

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

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(43)

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2004 01 31

(21) 10-2003-0048270
(22) 2003 07 15

(30) 10/195,947 2002 07 16 (US)

(71) 343

(72) 14612 42

14464 518

14526 8

(74)

:

(54) -

- ,

가

;

- ;

- , 가 가 - - , - .

1
 2 1
 3a 3d
 3a
 3b 2
 3c
 3d 3b
 4
 5 4
 6
 7 6
 8 OLED
 9 EL (green) OLED

OLED

(OLED)

1 2 2

(ITO) OLED (anode),
 가 10⁻³ Torr , 2

2

(cathode)

() 가 OLED () 가 ()

OLED (TFT) 1

.2

2

5,550,066

- (a) ;
- (b) 1 가 1 2 1 ;
- (c) 가 - 1 ; , 1
- (d) 2 가 2 - ; 1
- (e) 1 2 - 가 , 가 -

OLED

- (a) - ;
- (b) 가 ;
- (c) 가 ;
- (d) ;
- (e) 가 가

OLED 가

OLED-

OLED

OLED (EL) OLED (20)

(10)가 (30) (20) (32) (24) (20) (32)

30) 1 () (28) (22) (getter) (24) (34)

(30) (24) (24) (33) (24) Tg (24) (30) (24)

가 (30) (30) (24) (20) (32)가 (30) , 2,000 8,000 psi

20) 1 (28) 1 (29) 가 (30) , 4,000 6,000 psi

(24) 가 (20) (20) (20) (20) (20)가 40 80%

(20) (20) (20) (20) (20) (20)가

2 (52) (32) (30) (2) (50) (32) (32) (32) (2) (29) (2)

0) (31) (52) (32) (20) 2 (22)(2 (52) 1 (20) (52)

(20) 3a , 2 (20) (24)(1)

3a 3d , 1 (54) 2 (58) 3b 2

(56) 1 (28) 가 1 (54) : 1 (54)

2 (22) 1 (28) 1 100 500psi 가 , 가 ,

2 (28) 100 500psi 가 2 (58) 가 , 1

가 (54) 2 (58) (54, 58) (56) (56)

(60), (52) 3c (56) (56)

(20) (66) (66) 3d 2 (

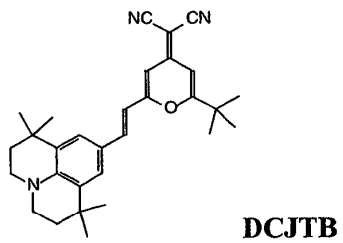
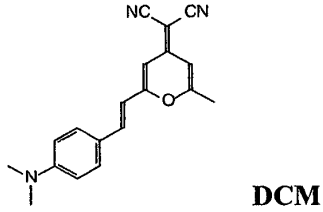
62,64) 가 (66) (68 70) (68 70)

(52)(3a)

(8- (-N1,08) (Alq)()

(; EL)

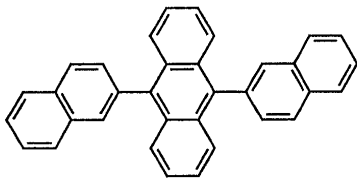
Alq 8- /
 가 DCM 6,020,07
 8 (Tang) C545T -
 5,593,788 CFDMQA - DCM (Shi)
 DCJTB . DCM DCJTB :



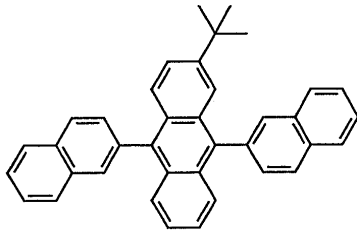
[O'Brien , Applied Physics Letters, Vol. 74, pp. 442-444, 1999]
 ansky , Journal of the American Chemical Society, Vol.123, pp. 4304-4312,2001]

[Lam

0.01 10% , 0.5 2% . , -
 8- 4,885,211 ,
 가 Alq 5,645,948 TPBI
 가 ,
 3 4,539,507 [(Van Slyke)]
 7 () NPB, 4,4'- [N-(1-)-N-] 4,539,50
 TBADN . ADN TBADN 9,10- , 9,10- [4-(2,2-)] , ADN



