

(19)
(12)

(KR)
(A)

(51) 。 Int. Cl. ⁷
C09K 11/06

(11)
(43)

2001 - 0076654
2001 08 16

(21) 10 - 2000 - 0003929
(22) 2000 01 27

(71)

575

(72)

206 - 1306

101 - 306

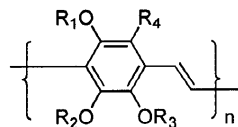
(74)

:

(54)

(1) : 가 1 (p- 가 4) (PPV) , (long chain) ,

(1)



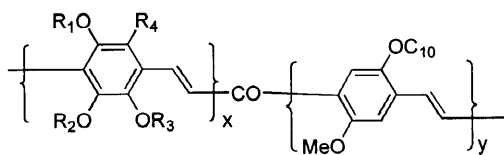
, R₁, R₂, R₃ , C₁₋₂₀ 가 , R₄ C₁₋₂₀ 가 .

OC1C10 - PPV

(2)

:

(2)



9 0.1 R₁, R₂, R₃ C₁₋₂₀ 가 , R₄ C₁₋₂₀ y 0.

4 가 PPV (defect) (voltage) 3V 504nm (color tu 1.22lm)
 (greenish blue) , OC1OC10 (voltage) 2.3V, 23000cd/m²,
 ning) 가 , /W .

1

1

2 3 () () ¹H - NMR

3 6 () ¹H - NMR

4 NMR 7 {1,4(2 - - 3,5,6 -) ¹H -

5 ¹H - NMR 9 {1,4(2 - - 3,5,6 -)

6 / (buffer layer)/ / / /

11

7 - Visible /Al] 7 , PL(photoluminescence) EL(electroluminescence) {1,4(2 - - 3,5,6 -) [ITO/PEDOT/ UV /Ca

8	7	{1,4(2 -	- 3,5,6 -)	
	[ITO/PEDOT/ (diagram)	/Ca/Al]	-	(voltage - current density)	
9	7	{1,4(2 -	- 3,5,6 -)	
	[ITO/PEDOT/ (diagram)	/Ca/Al]	-	(luminance - current density)	
10	7	{1,4(2 -	- 3,5,6 -)	
	[ITO/PEDOT/ (diagram)	/Ca/Al]	-	(luminance - voltage)	
11	8	{1,4(2 -	- 3,5,6 -	)	- co - {1,4(
2 -	- 5 -	) }	UV - Visible	, PL(photoluminescence)	,
	[ITO/PEDOT/ (diagram)	/Ca/Al]		EL(electroluminescence)	.
12	8	{1,4(2 -	- 3,5,6 -	)	- co - {1,4(
2 -	- 5 -	) }	[ITO/PEDOT/ (diagram)	/Ca/Al]	
	(voltage - current density)				
13	8	{1,4(2 -	- 3,5,6 -	)	- co - {1,4(
2 -	- 5 -	) }	[ITO/PEDOT/ (diagram)	/Ca/Al]	
	(luminance - current density)				
14	8	{1,4(2 -	- 3,5,6 -	)	- co - {1,4(
2 -	- 5 -	) }	[ITO/PEDOT/ (diagram)	/Ca/Al]	
	(luminance - voltage density)				
15	9	{1,4(2 -	- 3,5,6 -)	
UV - Visible	, PL(photoluminescence)		[ITO/PEDOT/ (diagram)		
/Ca/Al]	EL(electroluminescence)				
16	9	{1,4(2 -	- 3,5,6 -)	
	[ITO/PEDOT/ (diagram)	/Ca/Al]	-	(voltage - current dens	
ity)					
17	9	{1,4(2 -	- 3,5,6 -)	
	[ITO/PEDOT/ (diagram)	/Ca/Al]	-	(luminance - current de	
nsity)					
18	9	{1,4(2 -	- 3,5,6 -)	
	[ITO/PEDOT/ (diagram)	/Ca/Al]	-	(luminance - voltage de	
nsity)					

가 (green color) 가
 가 (color tuning) 가 4
 photon) (electron) (electron) (photon) 가 (p
 electronic device) (optoelectronic device)
 (electroluminescence display) 가 (backlight)
 가 가 가 가 GaN, ZnS, SiC (EL)
 가 200V 가 가
 (electroluminescence, EL) (hole)
 가 가
 Tang Vanslyke 1963 Pope (alumina - quinone, Alq₃) (Eastmann Kodak)
 10V 1%, 가 1000cd/m² 가 가
 가 (Joule) 가 가
 가 가 (band gap) 가 가
 (full color) 가 " (- conjugated polymer)"
 Cambridge (p -) (poly (p - phenylenevinylene): PPV) 가 1990 가 LED
 가 LED가 Full - color Red, Green, Blue 가 1 2
 PPV Full - color
 (polymer electroluminescent display, ELD) (precursor) PPV
 V PPV 가

yloxy) , Gilch (Dehydrogenhalogenation) PPV가
 (electron donor) 가 (ethylhexyloxy) (dimethyloct
 (red - shift) (orange) (electronic effect)

가 EL
 가 poly(arylene vinylene) EL
 (dialkoxy - PPV) (yellowish green)

, device - 가 PPV
 5 6 가 가

PPV , PPV
 (effective conjugation length)
 , Gilch 가 4
 가 가 (defect) (asymmetric)
 가 EL

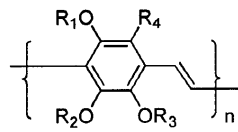
PPV , 가 4

가 PPV

- 5 -) PPV , 4 가 {1,4(2 -
 OC1C10 - PPV) (Poly{1,4(2 - methoxy - 5 - dimethyloctyloxy)phenylene vinylene;

가 1 (p-) (PPV) , (long chain)
 4 가
 (1) :

1



R₁, R₂, R₃ C₁₋₂₀ 가 , R₄ C₁₋₂₀
 , 가 , C₁₋₂₀ 가 .

- PPV(tetraalkoxy - PPV)
 가 가 ,

- PPV(trialkoxyalkyl - PPV)
 (defect) . 가 4

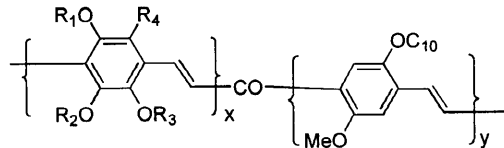
3 6V ,

4 가

(1)
 (2)

OC1C10 - PPV

2



R₁, R₂, R₃ C₁₋₂₀ 가 , R₄ C₁₋₂₀
 , 가 , C₁₋₂₀ 가 , x 0.1 0.9 y 0.
 9 0.1 (1) OC1C10 - PPV
 , 3V , 가 23000cd/m² ,
 1.22 lm/W , OC1C10 - PPV 가

(Wittig condensation)

(Gilch)

(Mn)

10,000 ,
 10,000 1,000,000

가 1.5 5.0 .

PPV , 4 가
 (EL diode) . ,
 C1C10 - PPV ,

0

6 / (buffer layer) / / / /

11

/ / , / (buffer layer)/ / , / (buffer layer)/
 / / , / (buffer layer)/ / / / , / (buffer layer)/
 / / / / ITO
 (work function)가 Al, Al:Li, Ca .

(polythiophene), (polyaniline), (polyacetylene), (polypyrrole),
 , LiF MgF₂가 .

1 1:Trimethoxyphenol (1)

1000Mℓ (trimethoxybenzaldehyde) 29.4g (150mmol) (dichloromethane) 500Mℓ
 0 m - CPBA 40g(180mmol) 가 .
 200Mℓ (sodiumbicarbonate) 300Mℓ
 10 (dichloromethane) 300Mℓ
 ering) 가 MgSO₄ (filt
 (column chromatography) (:
 n - / = "4/1) " (trimethoxyphenol) 22g(119mmol, 79%)
 .¹H - NMR .¹H - NMR(CDCl₃) : 3.79(s, 3H), 3.8
 2(s, 3H), 3.828(s, 3H), 5.46(br, 1H), 6.56(s, 1H), 6.59(s, 1H)

2 2:Trimethoxy(dimethyloctyloxy)benzene (2)

22g (119mmol) DMF 300Mℓ , K₂CO₃ 49g(357mmol) KI(10g) 가
 (dimethyloctylbromide) 52g(238mmol) 가 150 12
 300Mℓ . 10% NaOH 300Mℓ 가 10 .
 , n - 300Mℓ 가
 , MgSO₄ .
 (: n -) 25g(77.1 mmol) .
¹H - NMR .¹H - NMR(CDCl₃) : 0.85 0.95(m, 9H), 1.14 1.3
 2(m, 6H), 1.52 1.78(m, 3H), 1.83 1.93(m, 1H), 3.83(s, 3H), 3.837(s, 3H), 3.84(s, 3H), 3.97 4.03(m,
 2H), 6.59(s, 1H), 6.60(s, 1H)

3 3:Bis(chloromethyl)trimethoxy(dimethyloctyloxy)benzene (3)

25g(77.1mmol) (chloromethyl methylether)(31g, 385 mmol)
 가 5 Mℓ . 8 50 , 300Mℓ n - 300Mℓ 가
 10 . n - 300Mℓ .
 가 , MgSO₄
 (: n - / = "10/1) " (.
) 7g(16.6mmol, 22%) .¹H - NMR .¹H - N
 MR(CDCl₃) : 0.85 0.90(m, 6H), 0.96 0.99(m, 3H), 1.17 1.37(m, 6H), 1.52 1.78(m, 3H), 1.83 1.
 93(m, 1H), 3.88(s, 3H), 3.92(s, 3H), 3.93(s, 3H), 3.92 3.95(m, 2H), 4.70(s, 4H)

4 4:Trimethoxyphenylpropanol (4)

2,4,5- (2,4,5 - trimethoxycinnamic acid) 5g (21mmol) (200Mℓ) , Li
 AlH₄ 1.2g (31mmol) 0 가 , 6 ,
 가 , LiAlH₄ 가 0 ,
 , 가 2Mℓ 가 , 300Mℓ 가 가
 MgSO₄ (: n - / = "1/4) " 2.61g(11.5 mmol)
 : n - / = "1/4) " 2.61g(11.5 mmol)
¹H - NMR . 1.76 1.85(m, 2H), 2.65(t, 2H), 3.57
 (t, 2H), 3.82 3.88(m, 9H), 6.52(s, 1H), 6.87(s, 1H)

5 5:Dimethyloctyloxypropyltrimethoxybenzene (5)

2.61g(11.5mmol) THF 30Mℓ HMPA 6Mℓ NaH 0.55g(7.5mmol) 0
 가 .80 1 , (dimethyloctyl bromide) 5g(23 mmol)
 .80 6 50Mℓ 가 10 ,
 , n - 100Mℓ 가 , MgSO₄
 (: n - /
 = "10/1) " 2.7g(7.5mmol, 65%)
¹H - NMR . 0.86 0.91(m, 9H), 1.14 1.
 32(m, 6H), 1.52 1.78(m, 4H), 1.82 1.87(m, 2H), 2.63(t, 2H), 3.43(m, 4H), 3.81(s, 3H), 3.84(s, 3H),
 3.89(s, 3H), 6.52(s, 1H), 6.72(s, 1H)

6 6:Bis(chloromethyl)dimethyloctyloxypropyltrimethoxybenzene (6)

2.7g(7.5mmol) (3.1g, 38.5 mmol) 가 0.5Mℓ
 .8 50 , 100Mℓ n - 100Mℓ 가 10
 , n - 100Mℓ
 가 , MgSO₄ (: n - / = "10/1) " ()
 540mg (1.16 mmol, 16%) ()
¹H - NMR . 0.87 0.95(m, 9H), 1.14 1.42(m, 7H), 1.52 1.78(m, 3H),
 1.83 1.93(m, 2H), 2.76 2.82(m, 2H), 3.47(t, 4H), 3.89(s, 3H), 3.93(s, 3H), 3.97(s, 3H), 4.70(s, 2H),
 4.73(s, 2H)

7 7:Poly{1,4(2 - dimethyloctyloxy,3,5,6 - trimethoxy)phenylene vinylene (7)}

3 (3) 430mg(1mmol) (anhydrous) THF 63Mℓ (0.016M solution)
 0 - (potassium tert - butoxide) 4Mℓ(1.0mol solution in TH
 F, 4) 가 - 1.5 2.0
 . 3 , (500Mℓ)
 Soxhlet ,
 (70%). 200,000 300,000 .

