

(19)
(12)

(KR)
(A)

(51) Int. Cl. 7
C07D 285/12

(11)
(43)

2003-0034659
2003 05 09

(21) 10-2001-0066330

(22) 2001 10 26

(71) 2 39-1

(72) 2-38

258-40(1 1)

1가560-9

1 1604-37 B 8

(74)

:

(54) , E L

/ - (Diels-Alder) (cyclopentadienone) , (Electroluminescence)
EL , ,

5

, , , , , , , EL

1 6 M-3 1 H-NMR .

2	6	M-3	UV-Vis	
3	17	P-5	¹ H-NMR	
4	17	P-5	UV-Vis	PL(photoluminescence)
5			(PVK/ P-5; 8/2)	17 P-5 EL

(Electroluminescence, 'EL')

(poly-phenylene)
EL

(*Semiconducting Polymers: Chemistry, Physics and Engineering* , (Edited by G. Hadziioannou and P. F. van Hutten) WILEY-VCH (2000)) (*Angew. Chem. Int. E d.*, 37, p402 (1998), *Nature*, 397, p121(1999), *Prog. Polym. Sci.* , 25, p1089 (2000) *Adv. Mater.* , 12, p17 37 (2000)) (Poly(phenylene vinylene), 'PPV'), (Polythiophene, 'PTh') (*Synth. Met.* , 50(1-3), p491 (1992), *Adv. Mater.* , 4, p36 (1992), *Adv. Mater.* , 6, p190 (1994) *Chem. Rev.* , 99, p1747(1999)).

가 가 PPV
PTh (*Synth. Met.* , 62, p35 (1994), *Adv. Mater.* , 4, p36 (1992), *Macromolecules*, 28, p7525 (1995))
(*Adv. Mater.* , 10, p1340 (1998)).
(*Jpn. J. Appl. Phys.* , 30, pL1941 (1991), *J. Polym. Sci. Polym. Chem. Ed.*, 31, p2465(1993), *J. A m. Chem. Soc.* , 118, 7416 (1996), *Adv. Mater.* , 9, p326 (1997), *Adv. Mater.* , 10, p993 (1998), *Macromolec ules* , 32, p1476 (1999), *Nature* , 405, p661 (2000), *Syn. Met.* , 111-112, p397 (2000) *Syn. Met.* , 122, p79 (2001) *J. Am. Chem. Soc.* , 123, 946 (2001)).
5,621,131 , 5,708,130 5,900,327
EL 5,807,974

(*Makromol. Chem.* , 191, p857 (1990), *Macromolecules* , 27, p562 (1994), *J. Chem. Soc., Chem. Commun.* , p1433 (1995), *Ma cromolecules* , 29, p5157 (1996)), (Photoluminescence, 'PL') , EL *Syn. Met.* , 102, p933 (1999) , 가 (*Science* , 279, p835 (1998)). (diacetylene) (*Prog. Polym. Sci.* , 20, p943 (1995), *CHEMTECH* , October, p32 (1993), *Macromolecules* , 29, p2885 (1996), *Syn. Met.* , 111-112, p429 (2000) *Syn. Met.* , 119, p105 (2001)), 가 가

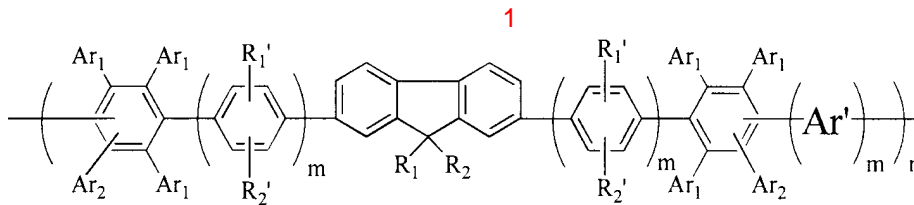
5,876,864 3,046,814) EL (PL 가 가 (bis-acetylene) , (ethynyl) - (bis-c yclopentadienone) (*J. Org. Chem.* , 28, p2725 (1963), *Chem. Rev.* , 65, p261 (1965), *J. Org. Chem.* , 30, p3354 (1965) 4,400,540) 가 (*J. Polym. Sci.* , Part B, 4, p791 (1966), *J. Polym. Sci.* , Part A-1, 5, p2721 (1967), *J. Po lym. Sci.* , Part B, 7, p519 (1969), *Macromolecules* , 5, p49 (1972), *Macromolecules* , 28, p124 (1995), *Macr omolecules* , 33, p3525 (2000)) 가 가 100-400 , , , , 0-