ADN



TBADN

4 (100) 가 (126) (122) 가 (124) (120) (110) (122) (110) 2() (130) (110) 가 (124) (126) 가 (126) (124) (126) (126) (124) 1 () (140) (126) 1 (141) (124) (126) 가 (132) (140) (250) (250) 5 (250) (131) (250) (250) (120) (120) (250) 2 (200) (130) 2 (250) 6 (300) (320) (330) 2 (310) (350) 가 (340) 2 () (37) (320) (360) (320) (380) 1 (381) (320) (330) 1 () 가 (7) 6 (400)가 (4) (10) (350) (410)

가
8 (HTL)(520) (ETL)(530) (EML)(510) OLED(50) (52) (24) ()
1) 2 (HTL)(520) ETL(530) (540) (550) ()
EML(510) (560) OLED(500) OLED(500) (540) (ITO) (ITO) 80nm
(550) Mg-Ag (540)

(560)
 ITO 1
 550) Mg-Ag 37.5 nm ETL (90:10) Alq . 75 nm HTL(520) NPB , 200 nm ()
 . 37.5 nm EML(510) Alq
 . 37.5 nm EML OLED OLED Alq
 ITO 가 OLED 가 , CIE OLED EL 20
 mA/cm² , OLED 가 20mA/cm² ,
 가 OLED EL 가
 1
 OLED , Alq TBADB 1:1 CFDMQA 0.5 % 37.5 nm
 EML . EML Alq
 OLED #A1, A2, A3, A4 A5 (2) CaO
 , CaO #B1, B2 B3
 OLED, C1 , EML Alq EL 가 1

[1]

#		(V)	(cd/A)	EL (nm)	CIE _x	CIE _y	@20 cd/m ²
A1	CaO	9.6	3.71	532	0.37	0.57	742
A2	CaO	9.8	3.50	528	0.37	0.57	700
A3	CaO	9.8	3.50	528	0.37	0.57	700
A4	CaO	7.8	3.40	524	0.33	0.56	680
A5	CaO	7.7	3.30	524	0.33	0.56	660
B1	CaO	9.3	3.03	528	0.38	0.57	606
B2	CaO	9.3	3.05	528	0.38	0.57	610
C1		7.9	2.95	524	0.34	0.55	590

2

OLED , Alq TBADN 1:1 DCJTb 1.75 % Rubrene 5 %
 37.5 nm EML . EML Alq
 OLED
 #D1, D2, D3, D4 D5 (2) CaO
 , CaO #E1 E2
 OLED, C2 , EML Alq EL 2

[2]

#		(V)	(cd/A)	EL (nm)	CIE _x	CIE _y	@20 cd/m ²
D1	CaO	10.8	4.10	616	0.624	0.377	820
D2	CaO	10.9	3.60	616	0.625	0.372	720
D3	CaO	10.7	3.90	616	0.621	0.372	780
D4	CaO	10.9	3.60	616	0.625	0.372	720
D5	CaO	10.9	3.80	616	0.623	0.372	760
E1	CaO	10.7	3.10	616	0.629	0.370	620
E2	CaO	11.9	3.06	624	0.635	0.362	612
C2		8.3	3.00	528	0.344	0.548	600

3

9 #C1 #A1 A2 OLED (fade test)

(가)

(57)

1.

(a) 가

(b) ;

(c) 가 가

2.

1

가

3.

1 ,

1 1 .

4.

3 ,

2 1 2 .

5.