8 8:Poly{1,4 (2 - dimethyloctyloxy - 3,5,6 - trimethoxy) phenylene - co - (1' - methoxy - 4' - dim
 ethyloctyloxy)phenylene vinylene (8)(Tetraalkoxy - PP - co - OC10C10 - PPV)

3 (3) 2,5 - () - 1 - - 4 - 가
 THF(0.016M solution) . 0 - (

1.0mol solution in THF, 4) 가 . - 1.5 2.0
 . 3 , (500Mℓ)
 Soxhlet ,
 (70%). 200,0
 00 300,000 .

9 9:Poly{1,4(2 - dimethyloctyloxypropyl - 3,5,6 - trimethoxy)phenylene vinylene (9)

6 (6) 170mg(0.37mmol) THF 23Mℓ (0.016M solution) 0
 - 1.47Mℓ(1.0mol solution in THF, 4) 가 .
 1.5 2.0 3
 (100Mℓ) . Soxhlet ()
 40%). 20,000 .

10 10:Poly{1,4 (2 - dimethyloctyloxypropyl - 3,5,6 - trimethoxy) phenylene - co - (1' - methoxy - 4' - dimethyloctyloxy)phenylene vinylene (10) (Trialkoxyalkyl - PP - co - OC1OC10 - PPV)

6 (6) 2,5 - () - 1 - - 4 - 가
 THF (0.016M solution) 0
 (1.0mol solution in THF, 4) 가 . - 1.5 2.0
 3 , (500Mℓ)
 Soxhlet ,
 (70%). 200,000 300,00
 0 .

11 11:

7, 8, 9, 10 EL device
 6 . EL device ITO(indium - tin oxide)
 , ITO (photoresist resin) (etchant) (pa
 tternning) , (conductive buffer layer) Bayer Batron
 P 4083 500 , 180 1 (baking) .
 0.2μm , ,
 (spin rate) 50 500nm ,
 (insulating layer) (thermoevaporator) 4 × 10⁻⁶ torr
 , 4mm² . (crystal sensor)
 (forward bias voltage)

12 12: UV - Visible, PL(photoluminescence)

7, 8, 9, 10 (glass)
 , UV Photoluminescence(PL) . (pin hole)
 UV PL 7, 11, 15 .

7 PL , PL - PPV , UV 446nm , 446nm
 506nm , shoulder가 541nm .

11 , Tetraalkoxy - co - OC1OC10 - PPV(10:1) UV 451nm ,
 451nm PL PL 581nm . , Tetraalkoxy - co - OC1OC1
 0 - PPV(1:1) UV 486nm , 486nm PL PL
 588nm .

15 , - PPV UV 399nm , 399nm
 PL PL 493nm , shoulder가 527nm . ,
 Trimethoxyalkyl - co - OC1OC10 - PPV(1:1) UV 475nm , 475nm
 PL PL 585nm .

13 13: 가

7, 8 9 EL device 가 8 10,
 12 14 16 18 ITO/PEDOT/ /Ca/Al EL 10
 (rectifying diode) . Tetraalkoxy - PPV (turn - on voltage) 10
 2.9 V , 28900 cd/m² 0.58 lm/W . Trialcox
 yalkyl - PPV 18 6.3 V , 8600 cd/m²
 0.77 lm/W .

8 Tetraalkoxy - co - OC1C10 - PPV(10:1) 3.6 V
 , 12500 cd/m² 1.22 lm/W .
 가 Tetraalkoxy - co - OC1C10 - PPV(1:1) 2.3 V
 , 24400 cd/m² 0.53 lm/W . 10
 Trialalkoxyalkyl - co - OC1C10 - PPV(1:1) 2.6 V , 1257
 0 cd/m² 1.10 lm/W . EL -

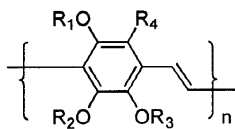
(p -) (PPV) , 4
 , OC1C10 - PPV ,

(57)

1.

(p -) (PPV) , 4 가 (1)

(1)

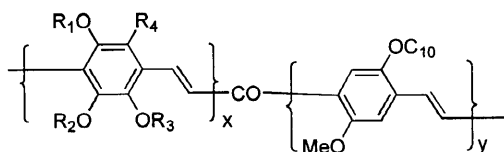


R₁, R₂, R₃ C₁₋₂₀ 가 , R₄ C₁₋₂₀ 가 .

2.

1 OC1C10 - PPV , (2)
:

(2)



R₁, R₂, R₃ C₁₋₂₀ 가 , R₄ C₁₋₂₀ 가 , x 0.1 0.9 y 0.

3.

1 2 , 10,000 1,000,000 , 가 1.5
5.0 .

4.

1 2 , / / , / (buffer layer)/
/ , / (buffer layer)/ / / , / (buffer layer)/ / /
/ , / (buffer layer)/ / / / /

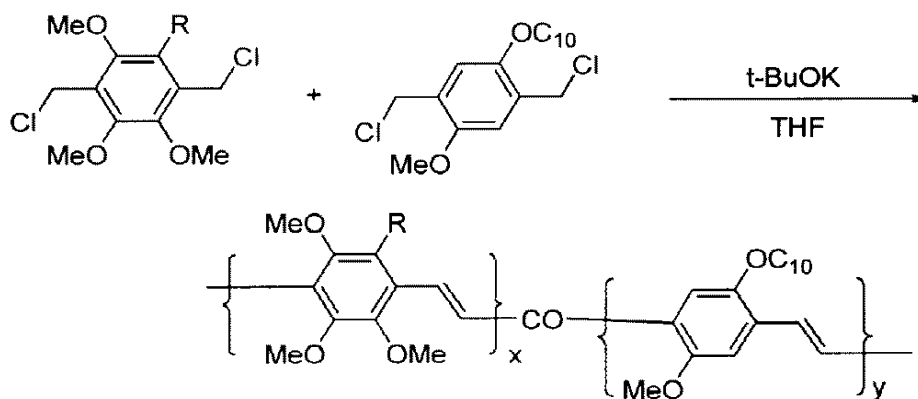
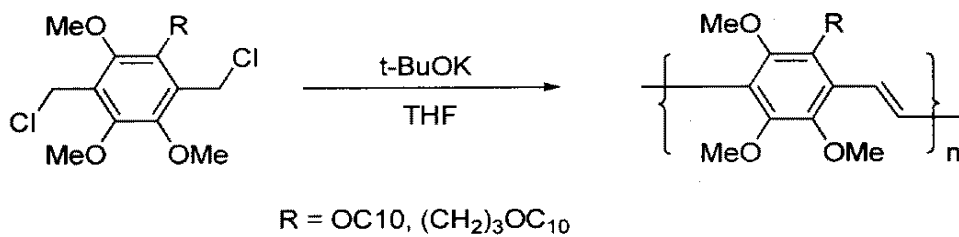
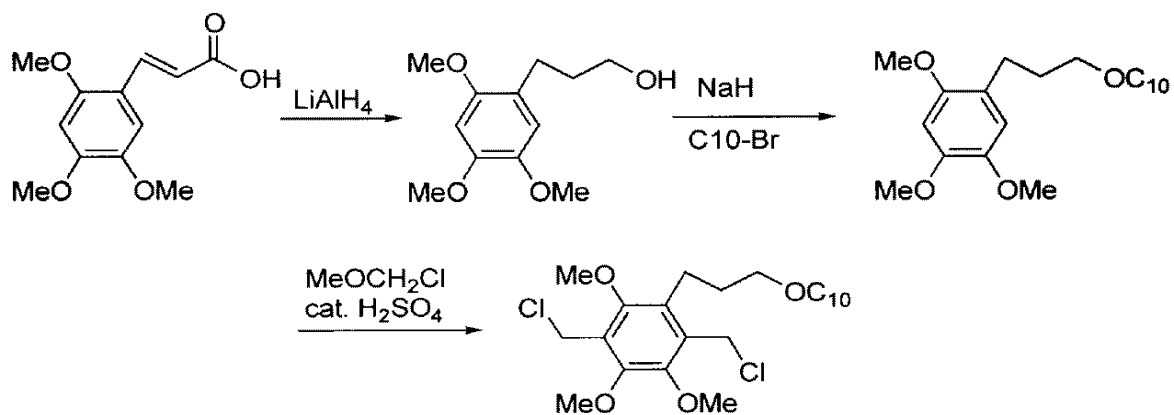
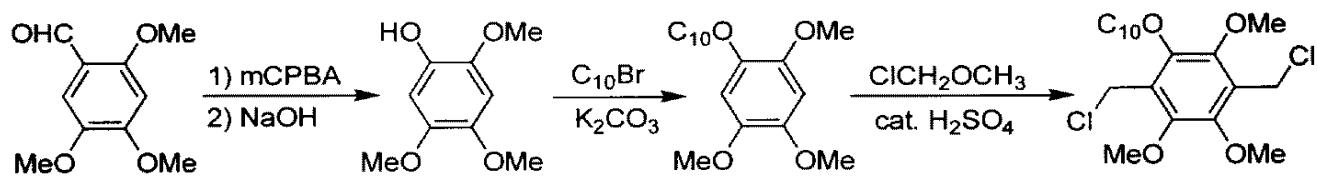
5.

4 , (polythiophene), (polyaniline), (polyacetylen
e), (polypyrrole), .

