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(A)

(51) 。 Int. Cl.⁷
C09K 11/06

(11)
(43)

10-2005-0010682
2005 01 28

(21)

10-2003-0050065

(22)

2003 07 22

(71)

1-23

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2가 284-25

(72)

204-5

APT104 405

APT113 1002

APT510 1208

1-1

102-B01

1002 502

111-4 3

5 270-5

APT405 1409

4

209 1005

8 392-27

102

99

APT101 801

1 65

APT6 304

958

APT106 504

1 28-11

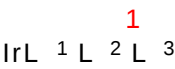
868 402-605

(74)

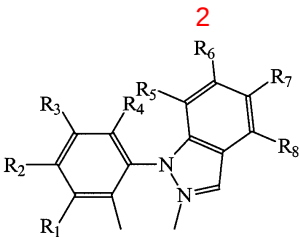
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(54)

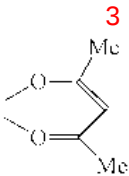
1



3 가 , L¹ L³ 3 , 2 3 , L¹ L .



, R₁ R₈ , 1 20 ,
2 14 (fused ring) .



가
6.3 7.5cd/A

1			
2	1	4	
3	1	4	(transient photoluminescence)
4	1	4	
5	1	4	
6	3	6	
7	3	6	
8	3	6	

*		*
1 -	EL	2 - ITO
3 -		4 -
5 -		6 -
7 -		8 -

(electroluminescence device: EL device)
가 가 가
EL (emitting layer) EL EL
가
, 1987 (Eastman Kodak)

EL

[Appl. Phys. Lett. 51, 913, 1987].

EL

가

num)

Alq₃Alq₃ (tris-8-hydroxyquinolinato alumi
가

phosphorescence)

(triplet exciton)

(p

EL

(excitation)

1

EL

S=0

3:1

S=

25%

100%

가

Forrest Thompson

(spin-orbit coupling)

Alq₃

3

PtOEP(H₂OEP=octaethyl porphyrin)

[V. Cleave, G. Yahioglu, P. L. Barny, R. H. Friend,

and N. Tessler, *Advanced Mater.* **1999**, *11*, 285.; R. C. Kwong, S. Sibley, T. Dubovoy, M. Baldo, S. R. Forre
st, and M. E. Thompson, *Chem Mater.* **1999**, *11*, 3709.], 130 mA/cm², 13V 264 cd/m²

(heavy-atom effect)

[N. E. Tokel, R. E. Hemingway, and A. J. Bard, *J. Am. Chem. Soc.* **1973**, *95*, 6582.; N. E. Tokel and A. J. Bard, *J. Am. Chem. Soc.* **1972**, *94*, 2862.], (III) (II) [M. A. Bal
do, M. E. Thompson, and S. R. Forrest. *Nature*, **2000**, *403*, 750.; M. A. Baldo, D. F. O'Brien, M. E. Thomps
on, and S. R. Forrest, *Phys. Review B*, **1999**, *60*, 14422.; P. E. Burrows, S. R. Forrest, T. X. Zhou, and L.
Michalski, *Appl. Phys. Lett.* **2000**, *76*, 2493.; M. Maestri, V. Balzani, C. Deuschel-Cornioley, and A. von Zel
ewsky, 'Photochemistry and Luminescence of Cyclometallated Complexes,' in *Advances in Photochemistry*,
Vol. 17, pp1, Wiley, New York, **1992**.; J. H. van Diemen, R. Hage, H. E. B. Lampers, J. Reedjik, J. G. Vos, L.
De Cola, F. Barigelletti, and V. Balzani, *Inorg. Chem.* **1992**, *31*, 3518.; S. Serroni, S. Campagna, G. Denti, A.
Juris, M. Venturi, and V. Balzani, *J. Am. Chem. Soc.* **1994**, *116*, 9086.].