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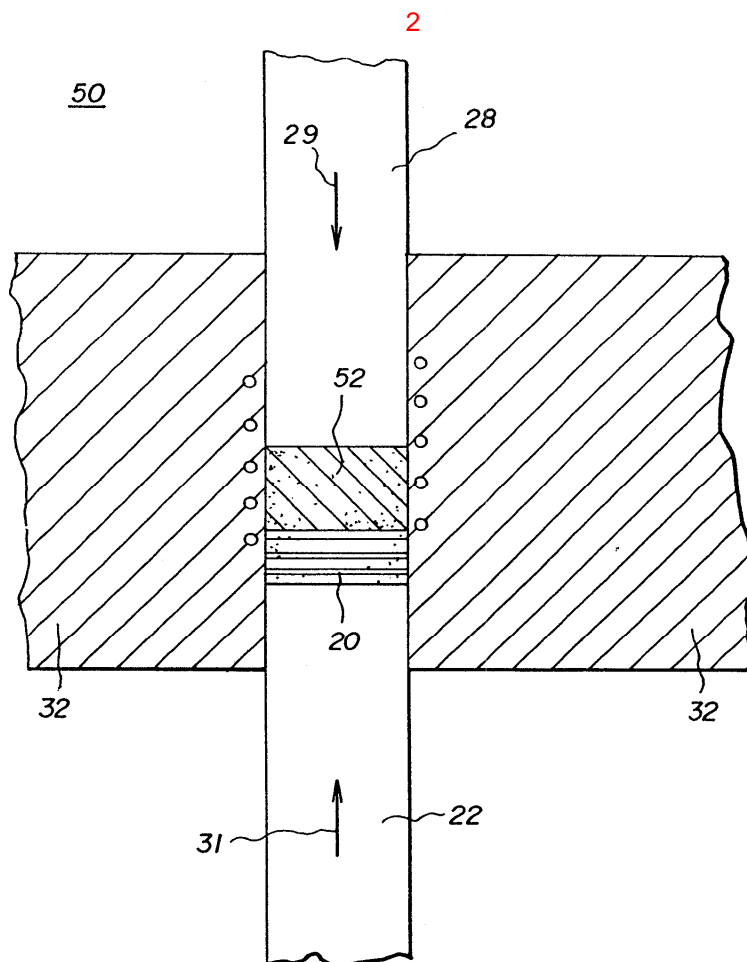
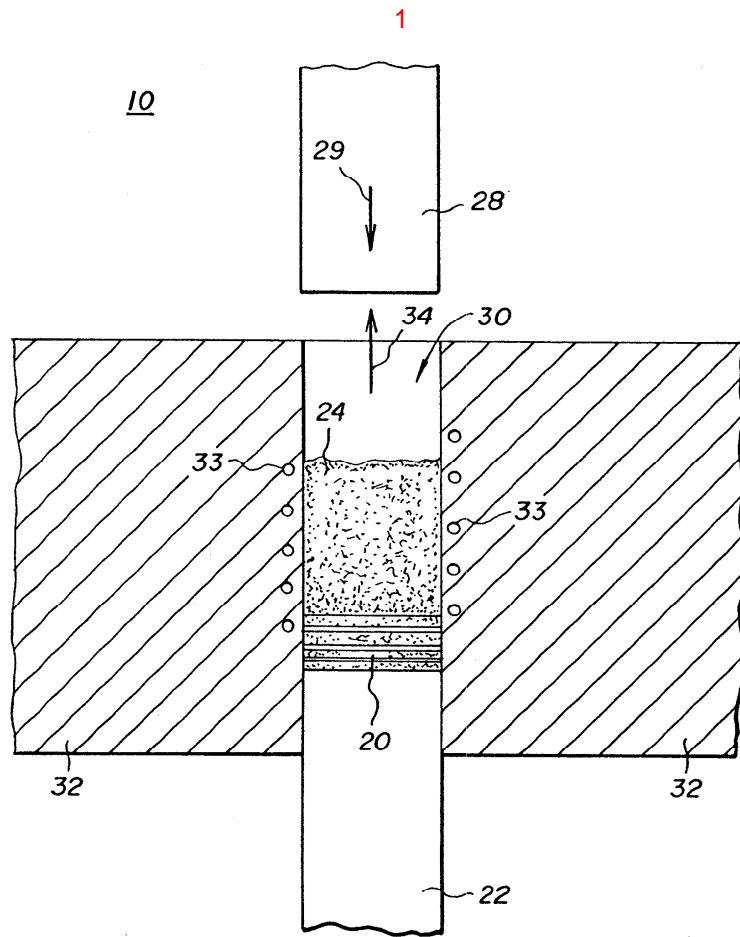
(a) ;