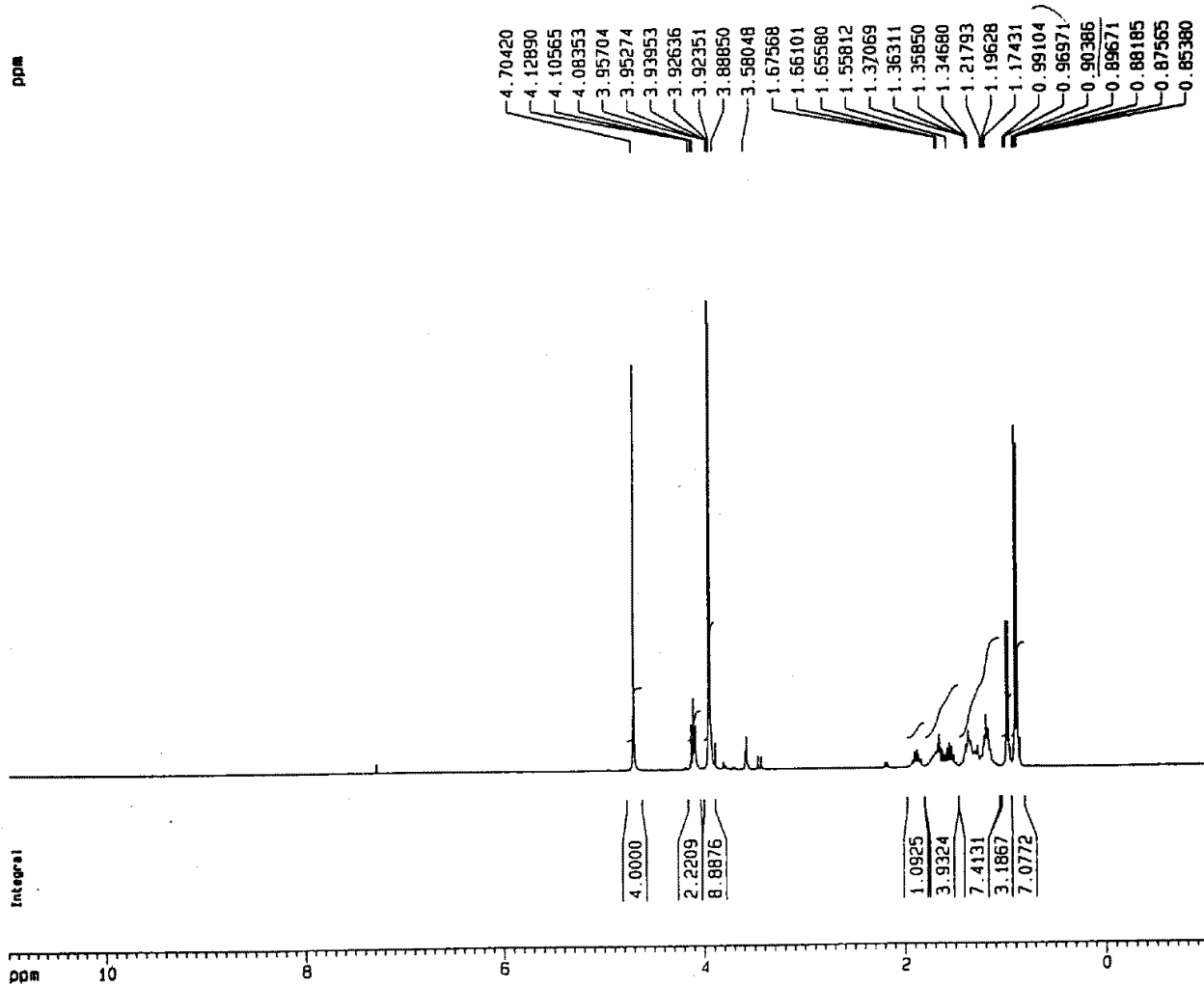
6.

4 , LiF MgF₂ .

