

30

30

(74)

:

(54) -

2) , (10) , (11) , - (1)
 3.5eV 1 (15) ; 3.5eV
 , 1
 2 (16) ; 3.5eV - 1
 - 3 (17) - .

2

- PCT/WO90/13148 4,539,507 ,
 (p- (phenylenevinylene)('PPV')) (sandwiched),
 () ()
 (photon) . PCT/WO90/13148 , 4,5
 39,507 (8- (hydroxyquinoline))
 ('Alq3')
 1 ('OLED') OLED (2)
 - - (indium-tin-oxide('ITO')) (1)
 uminescent) (3) 가 ITO- (4) (electrol

가

(polystyrene sulphonic acid)가

(dioxythiophene)('PEDOT - PSS')

(favor)

(work function)

. PCT/WO97/08919

1 (15) ; 3.5eV
 1 - 1 - 2 (16) ; 3.5eV 3 (17)
 2 - 1 - 3.5eV 1
 1 1 3.5eV 2 3.5eV 3.5eV 2
 , 3 3.5eV 2
 1 (가) 1 -
 가 , - 1 -
 1 50 , 30 25 20 1
 15 10 1 10 40 5 20 20 15 2
 2 , 1 1000 , 500 2 40 10
 0 2 , 150 200 2 40 500
 5eV 1 3.5eV (' 1 ') 2 3.
 가 (' 2 ') (bulk) 1 2
 3.5eV / 2
 3.5eV 1 2 (transition metal)
) 1 , 2 (halide)(
) 2 Mg, Li, Cs Y
 : Li, Ba, Mg, Ca, Ce, Cs, Eu, Rb, K, Sm, Y, Na, Sm, Sr, Tb Yb
 Si, Sb, Sn, Zn, Mn, Ti, Cu, Co, W, Pb, In Ag Al, Zr, 1
 1 2 2 (lithium fluoride) 1
 , 2 1
 1 3.4eV , 3.3eV 3.2eV , 3.2eV 3.1eV
 3.0eV () 3.2eV 3.1eV 3.0eV () 3.4eV , 3.3eV
 3.2eV 1 3.2eV 3.1eV 3.0eV ()
 1 (degradation)
 2 1
 2 (intermediate state)
 가 4.0eV 가
 / 3 10⁵ (.cm)⁻¹
 Al, Cu, Ag, Au Pt,
 (tin) - (ITO)
 가 3 1000 10000 , 2000 6000

4000 가
 1 50% , 80% , 90% 95% 1
 1 1 가 1 2 50% ,
 80% , 90% 95% 2 2
 가 2 2 2
 95% 가 3 50% , 80% , 90%
 가 3 가
 가 2 1 1, 2 / 3 3 2
 , 가 (TO), -
 (ITO) (가 가) (/
)
 (conjugated polymer)
 (sublimed)
 ,
 -5(2'-))('MEH-PPV'), PPV- (p-)('PPV'), (2-
), / , PPV
 (2,7-(9,9- -n-)-(1,4- -((4-))-1,4-))('TFB'), (2,7-(9,9-
 -n-)-(1,4- -((4-))-1,4- -((4-))-1,4-))('PFM'),
 (2,7-(9,9- -n-)-(1,4- -((4-))-1,4- -((4-))-1,4-))('PFMO'), (2,7-(9,9- -n-)('F8') (2,7-(9,9- -n-)-3,6-
 4-)('F8BT') Alq3
 (가)
 - (4- ())-1,4- - (4- ())-1,4-))('BFA'),)-(1,4- PPV

- 2
- 3 4
- 5 6
- 7
- 8 9
- 2 가

2 (10) (11)
 (12) PEDOT:PSS (13) (10) (12)
 (14)
 (11) 3 (12) 1 (15)
 2 (16) 3 (17)
 2 (10) ITO (14)
 가 1mm (sodalime) ITO
 ITO 100 150nm ITO 10 30 /
 가 ITO- (14)
 (perspex) ITO TO가