(III)

가

UDC (acac)Ir(btp)₂

[S. Lamansky, P. Djurovich, C. Adachi, P. E. Burrows, S. R. Forrest, M. E. Thompson, *J. Am. Chem. Soc.* **200**
1, *123*, 4304.; S. Lamansky, P. Djurovich, D. Murphy, R. Kwang, M. E. Thompson, *Inorg. Chem.* **2001**, *40*,
1704], Firpic[C. Adachi, R. Kwang, P. Djurovich, V. Adamovich, M. A. Baldo, S. R. Forrest, M. E. Thomps
on, *Appl. Phys. Lett.* **2001**, *79(13)*, 2082.] 가

(III)

가

가

가

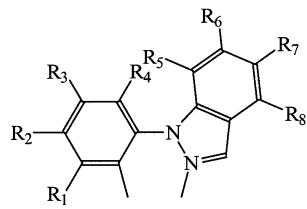
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1



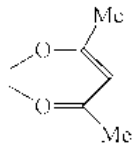
3 가 , L¹ L³ , 2 3 , L¹ L .

2



2 , R¹ R⁸ , 1 20 , (fused ring) .

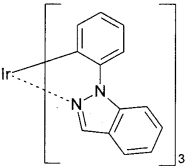
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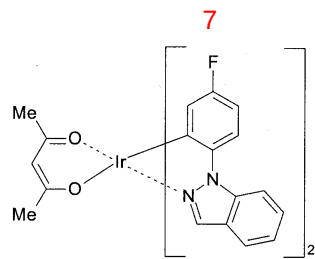
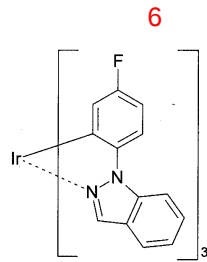
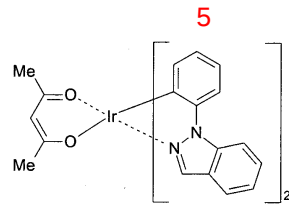


1 .

7 . 1 , 4

4





가 4 7 (III)

가

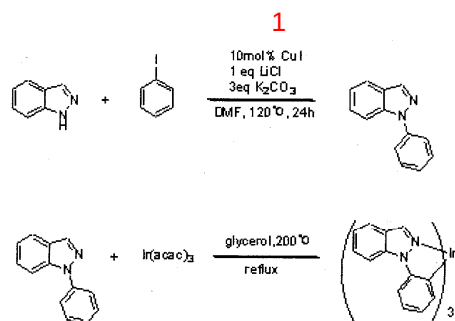
1

가

1 EL

가

1: 4



(1) (Indazole) 0.11g(1.0mmol, 1eq), 0.16Ml(1.5mmol, 1.5eq), 42mg(1.0mmol, 1eq)
, 19mg(10mol%), 0.41g(3.0mmol, 3eq) (seal tube) DMF 10Ml
, 120 24 가
4 () 0.15g(80%)

mp. 79.8-80.5

$^1\text{H NMR}$ (400MHz, CDCl_3): δ 8.21(s, 1H), 7.73-7.82(m, 3H), 7.52-7.56(m, 2H), 7.35-7.45(m, 2H), 7.21-7.35(m, 2H).

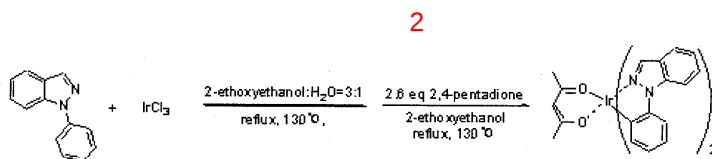
MS(m/e): 194(20.0, M^+), 58(30), 43(100).

(2) (1) 0.19g(1mmol) (III) 0.10g(0.20mmol) 10
Ml 200 24 , 1N 5
OMl 가 , 1
0.03g(20%)

mp. 250

$^1\text{H NMR}$ (400MHz, CD_2Cl_2): δ 9.04(s, 1H), 8.24(d, $J=9\text{Hz}$, 1H), 7.59-7.71(m, 3H), 7.45(t, $J=7.5\text{Hz}$, 1H), 6.85(t, $J=6\text{Hz}$, 1H), 6.42(t, $J=6\text{Hz}$, 1H), 5.84(d, $J=6.5\text{Hz}$, 1H).