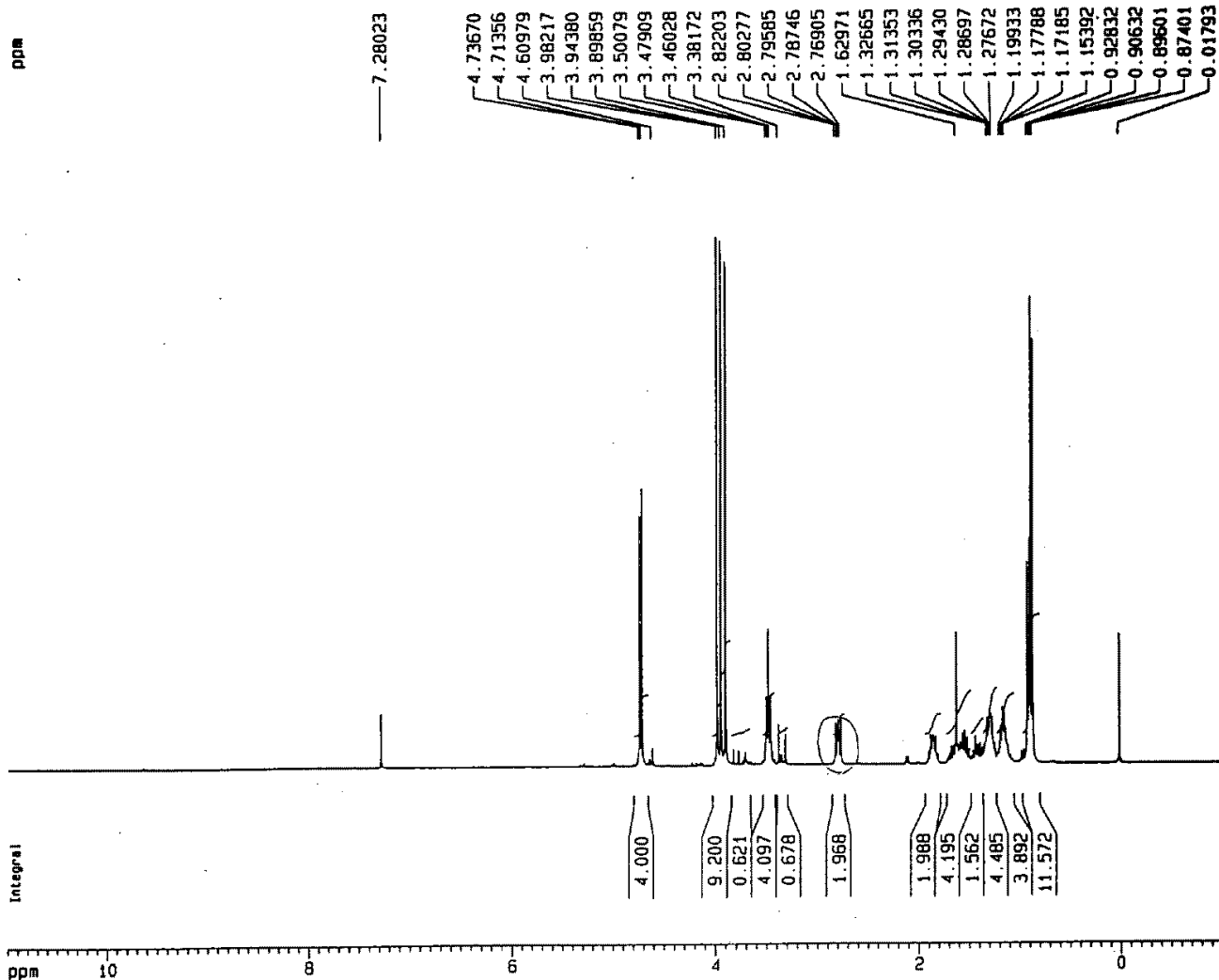
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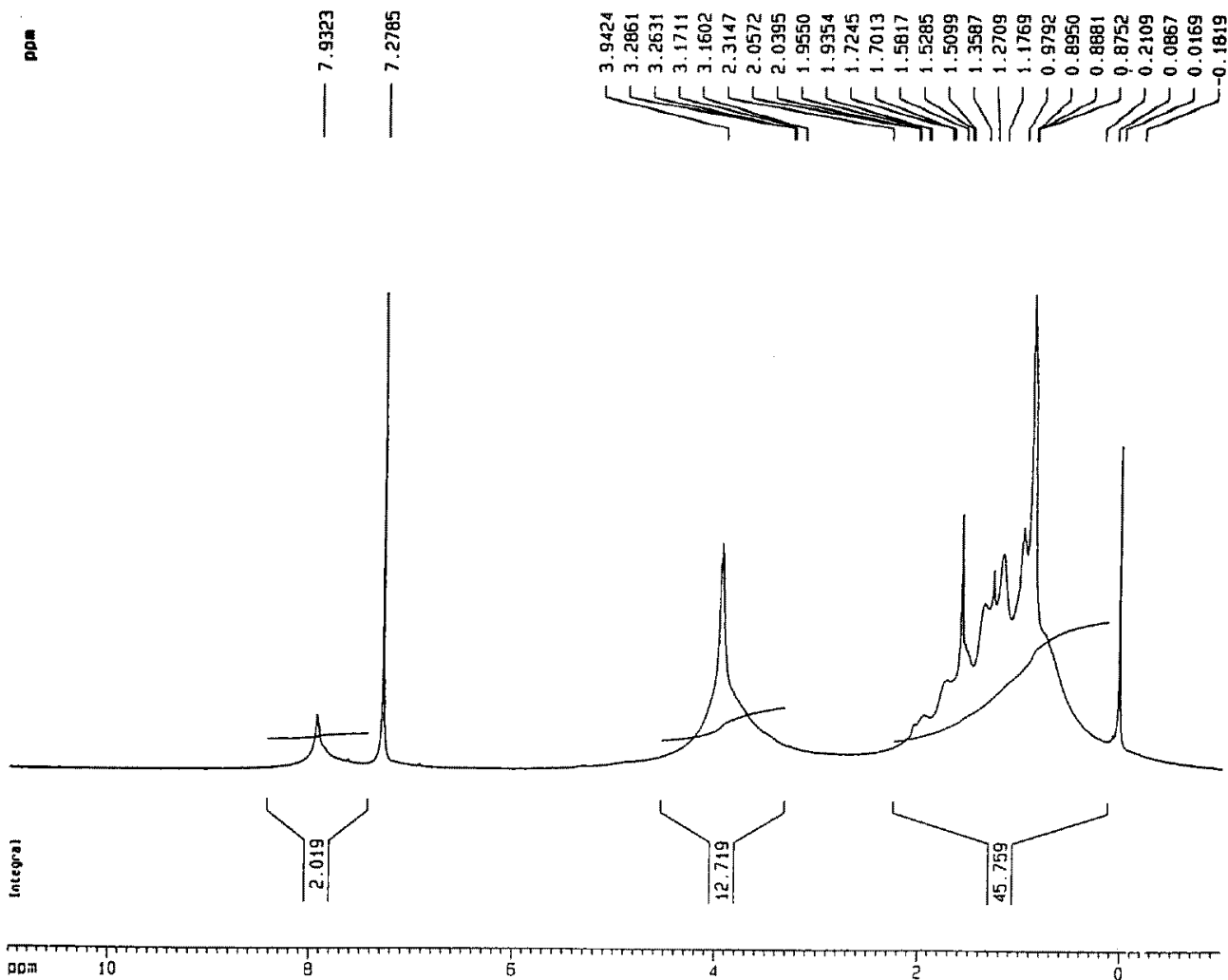
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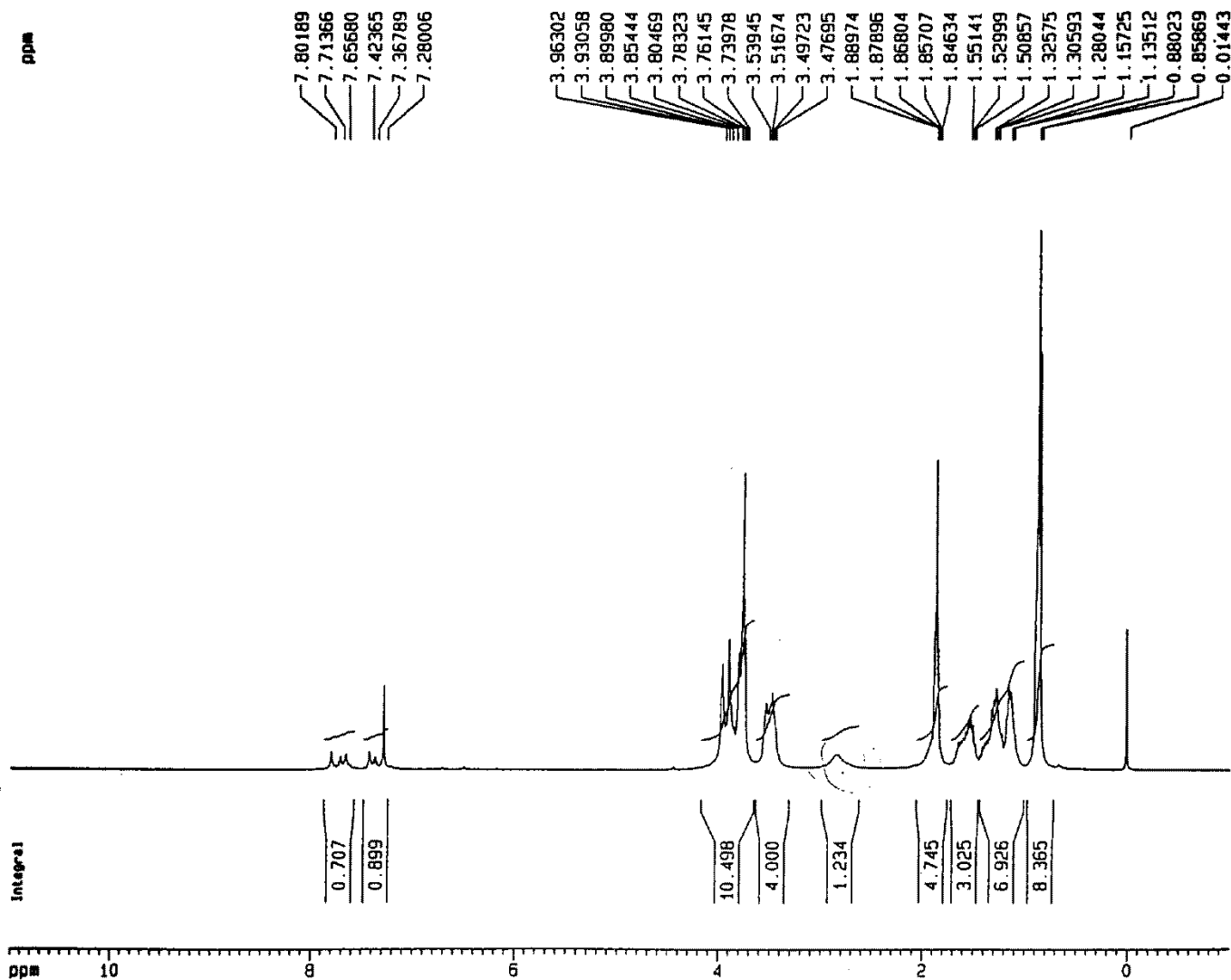
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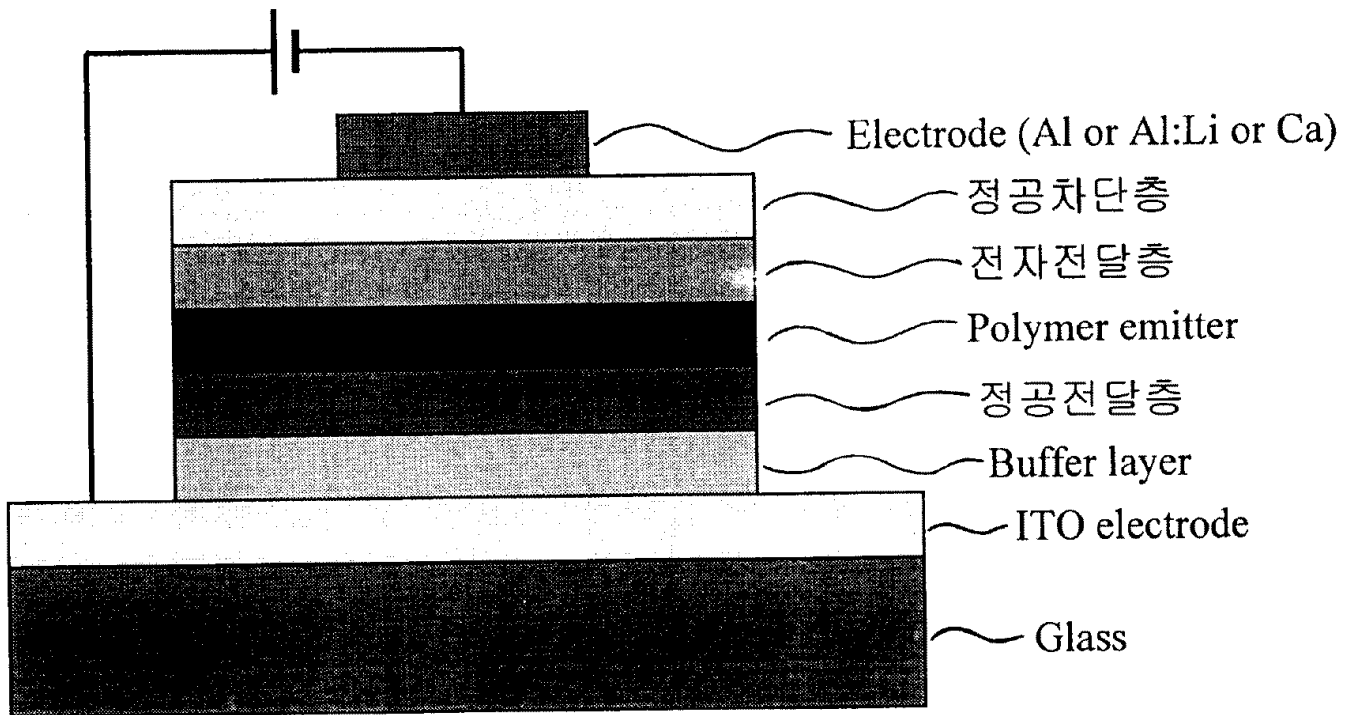
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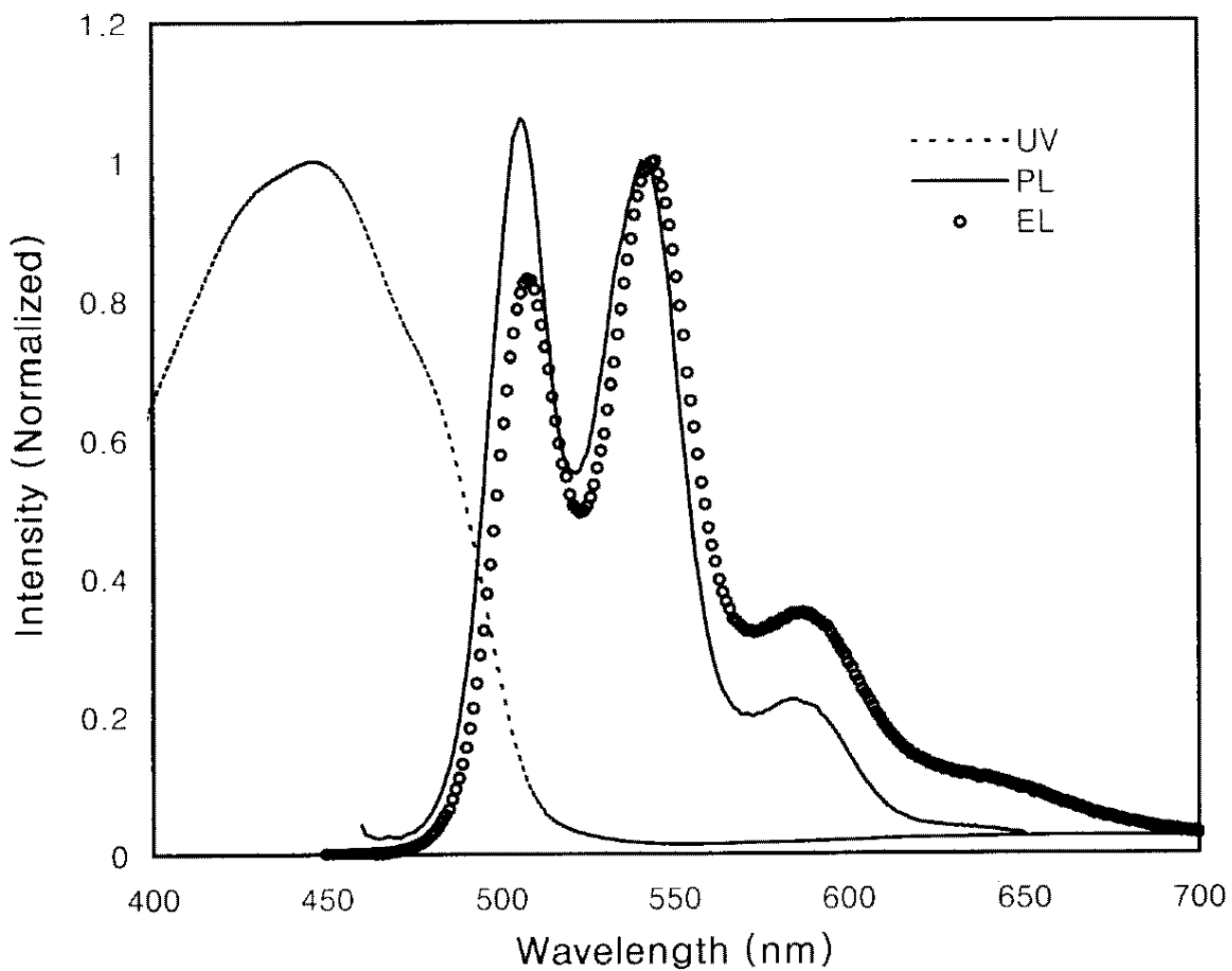
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6