ITO (10) (13) PEDOT PSS가 1
 5.5 PEDOT:PSS 500
 1 200
 (15) (15) 20%TFB 가 5BTF8
 5BTF8 5% (2,7-(9,9- n-)-3,6-)('F8BT') (2,7-(9,9- n-)-1,4-)-((4-
)-1,4-)) TFB (2,7-(9,9- n-)-1,4-)-((4-
 750 (13) PPV
 (12) (blade) (meniscus)
 (11)가 3 (15,16,17) 10⁻⁸ mbar
 (12) (12)
 (15) (15) 1 5 25 가 15
 0 500 2 3 (16) (16) 10
 4000 (17) (17)
 (10 17) (16)
 가 가 3 4 2 ()
 E H) (A D, J P)
 :
 : ITO
 : 1:5.5 PEDOT:PSS; 500 : 4:1 5BTF8:TFB; 750
 A D:
 500
 4000
 E H:
 500
 1000
 4000
 J P:
 25
 4000
 3 Lm/W Cd/A 4 0.01, 100 1000 Cd/m
 2 () (E H)
 가 (J P) 4 (E H)
 5 9 (glovebox) 5 ITO , 80nm PEDOT:PSS
 , 63nm (1 , 10nm Ca 2 (plot)
 , 70nm (F8:TFB:F8BT) 6 ITO , 80nm Al 3
 1 10nm Ca 2 Al 3

1	: Lm/W	: Lm/W
MgF ₂	0.30	8.5

1987) / 가
 Appl. Phys. Ltte. 51, 913-915(
 (가)
 .()
 /
 가

(57)

1. 3.5eV
3.5eV
3.5eV
3
2. 1 2 1 , 2
- 3.
- 4.
5. 1 2
- 6.
- 7.
- 8.
- 9.
10. 1 Li, Ba, Mg, Ca, Ce, Cs, Eu, Rb, K, Y, Na, Sm, Sr, Tb Yb
11. 1 2 1
12. 1 2 100
13. 1 3.5eV 2
3.5eV
14. 1 3 1000
- 15.

1 , 3.5eV 10^5 (.cm) ⁻¹

16.

1 , 3.5eV

17.

1 ,

18.

1 ,

19.

1 ,

20.

19 ,

21.

20 ,

22.

19 21 ,

23.

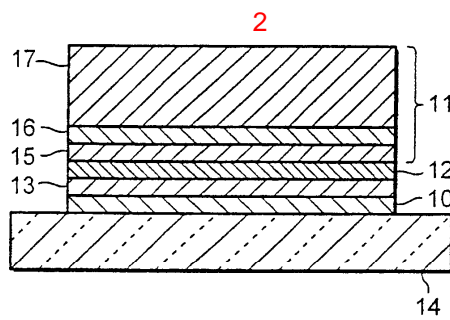
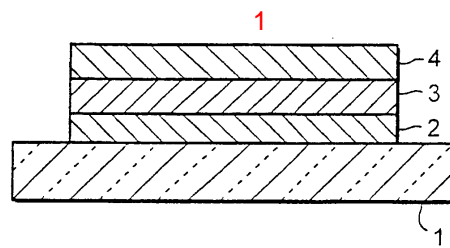
1 3.5eV

1 1 2 3.5eV

3 3.5eV 2

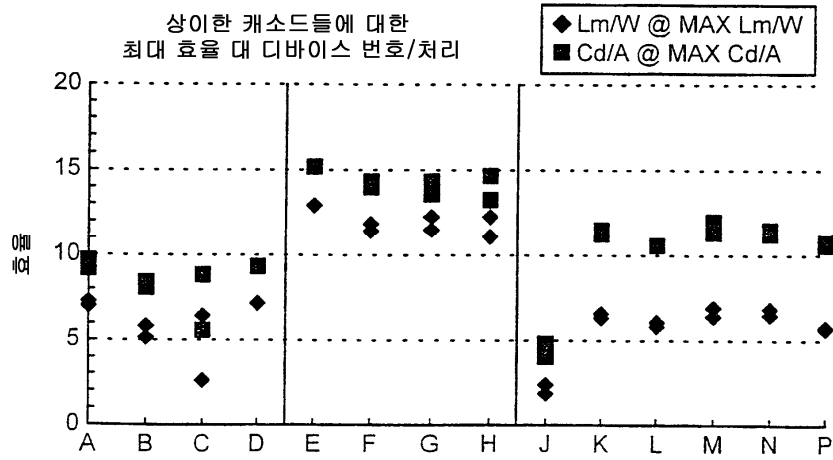
24.