2: 5

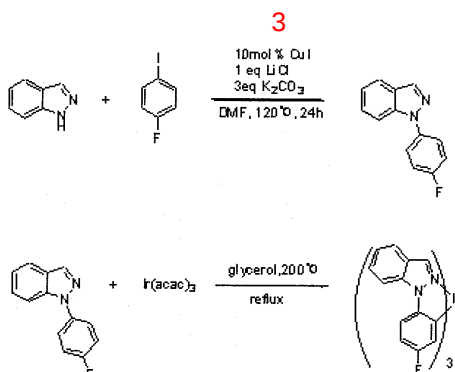


(III) 0.20g(0.68mmol) 1 (1) 0.52g(2.7mmol, 4eq) 2-
3:1 10Ml 24 ,
, 0.35g(45%) : 3:1 μ -
10Ml μ - 4 6 0.35g 2,4- 0.08Ml(2.6eq), 0.050g 2-
, 3:1 5
0.05g(25%)

mp. 250

$^1\text{H NMR}$ (400MHz, CD_2Cl_2): δ 8.23(d, $J=8\text{Hz}$, 1H), 8.20(s, 1H), 7.87(d, $J=8\text{Hz}$, 1H), 7.71(d, $J=8\text{Hz}$, 1H), 7.59(t, $J=7.5\text{Hz}$, 1H), 6.95(t, $J=7\text{Hz}$, 1H), 6.56(t, $J=6.5\text{Hz}$, 1H), 6.16(d, $J=6\text{Hz}$, 1H), 5.29(s, 1H), 1.83(s, 6H).

3: **6**



(1) (Indazole) 0.11g(1.0mmol, 1eq), 4- 0.1Ml(1.5mmol, 1.5eq), 42mg(1.0mmol, 1eq), 19mg(10mol%), 0.41g(3.0mmol, 3eq) DMF 10Ml, 120 , 24 가 (4-)
0.13g(60%) 6 4- (4-)

mp. 85.1-86.4 .

$^1\text{H NMR}$ (400MHz, CDCl_3): δ 8.32(s, 1H), 7.78(d, $J=8\text{Hz}$, 1H), 7.64-7.69(m, 3H), 7.35-7.45(m, 2H), 7.41(t, $J=3.6\text{Hz}$, 1H), 7.17-7.43(m, 3H).

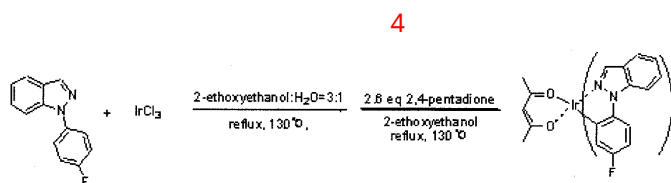
MS(m/e): 212(100, M^+), 185(10), 95(14), 75(22).

(2) (1) 0.19g(1mmol) (III) 0.10g(0.20mmol) 10
Ml 200 24 , 1N 5
OMl 가 , 0.02g(15%) 6

mp. 250 .

$^1\text{H NMR}$ (400MHz, CD_2Cl_2): δ 8.06-8.14(m, 2H), 7.40-7.84(m, 7H), 7.14-7.25(m, 2H), 6.65-6.77(m, 2H), 6.44(d, $J=6.8\text{Hz}$, 1H), 6.35(d, $J=5.2\text{Hz}$, 1H), 5.98(d, $J=6.4\text{Hz}$, 1H).

4: **7**



(III) 0.20g(0.68mmol) 4 (1) 0.57g(2.7mmol, 4eq) 2-
3:1 10Mℓ 24
3:1 μ -
0.3g(30%)
μ - 0.3g 2,4- 0.08Mℓ(2.6eq), 0.040g 2-
10Mℓ . 4 6 , 3:1 , 7
0.04g(20%)

mp. 250 .