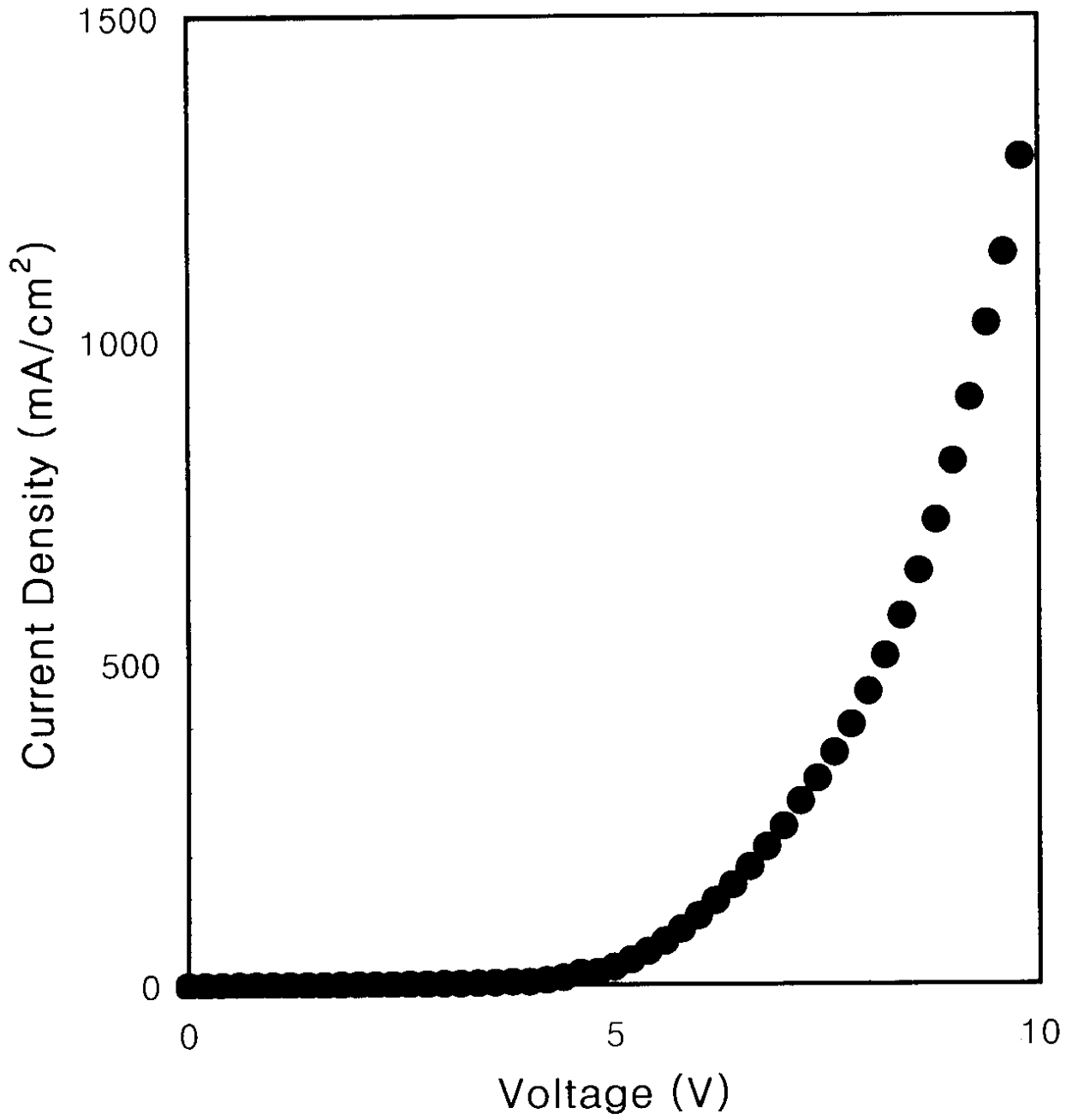


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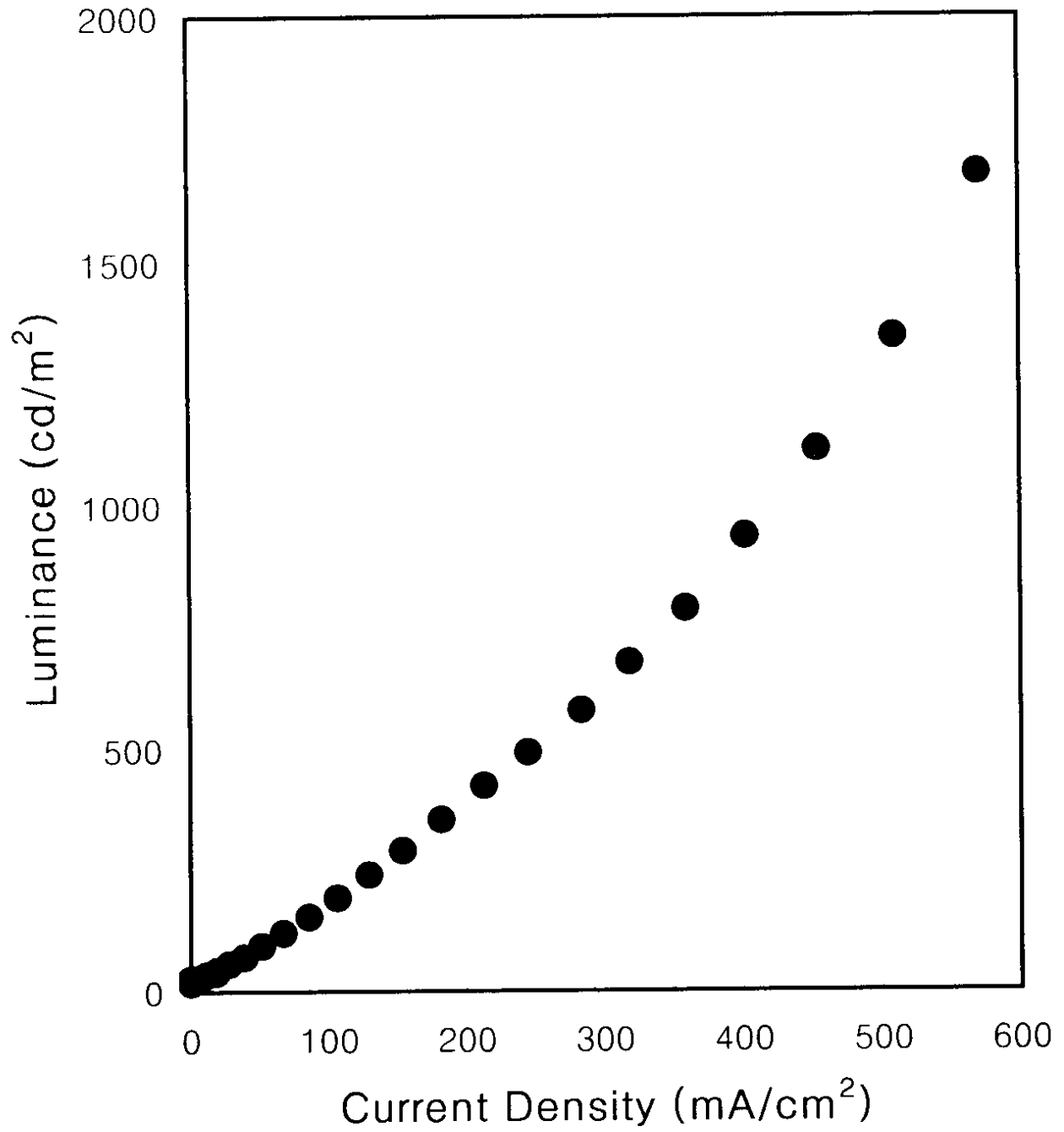