25.

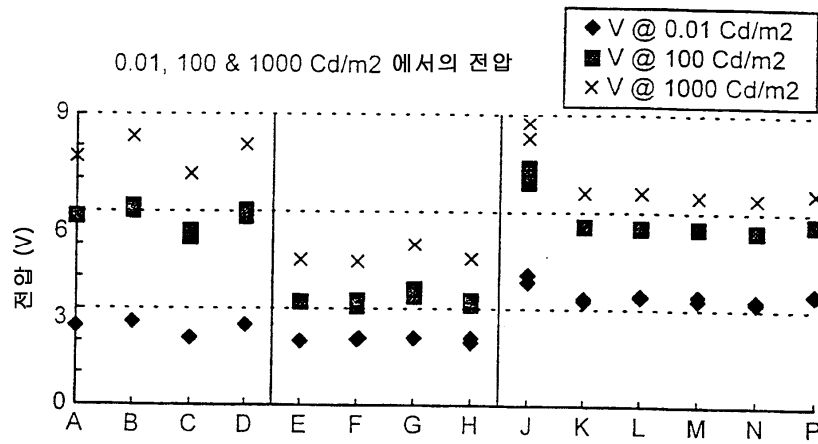


3

Li/Ca/Al 구조의 상이한 캐소드 층
 PEDOT=Ba/PEDT/6:Sp/PSS/1 (1:5.5 PEDT:PSS) 500Å
 EMITTER=R/5BTF8/1:R/TFB/1 (4:1) 750Å