가 , 80% 가
 (photoreceptor) (5,882,8
 (microelectronics) (integrated circuits) (
 29) (Diels-Alder) (
 5,965,679) (bis-pyrone) (bis-thiophene dioxides)
 (J. Chem. Soc. perkin Trans 1 p355(1994), 2,971,
 944 2,890,207).

가가
 (monomer)가
 가

가 , EL 가 ,
 EL

(1)



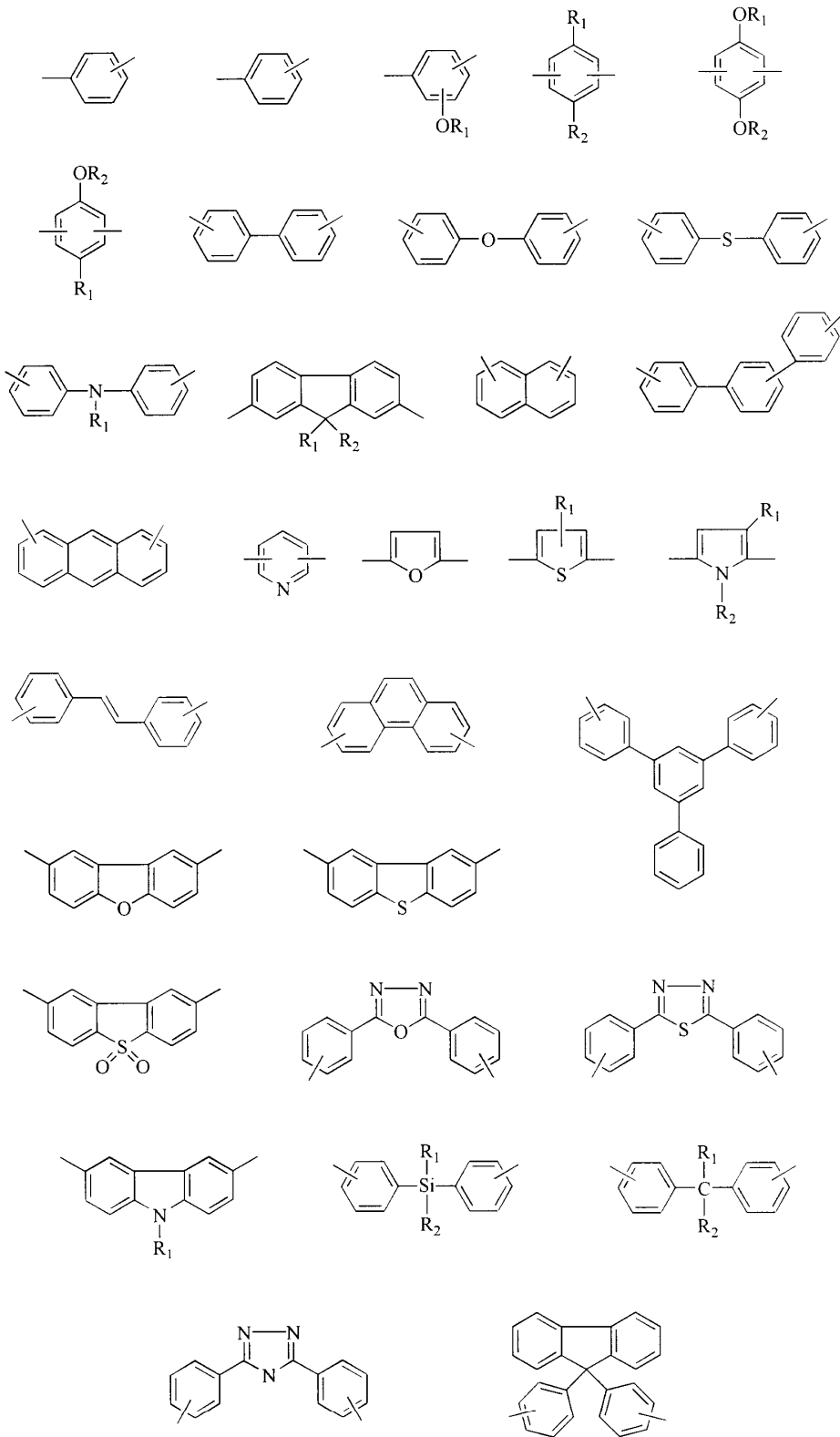
22 (1) , R₁, R₂, R₁' R₂' 6 18 , 1

(1) , Ar₁ Ar₂ / R₁, R₂, R₁' R₂'
 6 18

(1) , Ar'

Ar'

