

n=3 m=0,

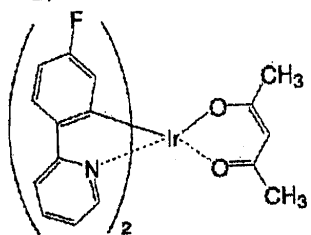
A

:

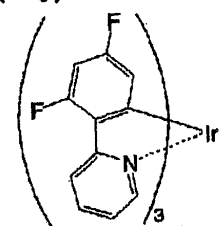
(K-1)



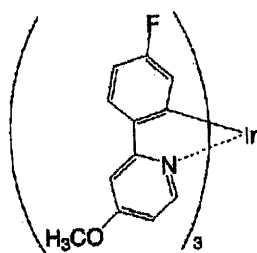
(K-2)



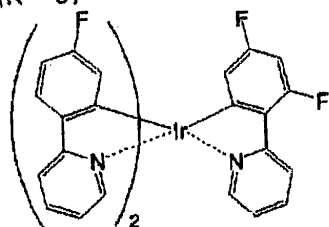
(K-3)



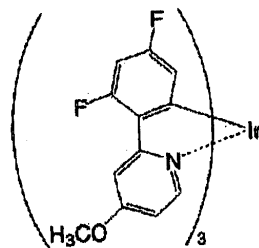
(K-4)



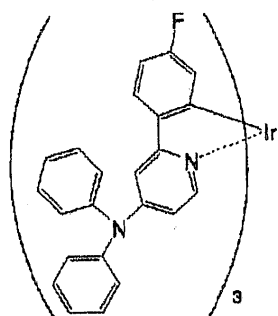
(K-5)



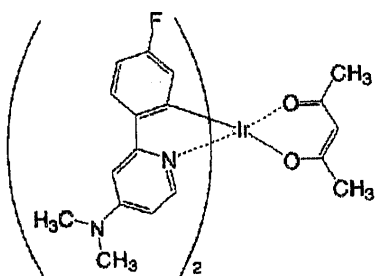
(K-6)



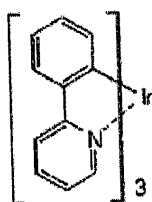
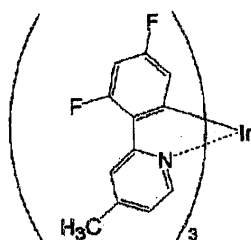
(K-7)



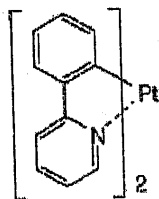
(K-8)



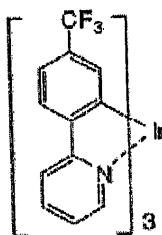
(K-9)



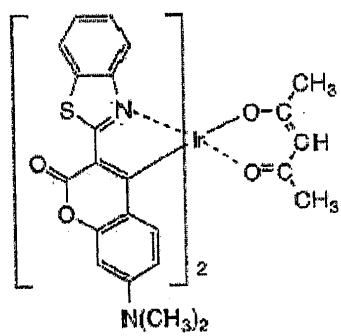
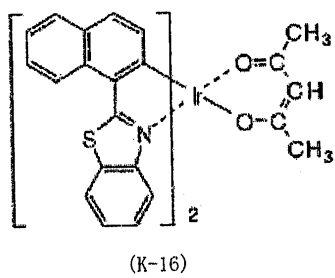
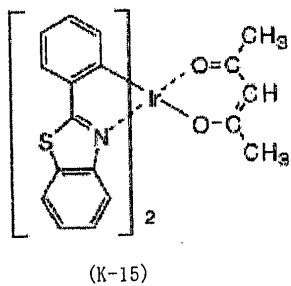
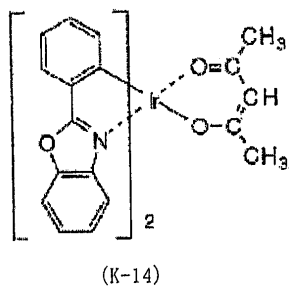
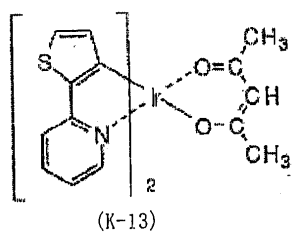
(K-10)