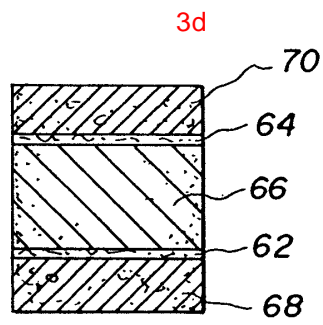
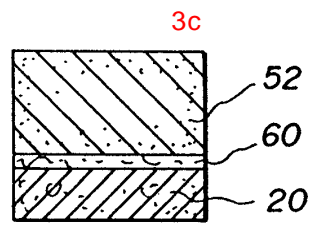
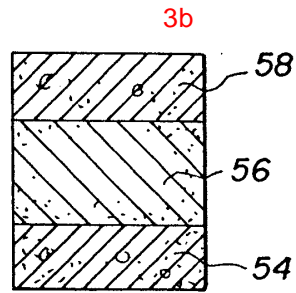
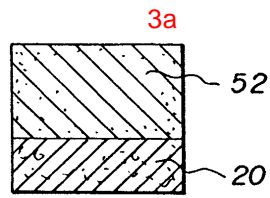
(b) 1 가 1 2 1 ;

(c) 가 - 1 ; , 1

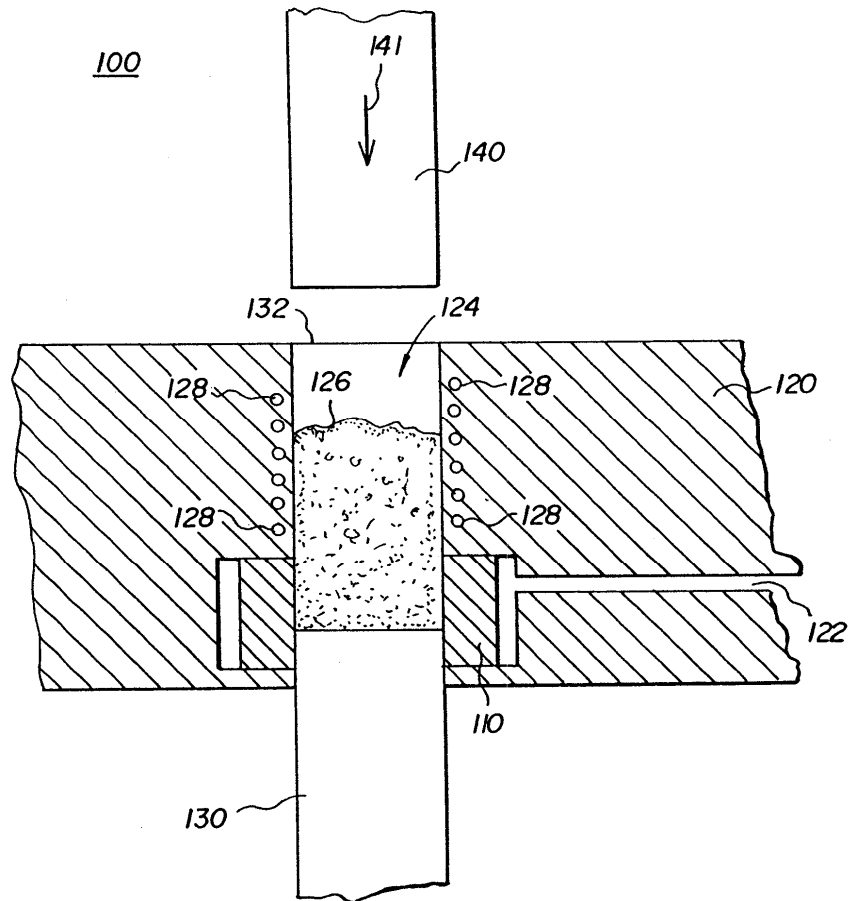
(d) 2 가 2 - ; 1

(e) 1 2 - 가 , 가 - -

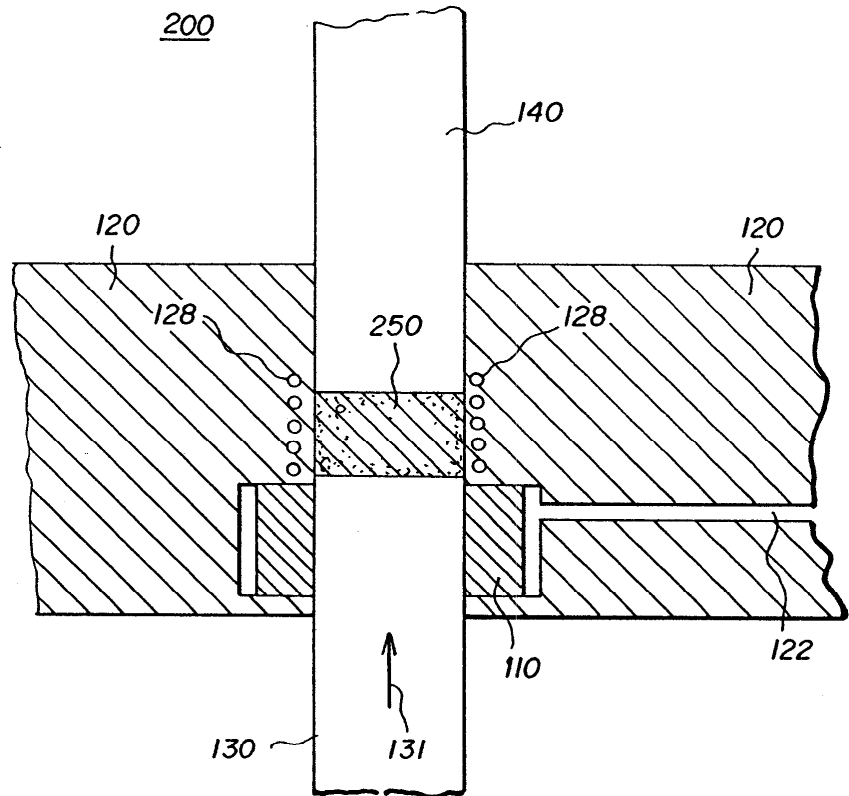


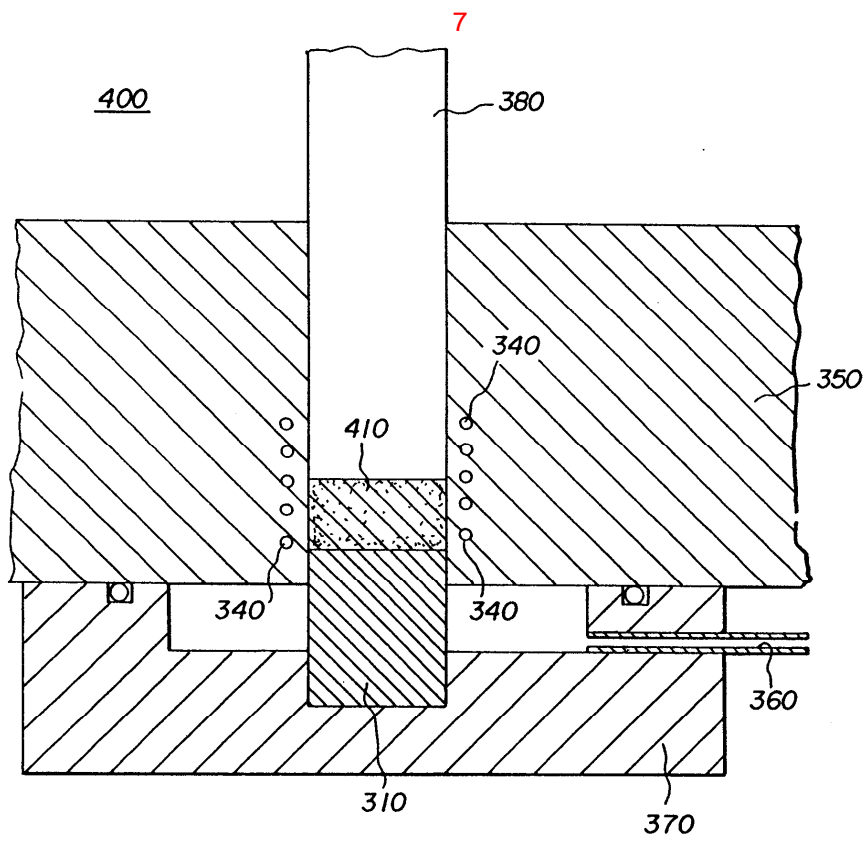
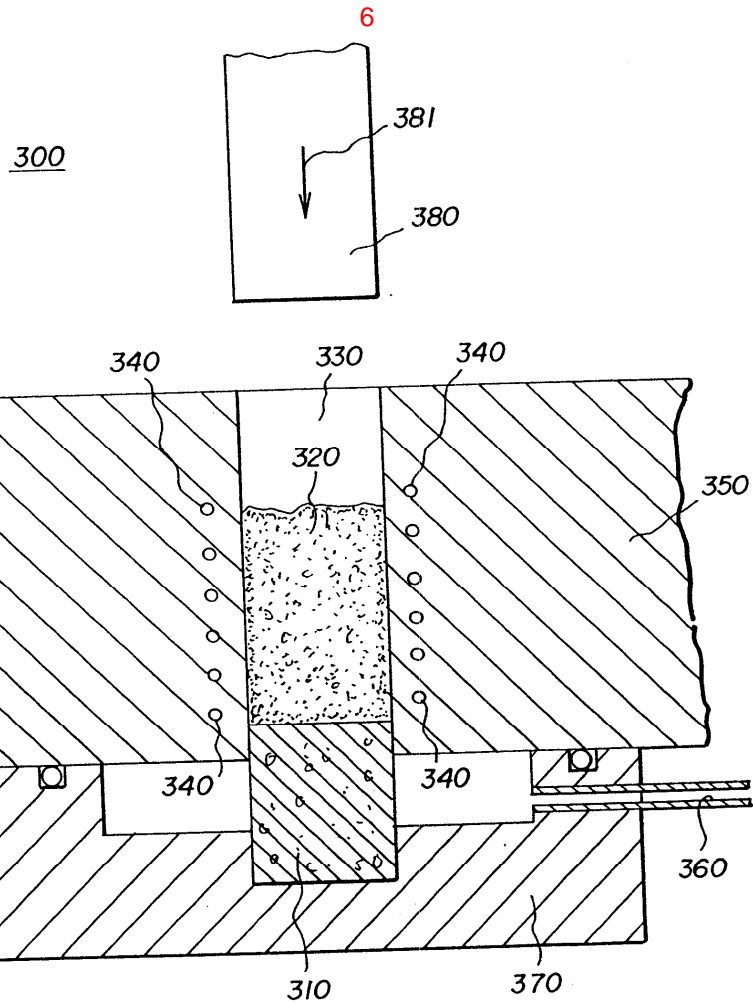