8

I – V Curve

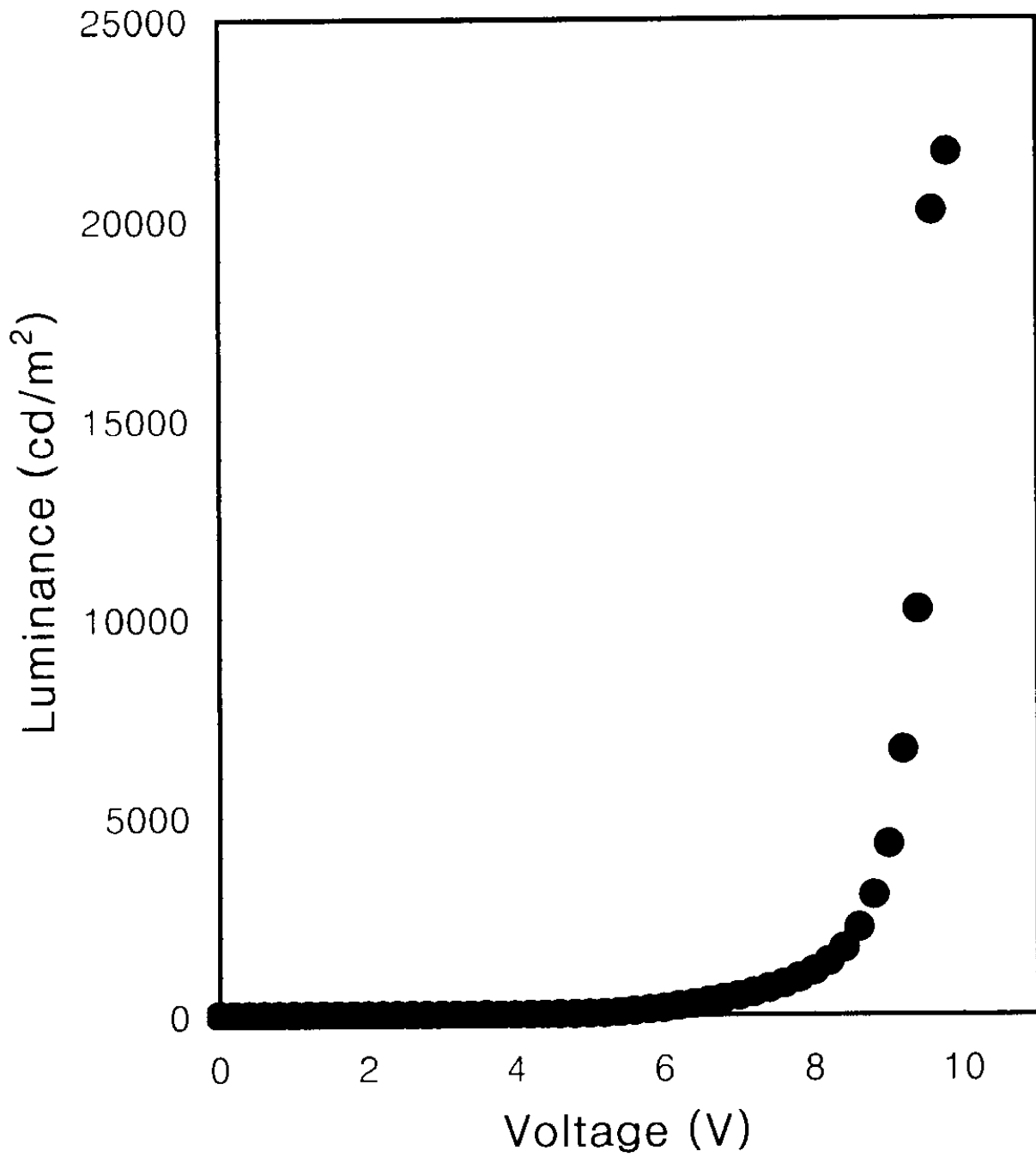


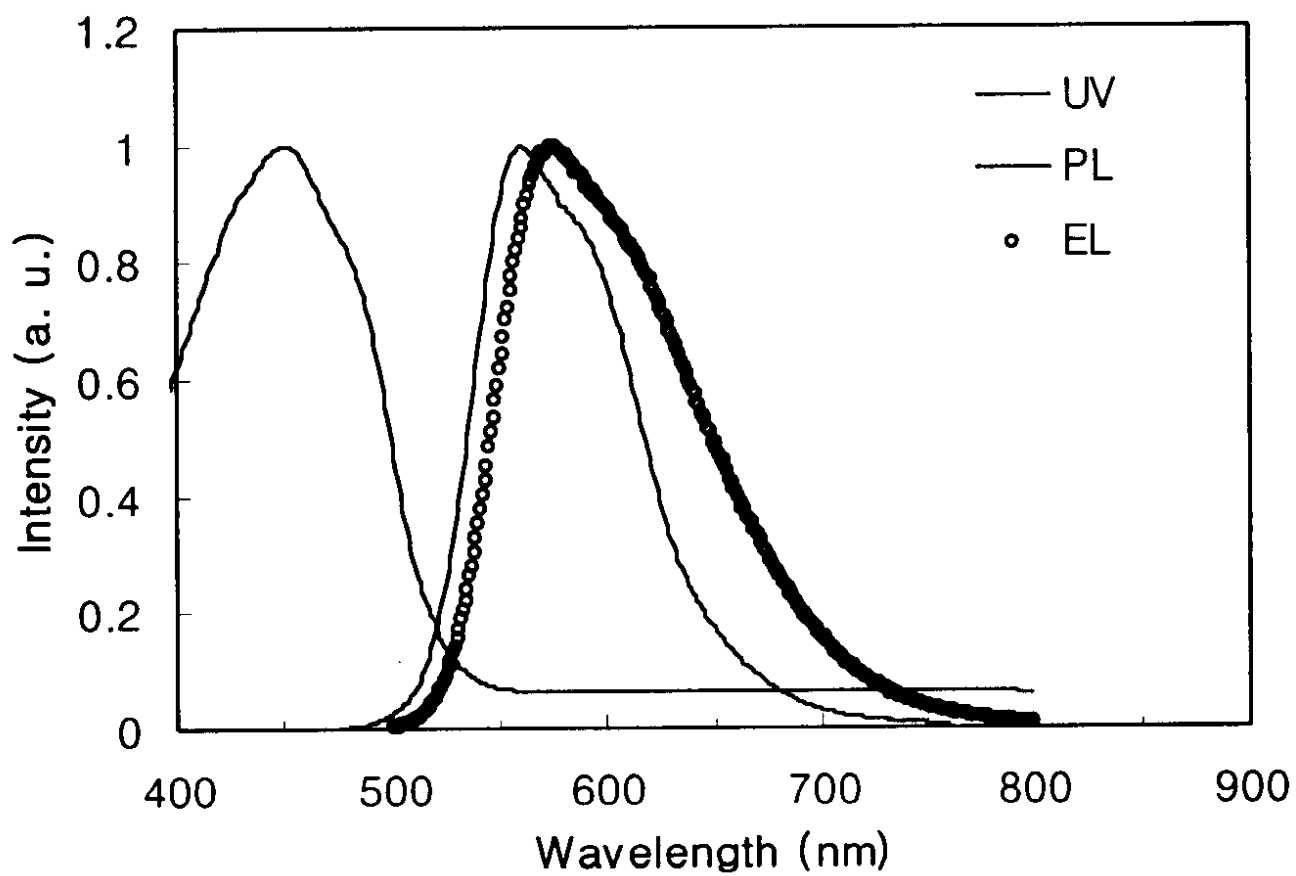
L - I Curve



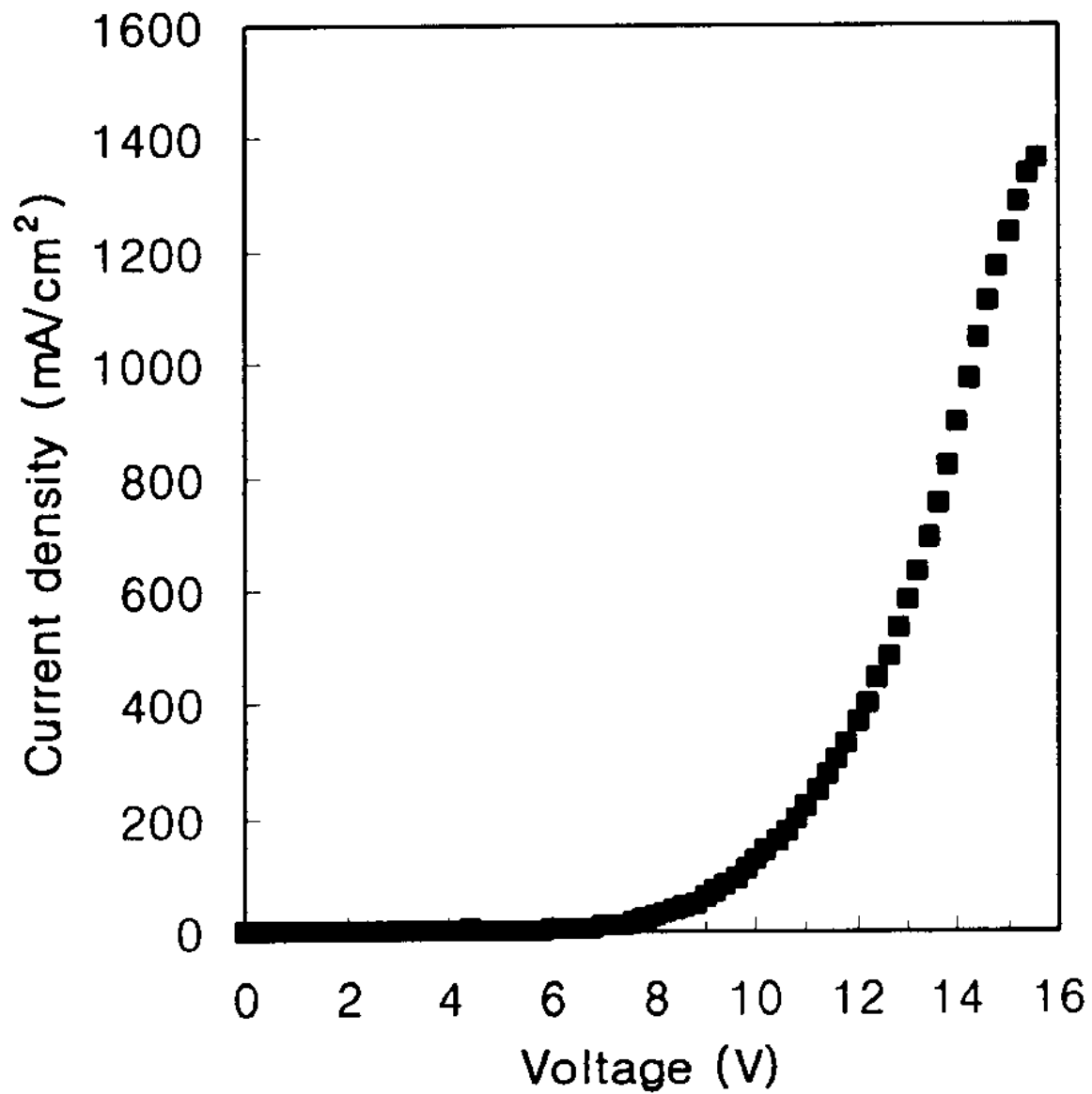
10

L - V Curve

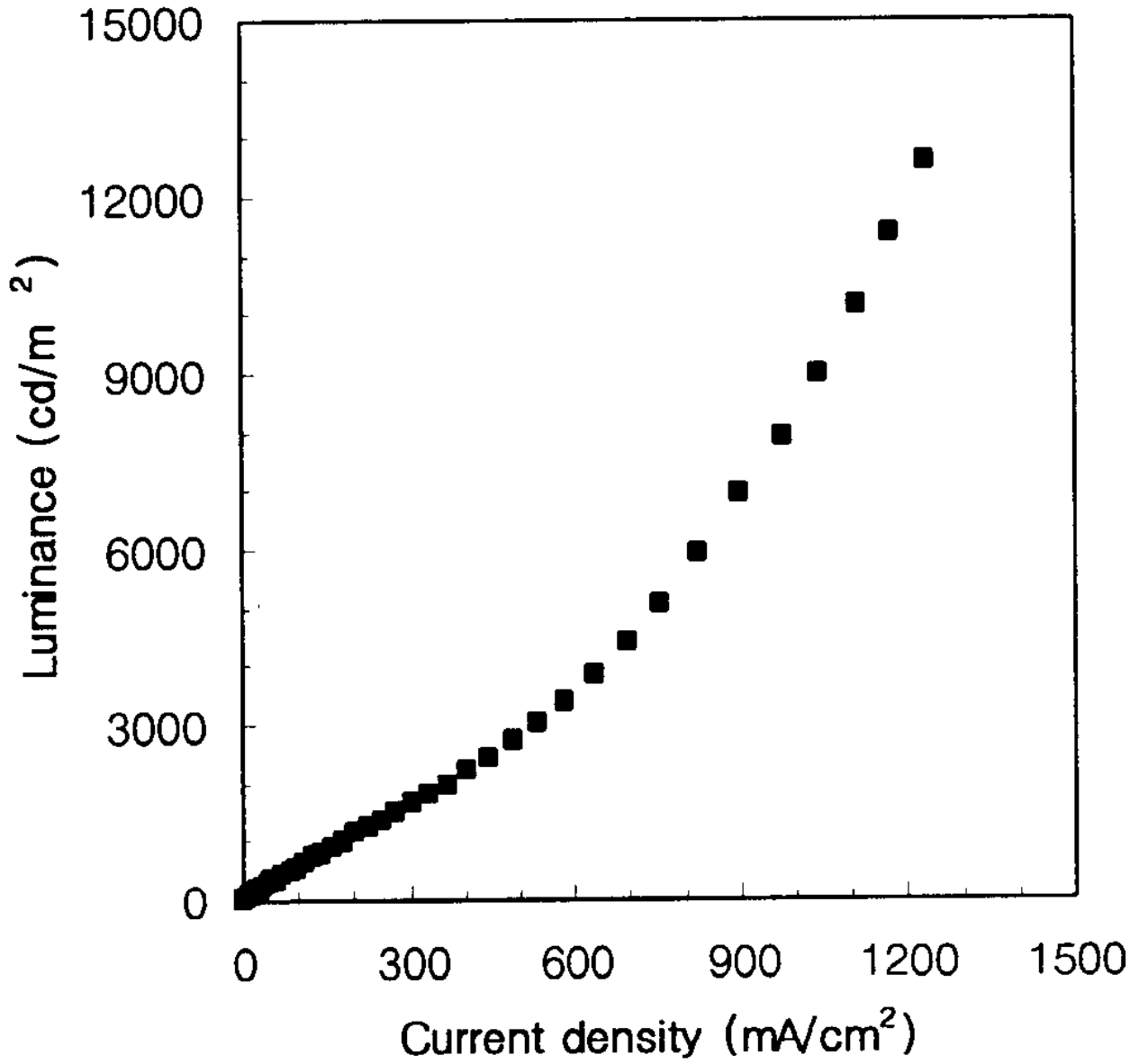




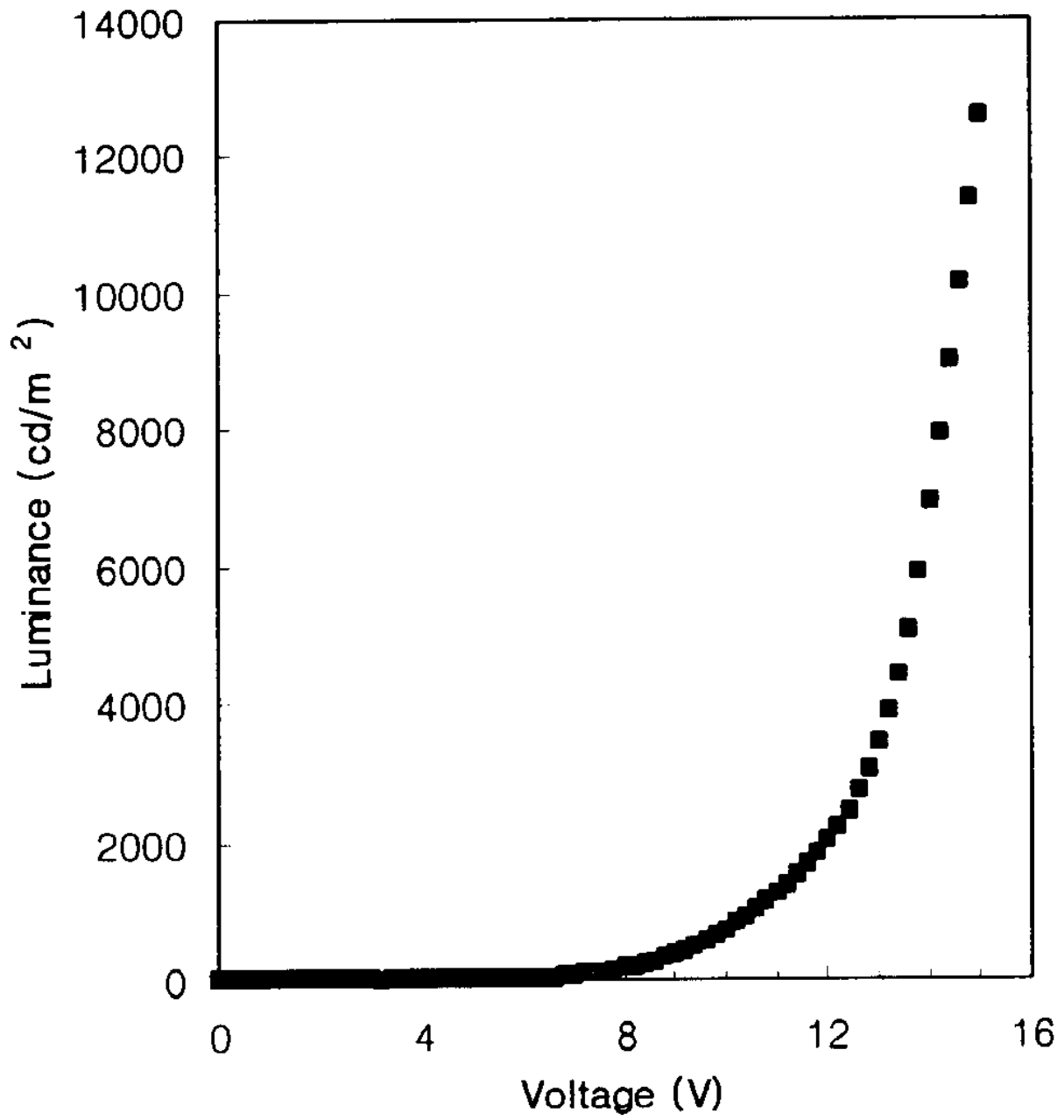
I-V Curve



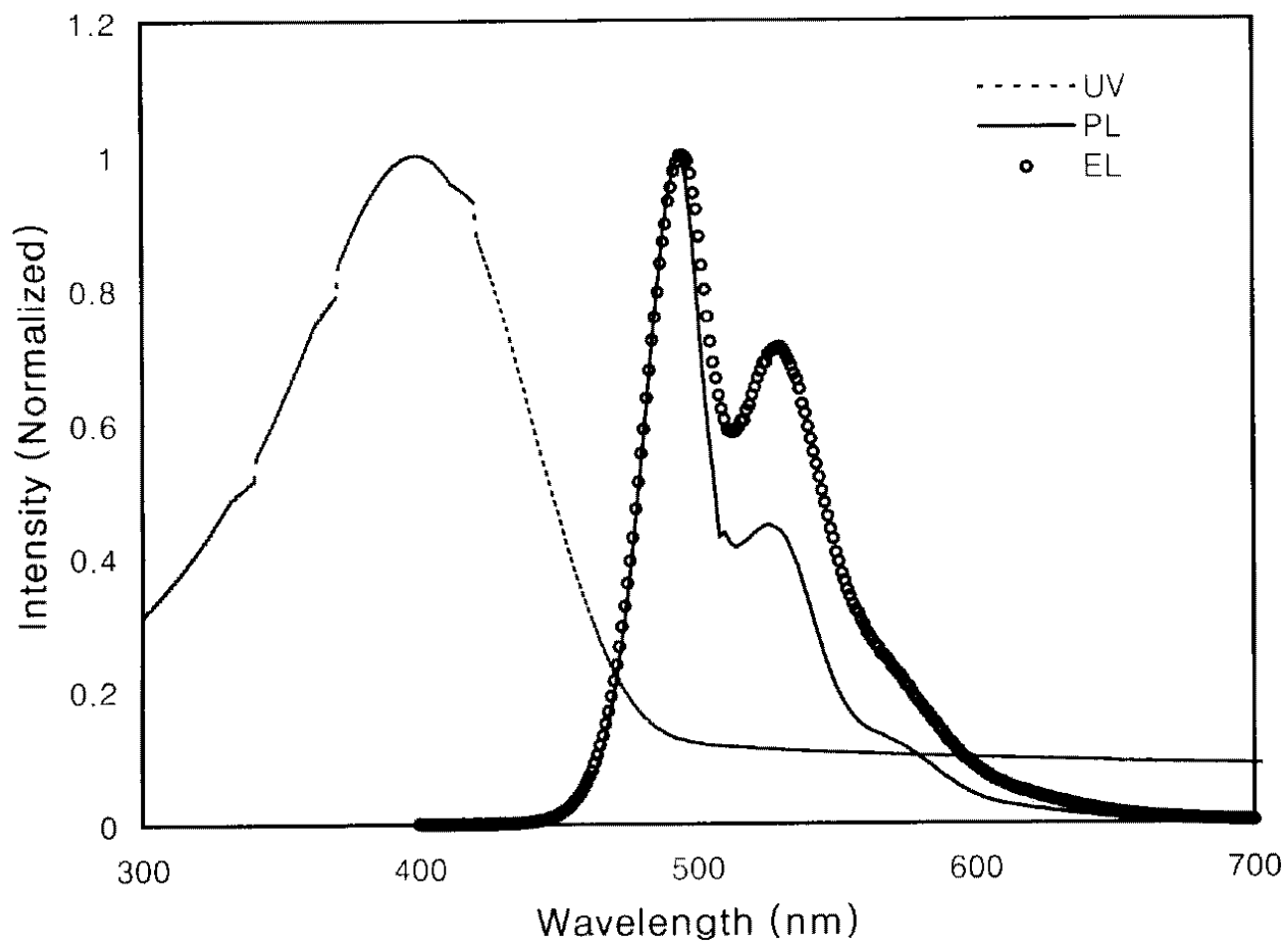
L-I Curve



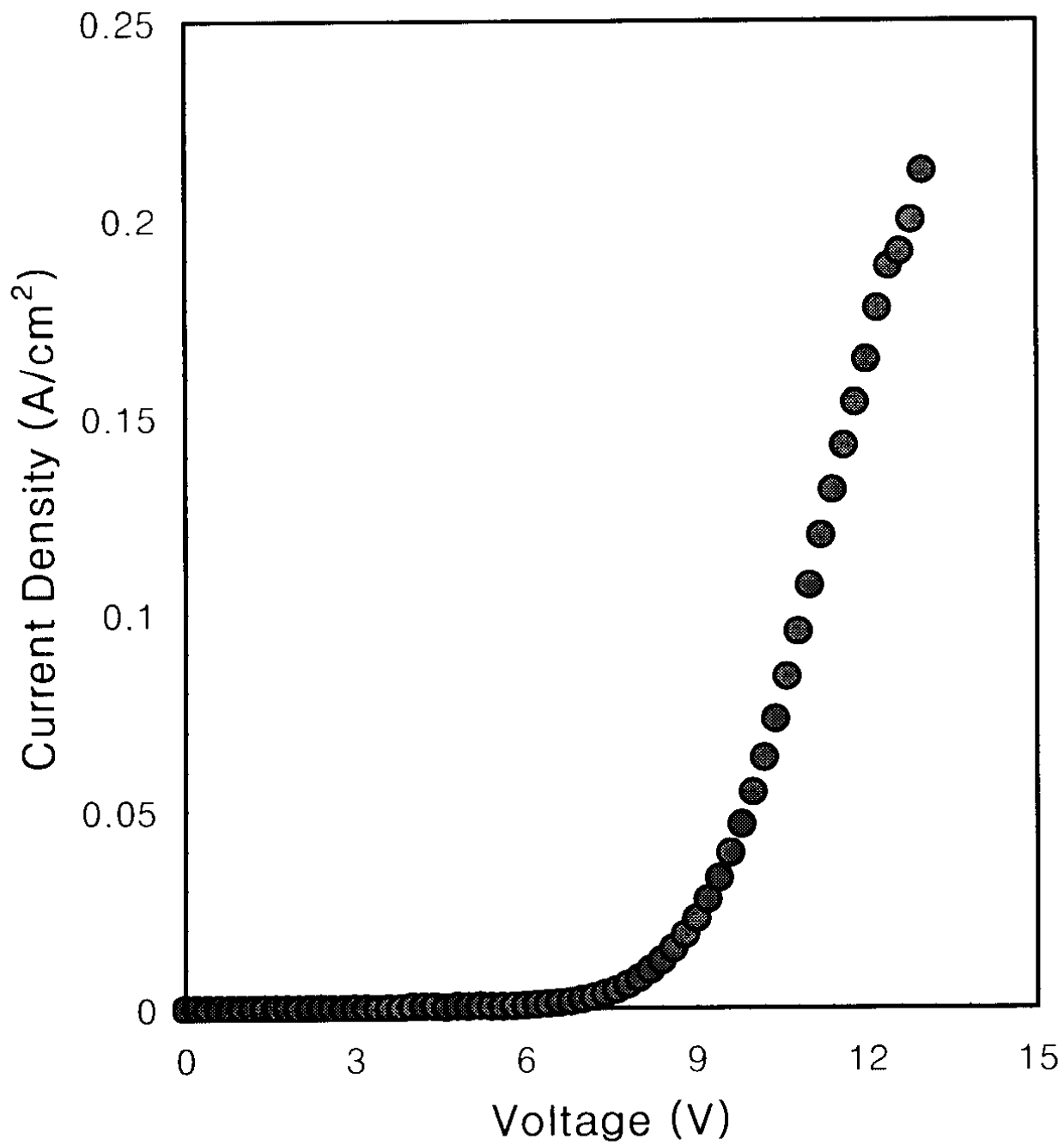
L-V Curve



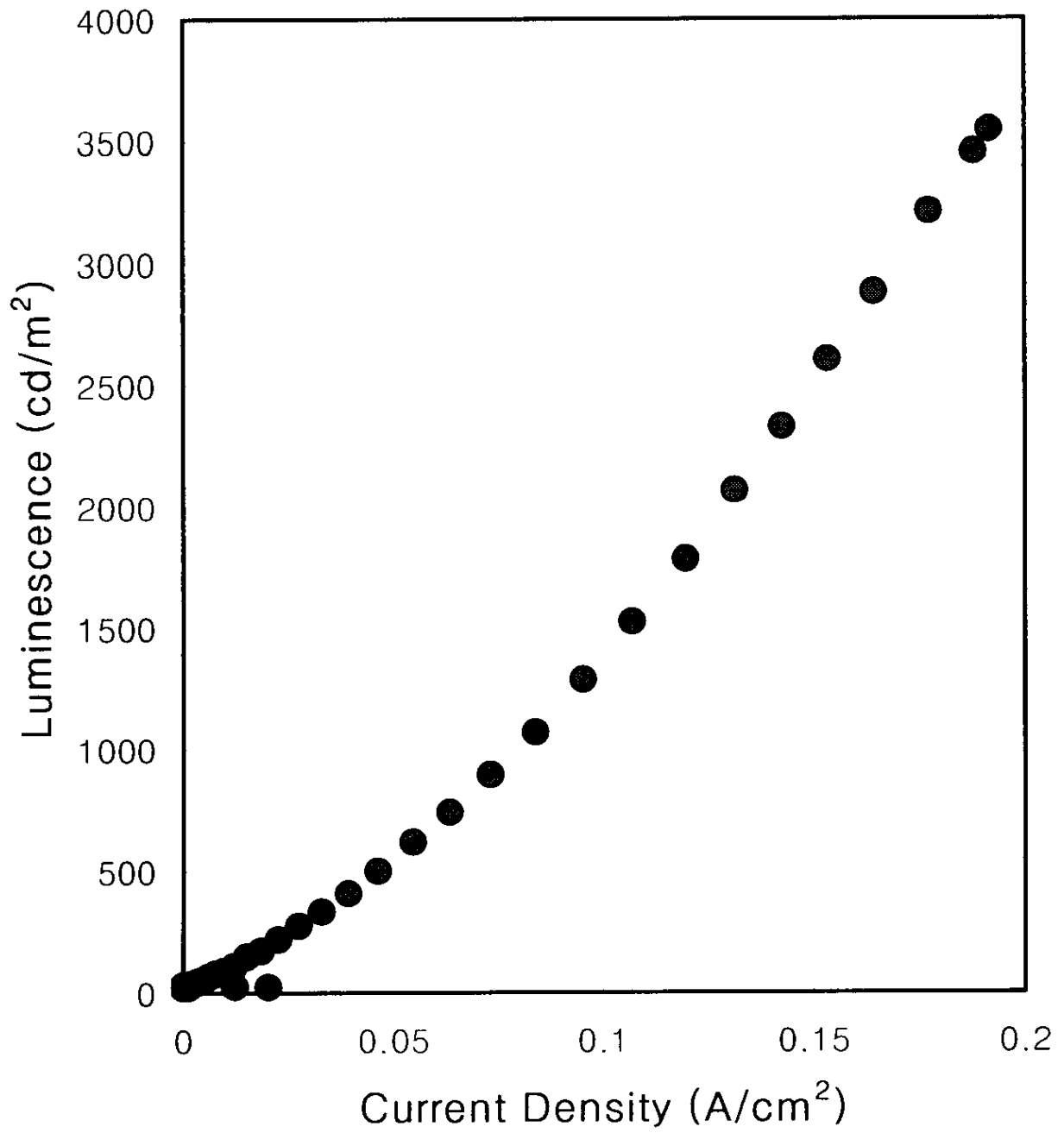
15



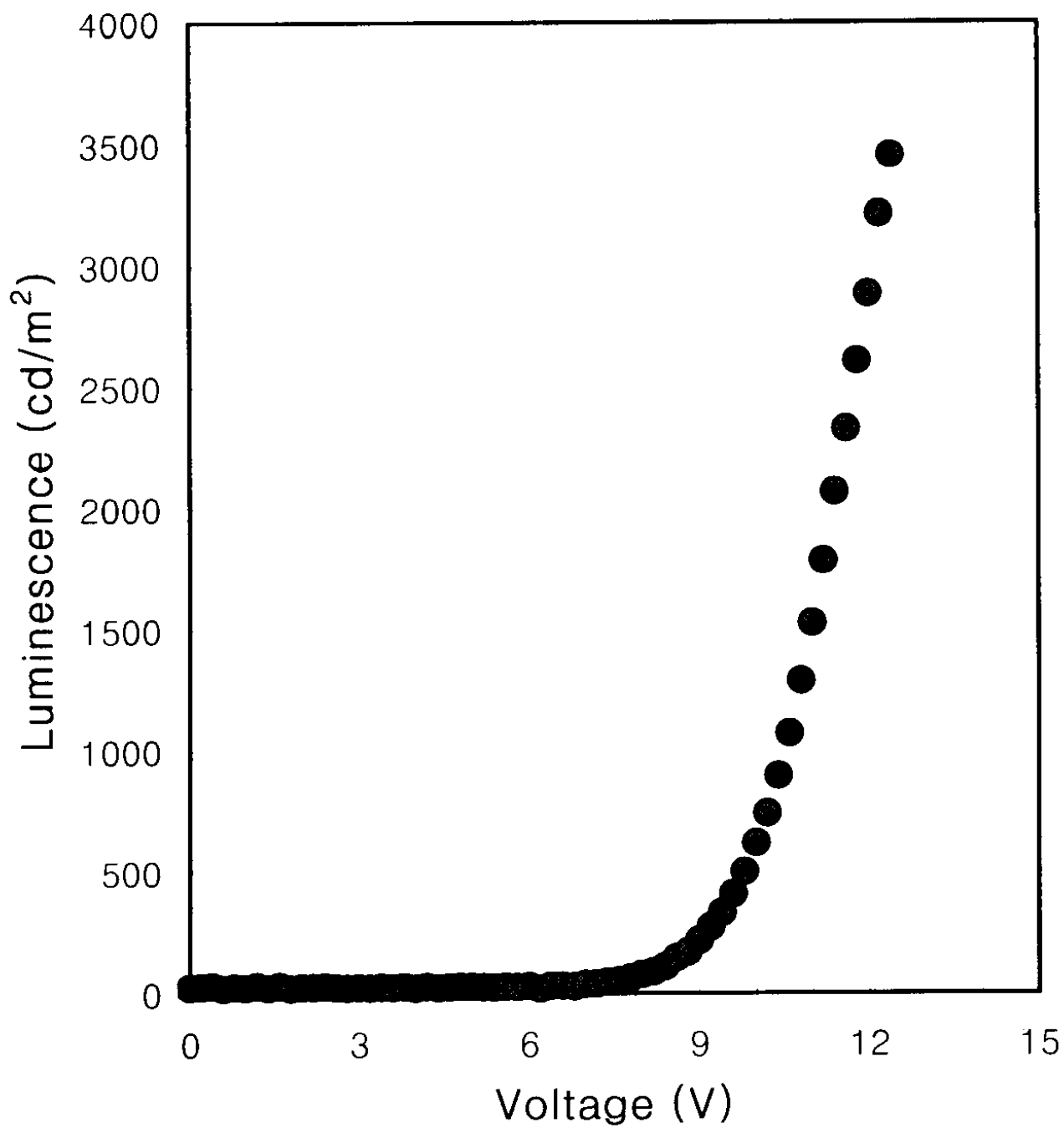
I-V Curve