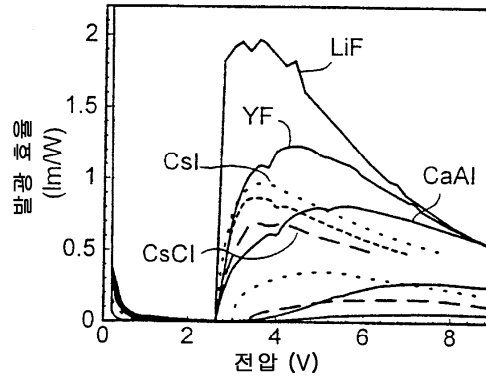


4

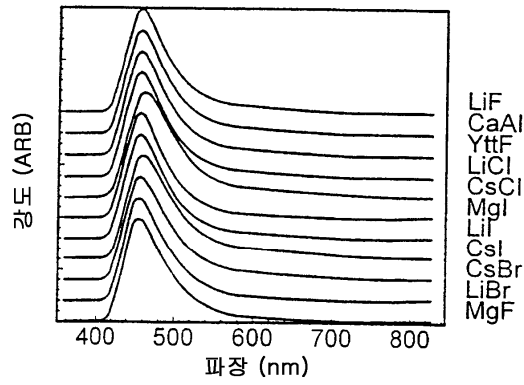


5

청색 디바이스들

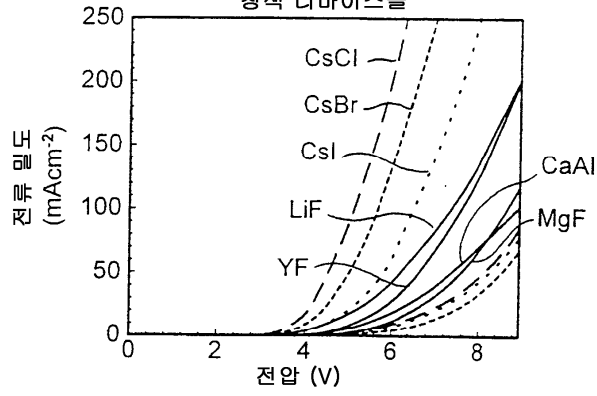


23691-23719: EL 스펙트라
- xx/Ca/Al 캐소드들

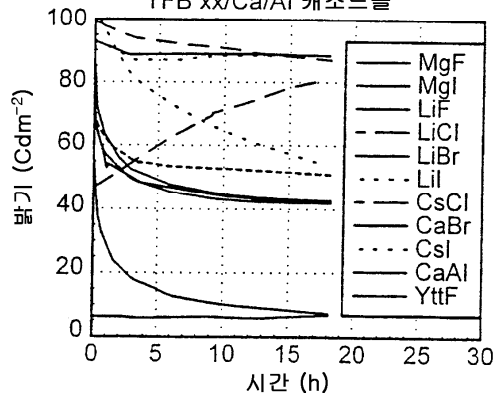


5-1

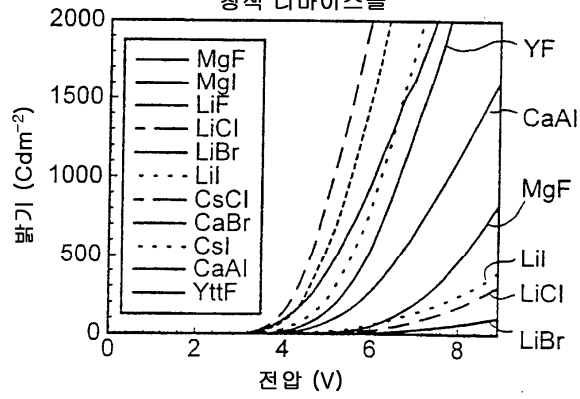
청색 디바이스들



23691-23717: SCB1/1:
TFB xx/Ca/Al 캐소드들

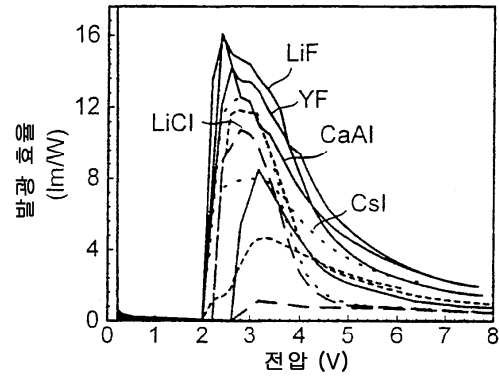


청색 디바이스들



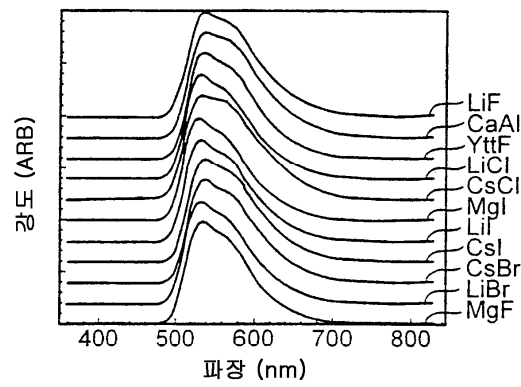
6

녹색 디바이스들

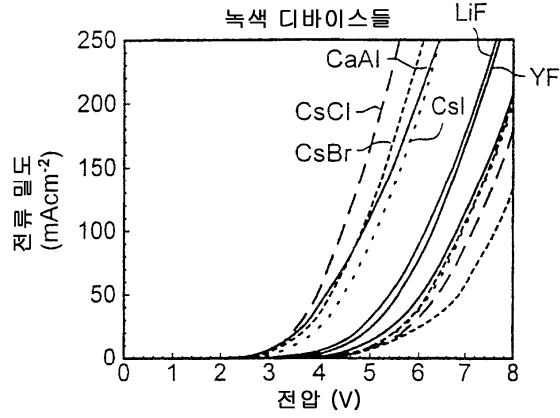


23721-23748: EL 스펙트라:

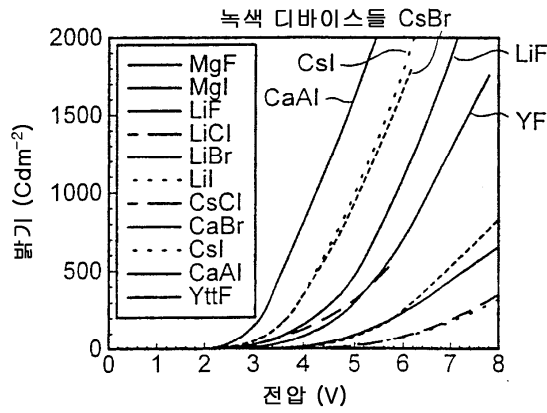
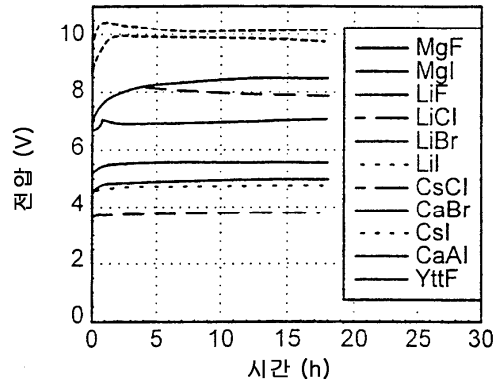
xx/Ca/Al