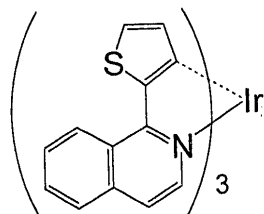
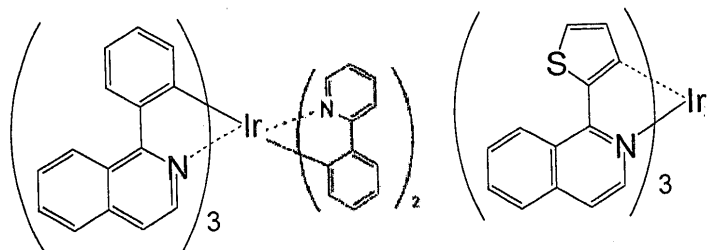
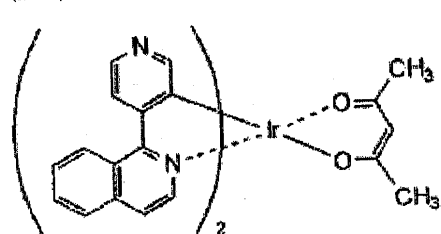
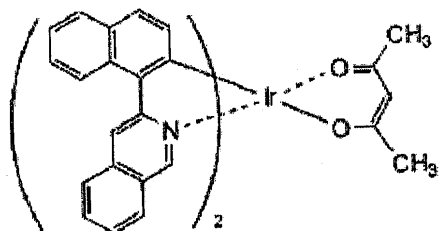
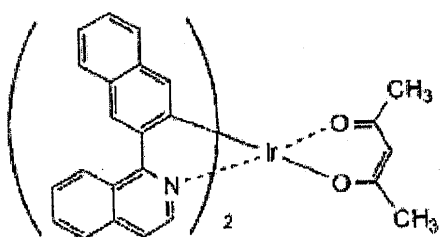
(K-11)



(K-12)



(K-17)



가 가 가

3

,
N'-(3-)-1,1'- -4,4'- , N,N,N',N'-(4-)-1,1'- -4,4'- , N,N'-
4-)-1,1'- -4,4'- , N,N'- -N,N'- -1,1'- -4,4'- , N,N,N',N'-(
-()-N,N'-(4-n-)- -9,10- , N,N- (4- -4-)-4- -
3

(Pc) , H₂ Pc, CuPc, CoPc, NiPc, ZnPc, PdPc, FePc, MnPc, ClAlPc, ClGaPc, ClInPc, ClSnPc, Cl₂ SiPc, (HO)AlPc, (HO)GaPc, VOPc, TiOPc, MoOPc, GaPc-O-GaPc

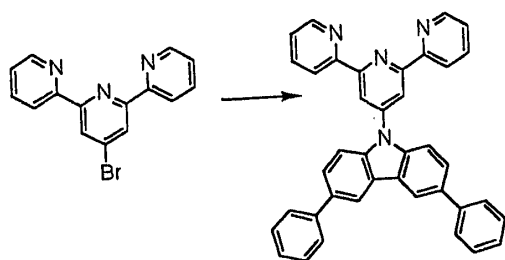
가 가

가
5 nm 가 10 μm 가 , 10nm 가 0.2 μm 가
가
가
-N-
가
가
EL 1 가
EL TV

3 1
(1) 3
3 (T1) (10 μ mol/ EPA(
: = 5:5:2) , 77K, (SPEX Company) FLUOROL
OG II), ()

(2) 1
1 (HITACHI Co., Ltd.) 가 (10⁻⁵ /)
()

1
(A2): 9-(2,6- -4-)
(A2)



Ar , 2,6- -4- (9.4g, 30mmol), 3,6- (9.6g, 30mmol),
(0.06g, 0.32mmol, 1% Cu), -1,2- (0.4Mℓ, 3.3mmol, Cu 10eq) (
14g, 66mmol, 2.2eq) (30Mℓ) , 10 가 (13.2g, 80%)

$^1\text{H-NMR}$ FD-MS() (A2) , FD-MS

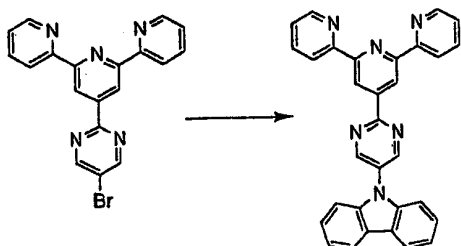
FD-MS, $\text{C}_{39}\text{H}_{26}\text{N}_4$: 550, : $m/z = 550(\text{M}^+, 100)$.

, 1 3 1 .