4

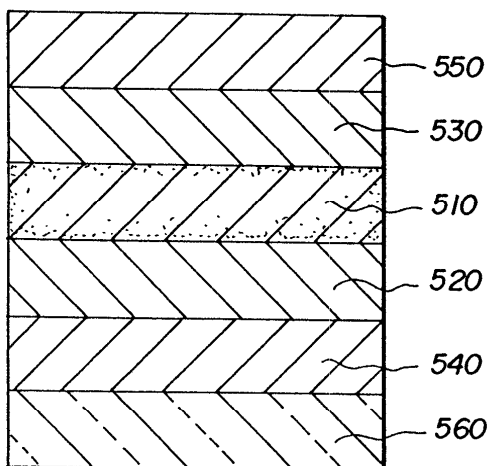


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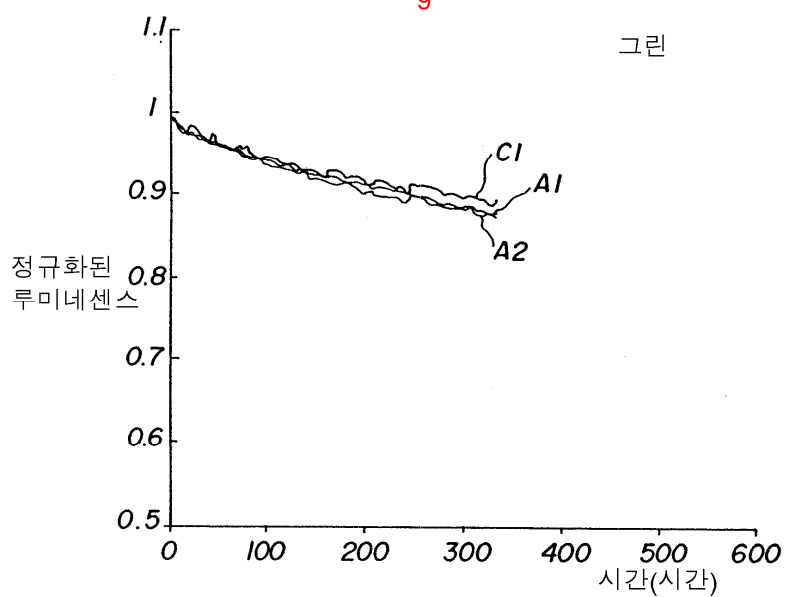


8



500

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그린