가



(1) , m 0 1

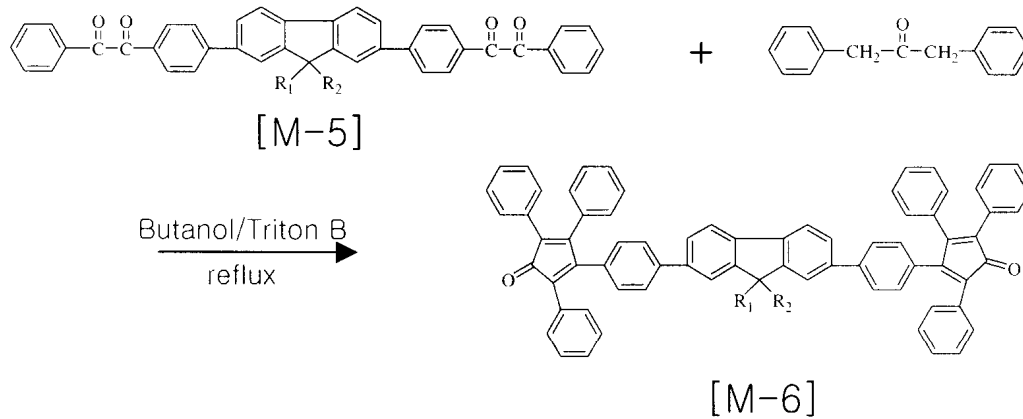
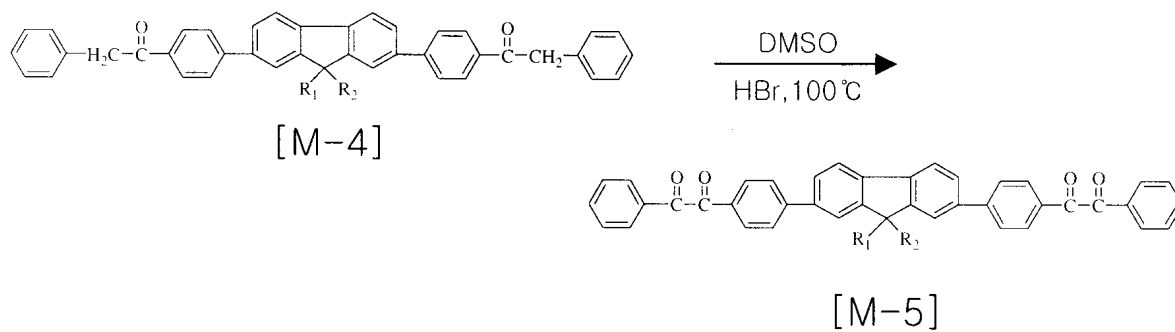
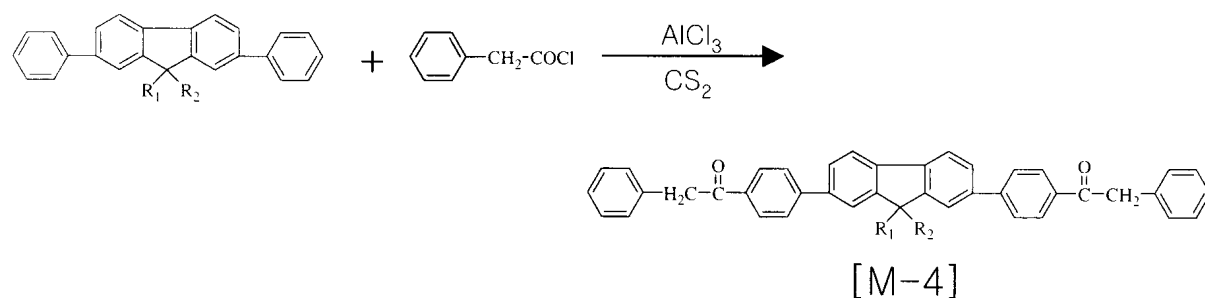
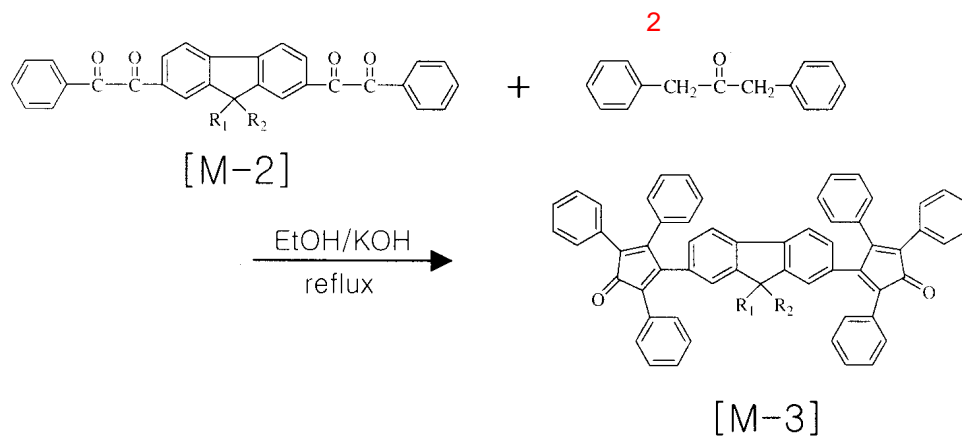