2

(A14): 2-(2,6- -4-)-5-(9-)

(A14)



Ar , 2-(2,6- -4-)-5- (12g, 30mmol), (5g, 30mmol),
(0.06g, 0.32mmol, 1% Cu), -1,2- (0.4Ml, 3.3mmol, Cu 10eq)
(14g, 66mmol, 2.2eq) (30Ml) , 10 가 .
(10.9g, 76%)

$^1\text{H-NMR}$ FD-MS (A14) , FD-MS

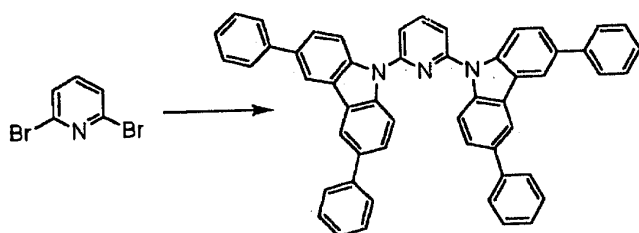
FD-MS, $\text{C}_{31}\text{H}_{20}\text{N}_6$: 476, : $m/z = 476(\text{M}^+, 100)$.

, 1 3 1 .

3

(A33): 2,6- (9-)

(A33)



Ar , 2,6- (2.4g, 10mmol), 3,6- (9.6g, 30mmol), (0.06g, 0.32mmol, 1% Cu), -1,2- (0.4Ml, 3.3mmol, Cu 10eq)
mol, 2.2eq) (30Ml) , 10 가 .
(14g, 66mmol, 2.2eq) (4.8g, 67%)

MR FD-MS (A33) , FD-MS

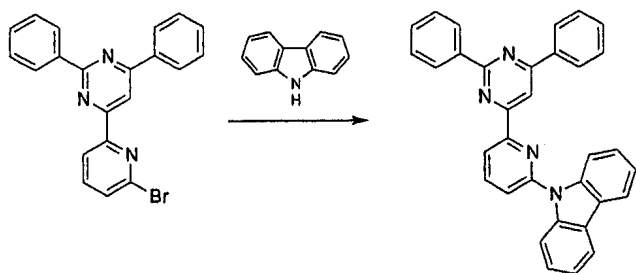
FD-MS, $\text{C}_{53}\text{H}_{35}\text{N}_3$: 713, : $m/z = 713(\text{M}^+, 100)$.

, 1 3 1 .

4

(A45)

(A45)



2-(2,4- 4mmol) 가 , 3.7g(17mmol) 1,4- 15 가 , 3.2g(8mmol), 16Mℓ , 1.4g(9mmol), -1,2- , 0.08g(0.4m 0.5Mℓ(59%) , 25Mℓ 가 , 90MHz ¹ H -NMR FD-MS (A45) , 2.3g(, FD- MS

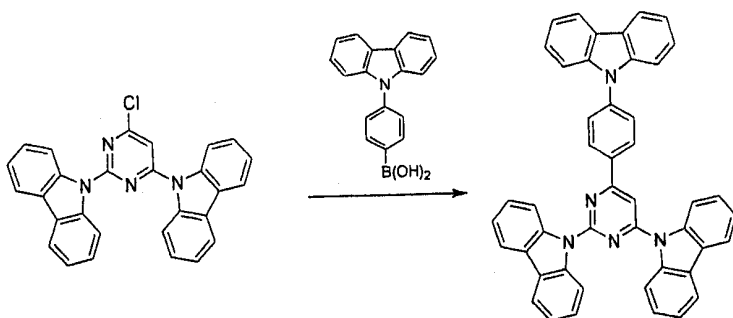
FD-MS, C₃₃ H₂₂ N₄ : 474, : m/z= 474(M⁺ , 100).

, 1 3 1 .

5

(A46)

(A46)



2,4- 4mmol) 1.8g(17mmol) 8Mℓ , 2.5g(6mmol), 4-) 0.13g(0.1mmol) 1,2- 20 가 , 1.6g(6mmol), 25Mℓ , 0.08g(0. 3.7 g 90MHz ¹ H -NMR F D-MS (A46) , 3.1g(85%) , FD-MS

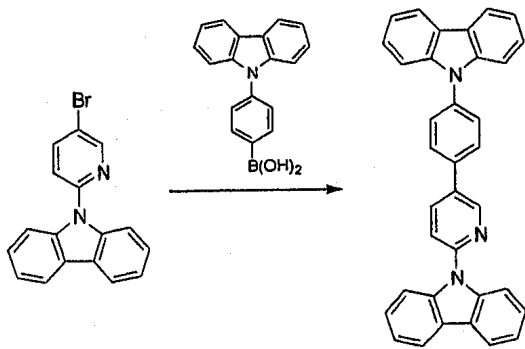
FD-MS, C₄₆ H₂₉ N₅ : 651, : m/z= 651(M⁺ , 100).