L-I Curve



L-V Curve



专利名称(译)	一种高官能度电致发光聚合物，包含具有四个取代基的亚苯基		
公开(公告)号	KR1020010076654A	公开(公告)日	2001-08-16
申请号	KR1020000003929	申请日	2000-01-27
申请(专利权)人(译)	三星SD眼有限公司		
当前申请(专利权)人(译)	三星SD眼有限公司		
[标]发明人	KEE INSEO 기인서 LEE JIHOON 이지훈		
发明人	기인서 이지훈		
IPC分类号	C09K11/06 C09K		
CPC分类号	C09K11/06 C09K2211/1425 H01L51/0038 H01L51/0043 H01L51/50 H05B33/14 Y10S428/917		
代理人(译)	CHOI, DUK KYU		
其他公开文献	KR100394509B1		
外部链接	Espacenet		

摘要(译)

本发明的高功能发光聚合物由聚(对亚苯基亚乙烯基)(PPV)至主链的结构和其中包含长链的脂族烷基或烷氧基的取代基组成。1/4是由苯基化的主链进口的。并且表示为下列化学式(1)：化学式(1)中的r 1式，R 2和R 3可以是长链的烷氧基，称为烷基，兰烷基或C 1~20称为R 4的长链C 1~20分别称为长链的烷基或种兰烷基，C 1~20或兰烷烷氧基。此外，电致发光聚合物表示如下化学式(2)，其能够促进其共聚合，同时控制电致发光聚合物单体和OC1C10-PPV的单体的比率可以是制造：r 1在化学式(2)中的方程式中，R 2和R 3是长链的烷基，称为R 4是C 1~20，它是分别称为长链的烷基或种兰烷基，C 1~20，x为长链的烷氧基或兰花烷氧基称为兰烷基或C 1~20，y为0.9~0.1，为0.1~0.9。PPV组发光聚合物(其中4个取代基进口)表示该器件的驱动电压约为3V504nm，附近，绿色蓝色单一形态元素使其很好地溶解在一般有机溶剂和优异的薄膜中可以形成裂缝(缺陷)。并且可以根据与OC1OC10共聚的聚合物内的速率进行颜色调整。并且发光器件的驱动电压为2.3 V，最大发光亮度约为23000cd/m²，最大效率为1.22lm/W。