¹ H NMR(400MHz, CD₂ Cl₂): δ 8.19(s, 1H), 8.17(d, J=7.2Hz, 1H), 7.90(d, J=8Hz, 1H), 7.69-7.73(m, 1H), 7.63(t, J=7.0Hz, 1H), 6.91(t, J=7.2Hz, 1H), 5.86(d, J=6.4Hz, 1H), 5.32(s, 1H), 1.86(s, 6H).

가

(1) 가

ent PL) UV - vis (Trasienst photolumenescence, Transi
100nm 337nm
450nm, 550nm, 588nm

$$Y = y_0 + A_1 \exp(-t/T_1) + A_2 \exp(-t/T_2)$$

, Y , y₀ , A₁ (decay time) 1
, t , T₁ 1 , A₂ 2 , T₂
2
1 4 1

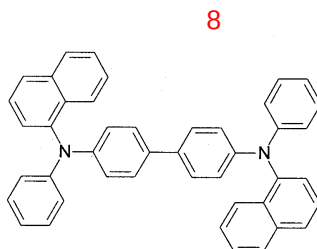
[1]

	(nm)		
	450	550	588
A ₁	1	0.42	0.38
T ₁ (ns)	8.7	1030	800
A ₂	0.2	0.43	0.53
T ₂ (ns)	8.9	8045	7276

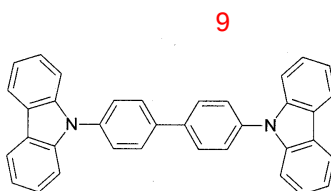
1 550nm 588nm μs ,

(2)

1 , EL (1)() ITO (2)(15Ω/□)

[illegible]

icarbazole-biphenyl, CBP) 9 4,4'- *N,N'*- (4,4'- *N,N'*- d 20nm (4) CBP 4 10mol%



NPB (2,9-dimethyl-4,7-diphenyl-1,10-phenanthroline, BCP) (5) 2,9- -4,7- -1,10- (6)
(aluminum quinolate, Alq) 40nm (7)
(lithium quinolate, Liq) 1nm Al (8) 15
0nm

1)  , 0V 15V 0.5V - (Keithley SMU 2000)

36)  , 0V 15V 0.5V (Minolta Cs-100)

2)  , 0V 15V 0.5V (Minolta Cs-100)

3)  , 0V 15V 0.5V (Minolta Cs-100)

1) 2)  , 0V 15V 0.5V (Minolta Cs-100)

_____가

1) 4

1

2

5

4

가

2

1

4

4

EL
450nm

, 580nm
가

3

1

4

μs

5

6.3cd/A

4

가

4

가

2) 6

3

6

4

가

6

8

6

, 454nm

, 540nm

580nm

가

가

가

8

6

7.5cd/A

가

가

6.3

7.5cd/A

(57)

1.

1

_____1

$IrL^1 L^2 L^3$

$L^1 L^3$
3 가

3

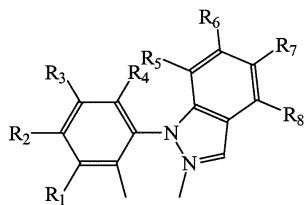
2

3

L^1

L

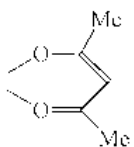
_____2



, R₁ R₈
2 14 ,

, , 1 20 ,
(fused ring) .

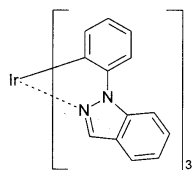
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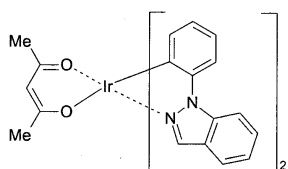
2.

1 , 1 4 7

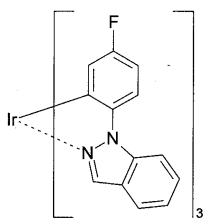
4



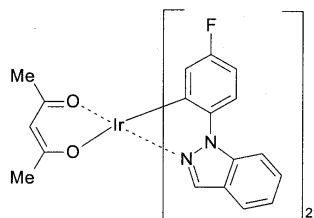
5



6



7



3.