, 1 3 1 .

6

((A47))

(A47)



2- 0.14g(0.1mmol) 1,2- 1.9g(6mmol), 4- 1.7g(6mmol) ()
 가 9 15 가 18Mℓ , 1.9g(18mmol) 9Mℓ
 2.4 g(84%) 2.9 g
 , FD-MS 90 MHz ¹ H-NMR FD-MS (A47)

FD-MS, C₃₅ H₂₃ N₃ : 485, : m/z= 485(M⁺, 100)

, 1 3 1 .

[1]

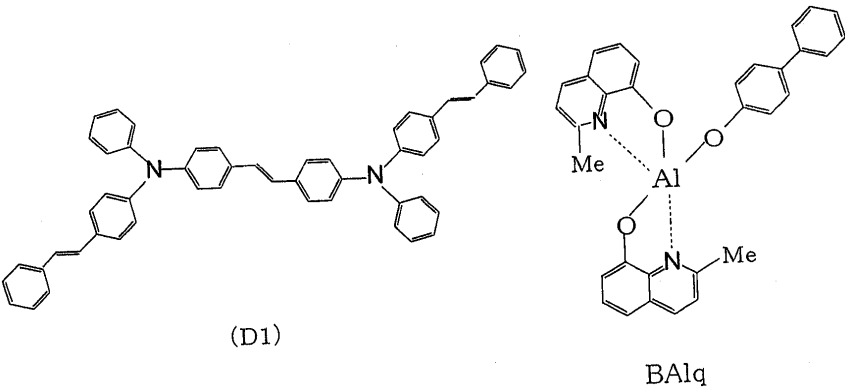
	화합물	1중항 에너지 갭(eV)	3중항 에너지 갭(eV)
합성예 1	A2	3.2	2.7
합성예 2	A14	3.2	2.8
합성예 3	A33	3.3	2.7
합성예 4	A45	3.2	2.8
합성예 5	A46	3.3	2.8
합성예 6	A47	3.4	2.8

1

25mm×75mm×1.1mm ITO (GEOMATEC Company)
 5 , UV 30 .

60nm N,N'- (N,N'- -4-)-N,N'- -4,4
 '- -1,1'- (TPD232) TPD232
 TPD232 20nm 4,4'- [N-(1-)-N-] (NPD)
 NPD , NPD 40nm (A2)
 , 1 , (DI) , (A2):(DI) 40:3 , (DI)
 가 2.79eV (A2) (D1)
 20nm BAlq(Me) . BAlq
 , Li(Li : (SAES GETTERS Company)) Alq 2 , 2
 () Alq:Li (10nm) . Alq:Li Al
 EL

5.0V 150cd/m², 6.7cd/A
 , (0.15, 0.16) , 가 .

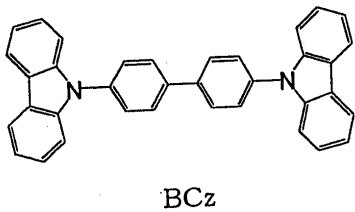


2 3

1 (A2) 2 EL
가 , , 2 .

1

EL 1 (A2) BCz 2
가 , , ,



[2]

	발광층의 유기 호스트 재료	전압(V)	발광 휘도 (cd/m ²)	발광 효율 (cd/A)	발광색	색도 좌표
실시예 1	A2	5.0	150	6.7	청색	(0.15,0.16)
실시예 2	A14	6.0	130	5.5	청색	(0.14,0.16)
실시예 3	A33	7.0	161	6.9	청색	(0.15,0.16)
비교예 1	BCz	8.5	120	3.4	청색	(0.14,0.16)

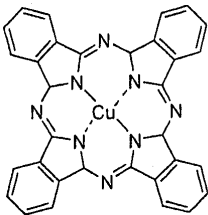
2 1 BCz EL
 , , ,

4

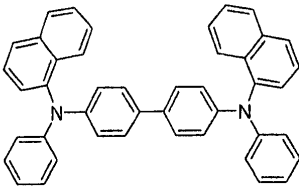
25mm×75mm×0.7mm ITO 5
 , UV 30 .
 ,
(, CuPc) CuPc
30nm 4,4'- [N-(1-)-N-]
α -NPD , α -NPD (, α -NPD)
(A46)
, Ir(ppy)₃) 가 Ir(2-) Ir(
5 %
10nm (1,1'-)-4-) (2- -8-)
BAIq) BAIq Alq 40nm 8-
(, Alq) Alq