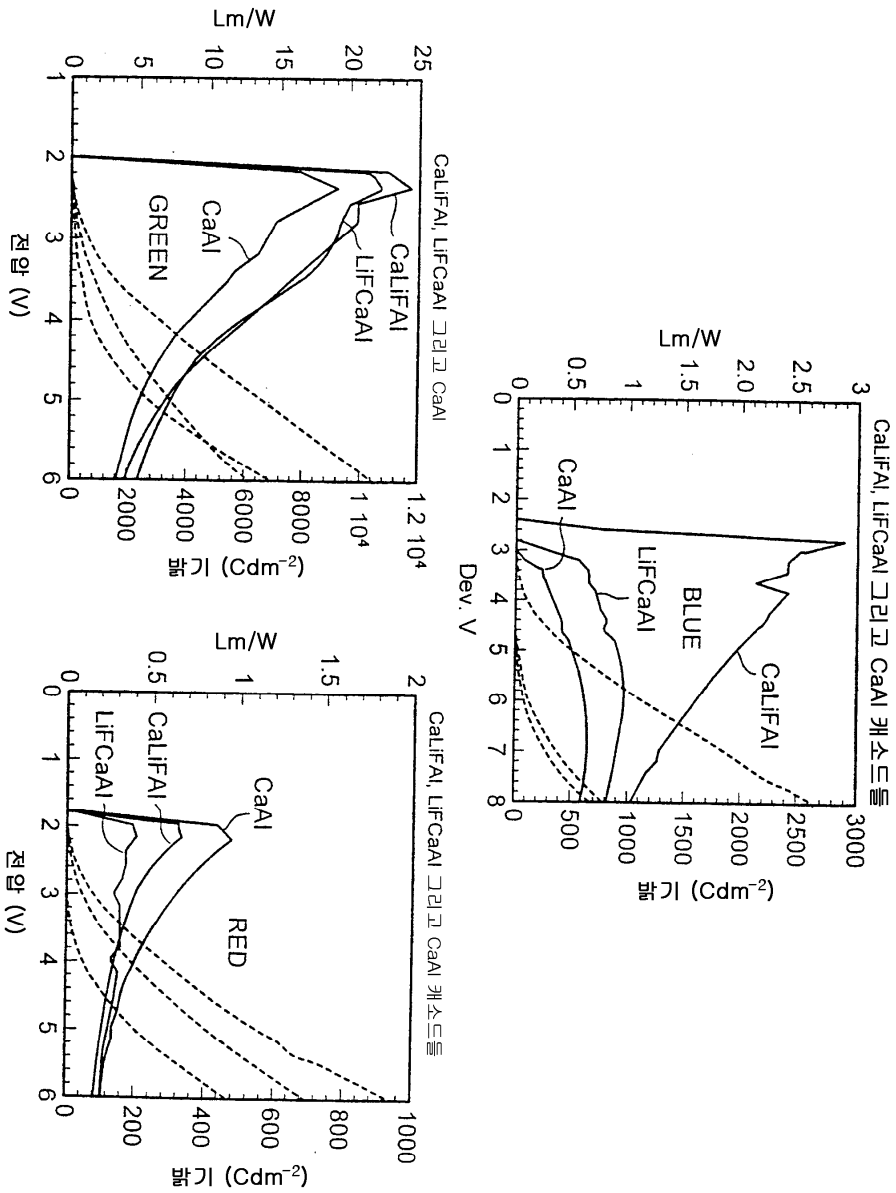
6-1



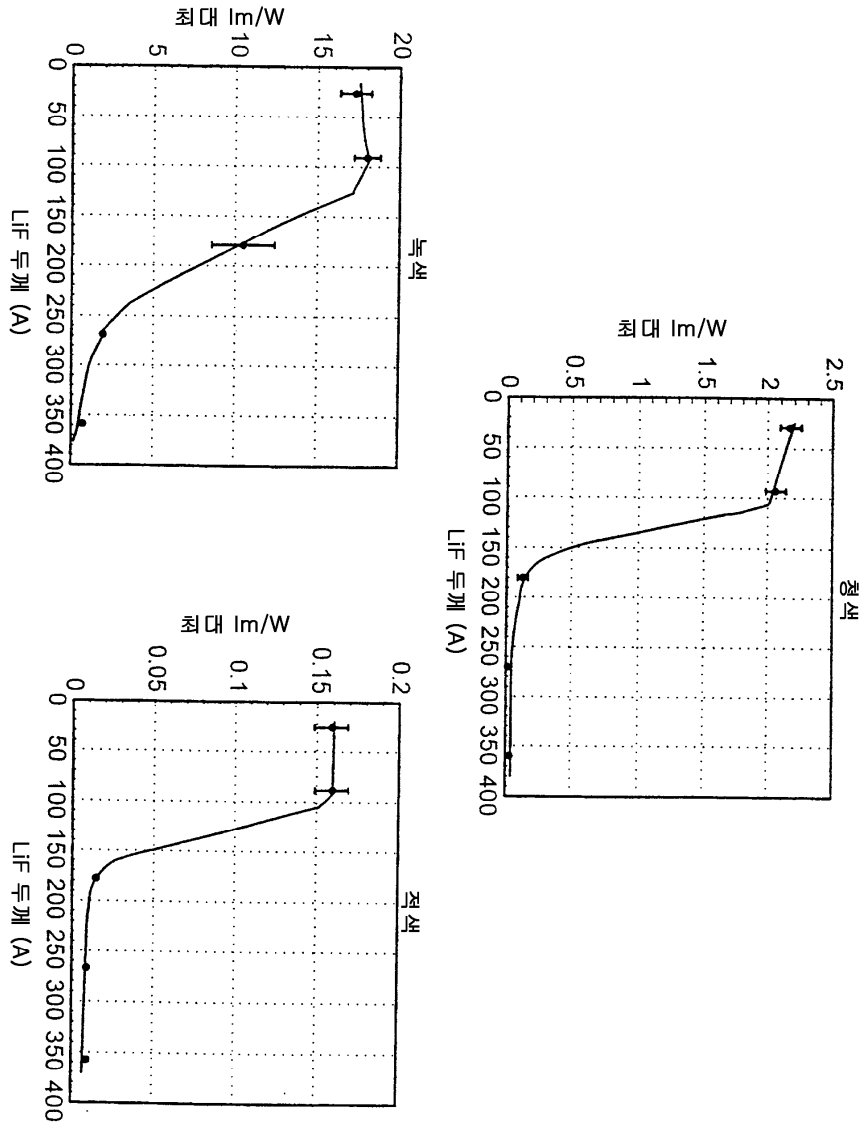
23691-23718: SCB1/1:
TFB xx/Ca/Al 캐소드들



7



8



9