1

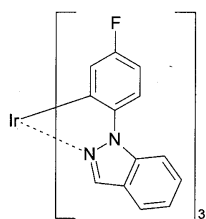
,

1

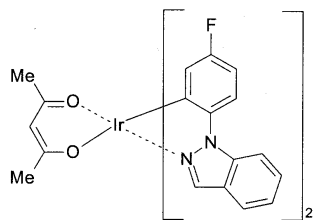
6

7

6



7



4.

1

1

IrL¹ L² L³, L¹ L³

3 가

3

,

2

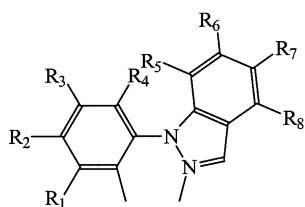
3

,

L¹

L

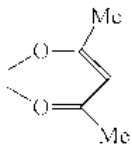
2

, R¹ R⁸
2 14 ,

(fused ring) .

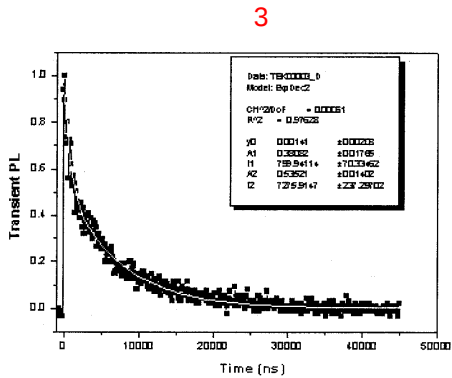
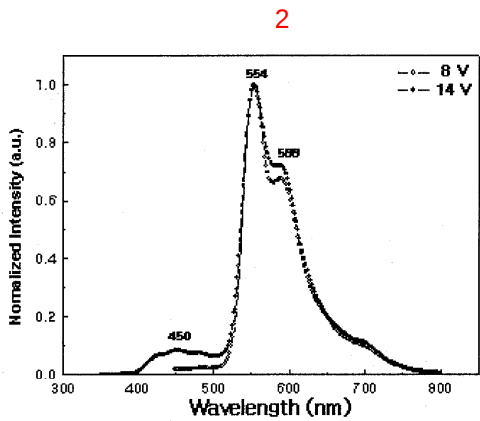
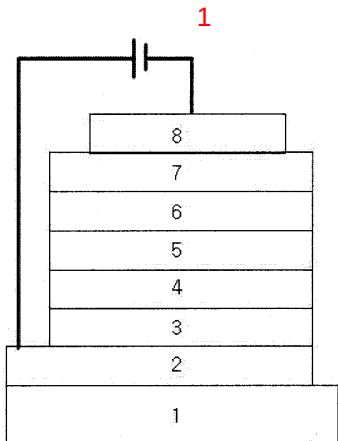
1 20

3

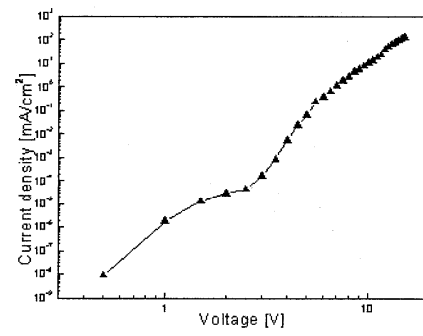


5.