LiF 0.2nm , 150nm , Al/LiF
EL

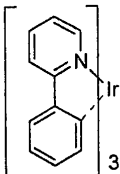
44.5cd/A , 5.5V, 0.22 mA/cm² , 100cd/m² ,
(0.32,0.61)



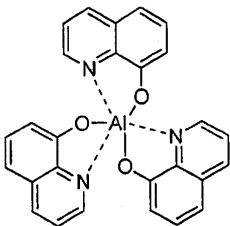
CuPc



α -NPD



Ir(ppy)3



Alq

5

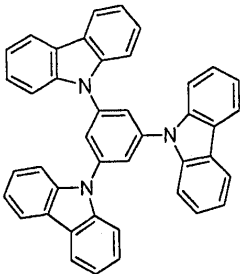
4 , (A46) , (A45)
EL , 가 , 3

2

4 , (A46) , BCz
EL , 가 , , ,
3

3

4 , (A46) , EL 2002-0028329 A1
(A-10) , 가 ,
, , 3



A-10

[3]

	발광층의 유기 호스트 재료	3중항 에너지 갭(eV)	1중항 에너지 갭(eV)	전압 (V)	전류 밀도 (mA/m ²)	발광 휘도 (cm/m ²)	발광 효율 (cd/A)	색도 좌표 (x, y)
실시예 4	A46	2.8	3.3	5.5	0.22	100	44.5	(0.32,0.61)
실시예 5	A45	2.8	3.2	5.7	0.23	97	41.8	(0.32,0.61)
비교예 2	BCz	2.8	3.6	5.4	0.31	101	32.6	(0.32,0.61)
비교예 3	A-10	3.1	3.7	5.9	0.32	100	31.8	(0.32,0.61)

3
EL

2 3

(BCz, A-10)

6

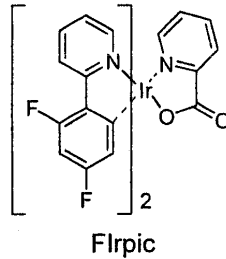
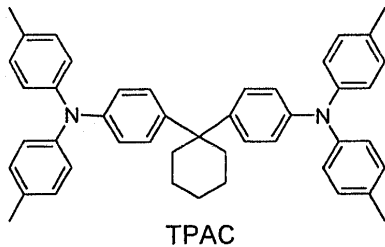
25mm×75mm×0.7mm
, UVITO
30

5

(CuPc)
30nm 1,1'- [4-N, N- (CuPc)]
TPAC (, TPAC) 30nm (, TPAC)
(, Flrpic) 가 Ir [(4,6-)- (A46)
30nm 8- Flrpic 7 %
LiF 0.2nm (Alq) Alq
Al/LiF EL 150nm

22.4cd/A

6.4V, 0.44mA/cm², 99cd/m²,
(0.17,0.39)



7

6 (A46), (A45)
EL 가 , , 4

4

6 (A46) BCz
EL 가 , ,

4

5

4 (TPAC) α-NPD Alq
BAIq EL 가 , ,

4

[4]

	발광층의 유기 호스트 재료	3중항 에너지 갭(eV)	1중항 에너지 갭(eV)	전압 (V)	전류 밀도 (mA/m ²)	발광 휘도 (cm/m ²)	발광 효율 (cd/A)	색도 좌표 (x, y)
실시예 6	A46	2.8	3.3	6.4	0.44	99	22.4	(0.17,0.39)
실시예 7	A45	2.8	3.2	6.8	0.55	99	18.2	(0.17,0.39)
비교예 4	BCz	2.8	3.6	7.8	1.70	98	5.80	(0.16,0.37)
비교예 5	BCz	2.8	3.6	7.6	1.09	99	9.15	(0.17,0.37)

4 , BCz , EL , .

가

EL 가 , 1 .

(57)

1.

1 :

1

(Cz-) n M m

,

Cz ;

M 2 40 ;

n m 1 3 ;

n 2 3 Cz , m 2 3 M , n 3 m 1
M 가 .

2.

1 ,

1 2 10 :

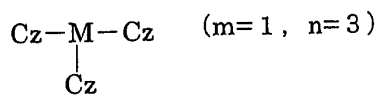
2

Cz-M (m=n=1)

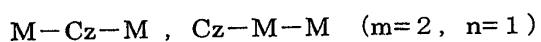
3

Cz-M-Cz (m=1, n=2)

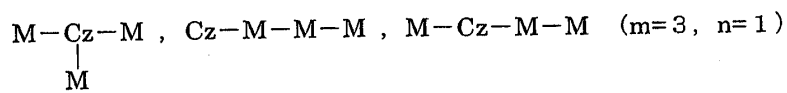
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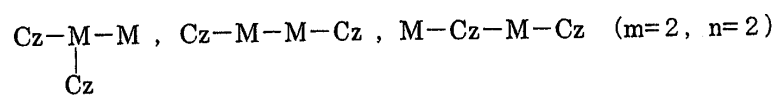
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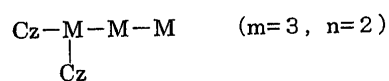
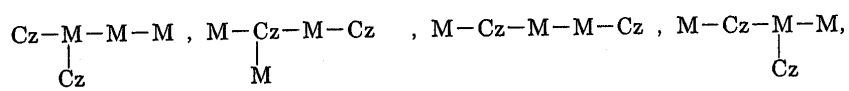
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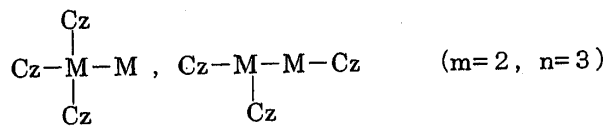
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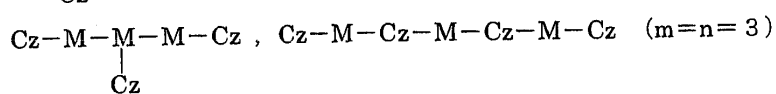
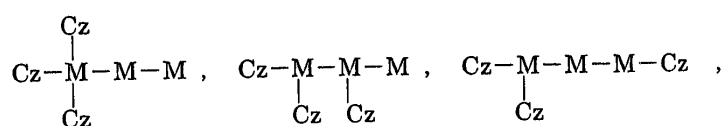
8



9



10



3.

1 ,

1 1 2.8 3.8eV .

4.

1 ,

1 3 2.5 3.3eV .

5.

1 1 1 ,

6.

1

1

7.

1

3

8.

1

4

9.

1

1

10.

1

1

11.

5

가

12.

5

13.

5

3

14.

5

专利名称(译)	有机电致发光器件材料和使用其的有机电致发光器件		
公开(公告)号	KR1020040094797A	公开(公告)日	2004-11-10
申请号	KR1020047014425	申请日	2003-03-13
申请(专利权)人(译)	高山出光株式会社		
[标]发明人	IWAKUMA TOSHIHIRO 이와쿠마도시히로 HOSOKAWA CHISHIO 호소카와지시오 IKEDA HIDETSUGU 이케다히데쓰구 TOMITA SEIJI 도미타세이지 ARAKANE TAKASHI 아라카네다카시		
发明人	이와쿠마도시히로 호소카와지시오 이케다히데쓰구 도미타세이지 아라카네다카시		
IPC分类号	C09K11/06 C07D401/04 C07D401/14 C07D403/04 C07D403/14 C07D471/04 C07F15/00 H01L51/00 H01L51/30 H01L51/50		
CPC分类号	C07D401/04 C07D401/14 C07D403/04 C07D403/14 C07D471/04 C07F15/0033 C09K11/06 C09K2211/1007 C09K2211/1011 C09K2211/1029 C09K2211/1044 C09K2211/1059 H01L51/0059 H01L51/0067 H01L51/0072 H01L51/0081 H01L51/0085 H01L51/5012 H01L51/5016 H01L51/5048 H01L2251/308 Y10S428/917		
代理人(译)	Gimchangse		
优先权	2002071398 2002-03-15 JP		
其他公开文献	KR100957288B1		
外部链接	Espacenet		

摘要(译)

一种有机电致发光器件用材料，由具有含氮杂环基与咔唑基键合的结构的化合物组成。和有机电致发光器件，包括阴极，阳极和置于阴极和阳极之间的一个或多个有机薄膜，其中至少一个有机薄膜含有上述材料。该材料可以使有机电致发光器件具有高色纯度并呈现蓝色。

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