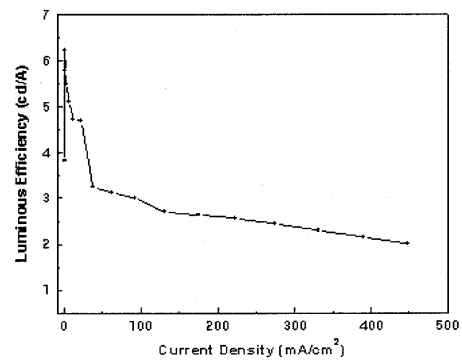
3



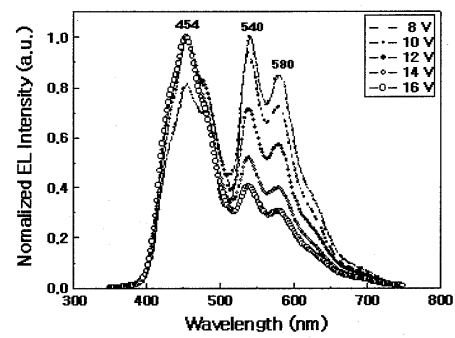
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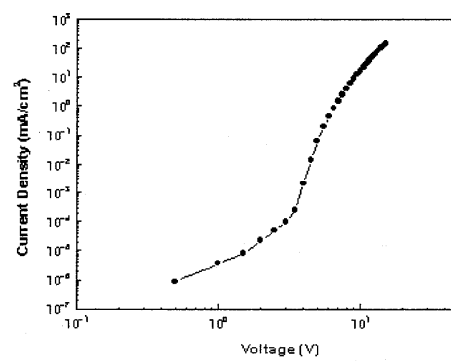
5



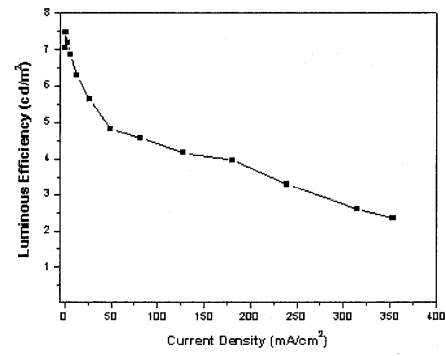
6



7



8



专利名称(译)	电致发光铍化合物和使用它们作为发光掺杂剂的显示元件		
公开(公告)号	KR1020050010682A	公开(公告)日	2005-01-28
申请号	KR1020030050065	申请日	2003-07-22
[标]申请(专利权)人(译)	可隆股份有限公司		
申请(专利权)人(译)	주식회사코오롱 宇预支給显示器材料有限公司		
当前申请(专利权)人(译)	주식회사코오롱 宇预支給显示器材料有限公司		
[标]发明人	KIM KWANHEE 김관희 PARK JUNGHO 박정호 CHO SUNGMIN 조성민 BAEK SEOGIN 백성인 KIM YUNCHUL 김윤철 PARK HOJIN 박호진 NAM EUNJUNG 남은정 YOON SEUNGSOO 윤승수 KIM JUNHO 김준호 KIM SUNGMIN 김성민 KIM BONGOK 김봉옥 KWAK MIYOUNG 광미영 KIM YOUNGKWAN 김영관 PARK NOGIL 박노길 KIM YOUNGSIK 김영식		
发明人	김관희 박정호 조성민 백성인 김윤철 박호진 남은정 윤승수 김준호 김성민		

김봉옥
곽미영
김영관
박노길
김영식

IPC分类号	C09K11/06
CPC分类号	C09K11/06 C09K2211/185 H01L51/0085 H01L51/50 H05B33/14 Y10S428/917
外部链接	Espacenet

摘要(译)

本发明提供由下式 (1) 表示的新型电致发光铱化合物。 一级方程式 $\text{IrL}_1\text{L}_2\text{L}_3$ 其中, $\text{L}_1\sim\text{L}_3$ 是选自由以下化学式2或3表示的每个其它这样, 杆相同的或不同的, 但 L_1 至3是将只在该壳体的一个是下式的不同 (3) 其他两个配体是一样的。 式 (2) 其中R, R_1 至 R_8 是相同的或彼此不同的, 为氢原子, 卤素基团, 碳原子数1~20的烷基的共轭结构, 和具有2-14个碳原子数, 芳基或稠合环 (稠合环) 的卤代烷基。 式 (3) 由此获得的铱化合物可以实现白色使用一种化合物, 以及优点有利于发射波长的调谐, 并且可以简化面板的制造过程中, 和高效率, 所以它也是一个6.3到7.5cd / A的发光效率它可用作磷光材料。 2