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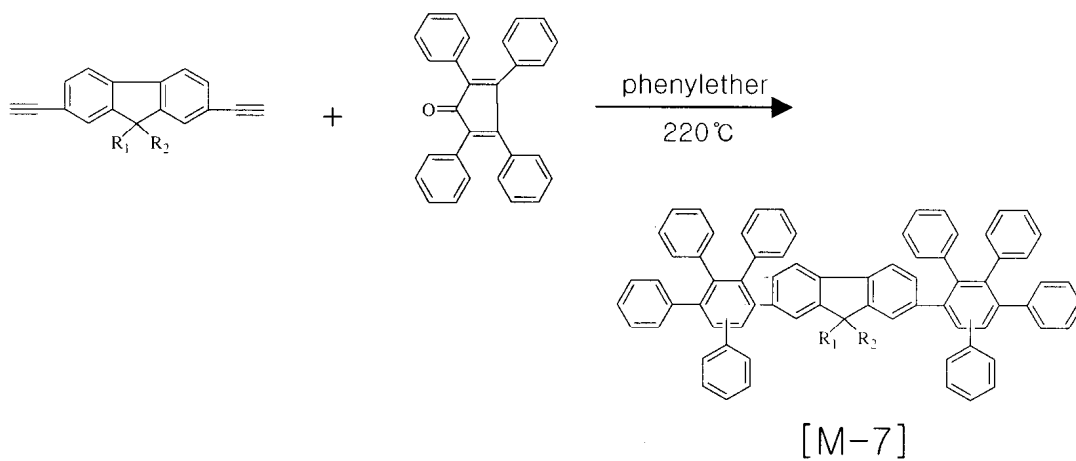
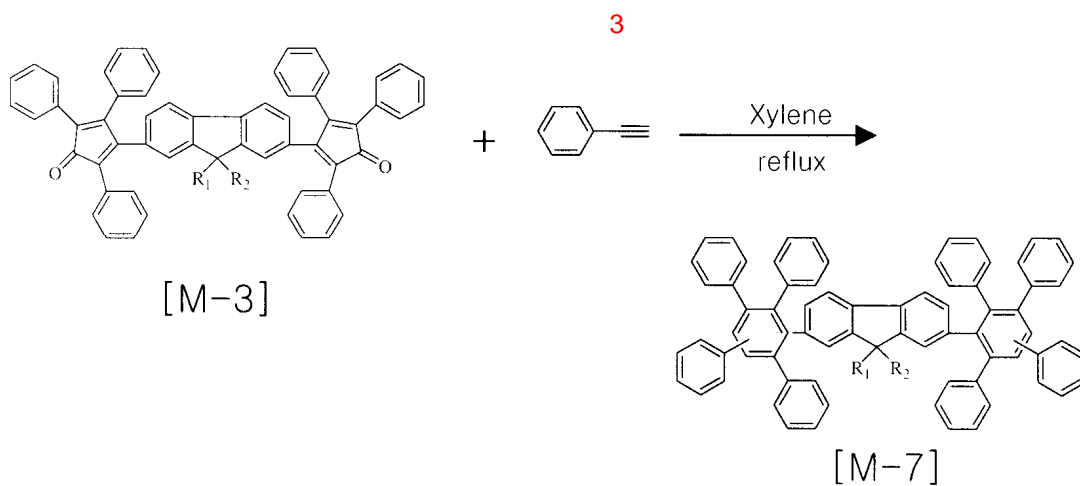
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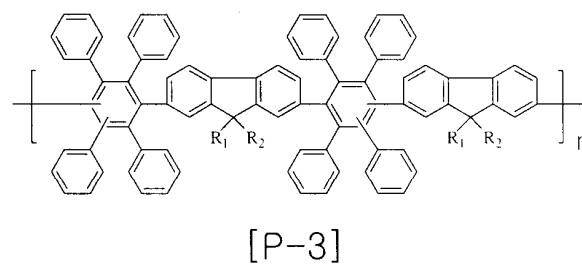
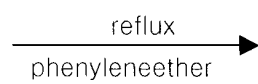
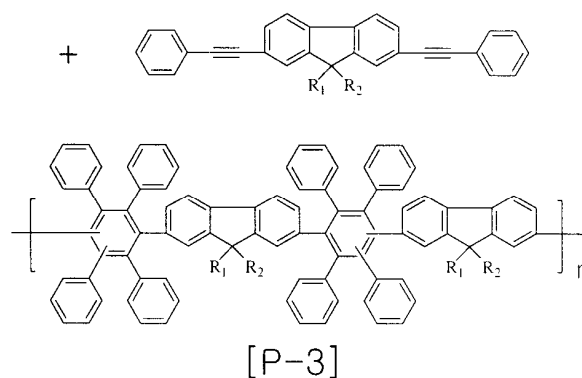
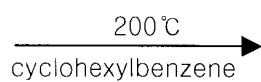
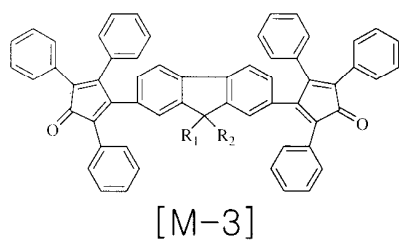
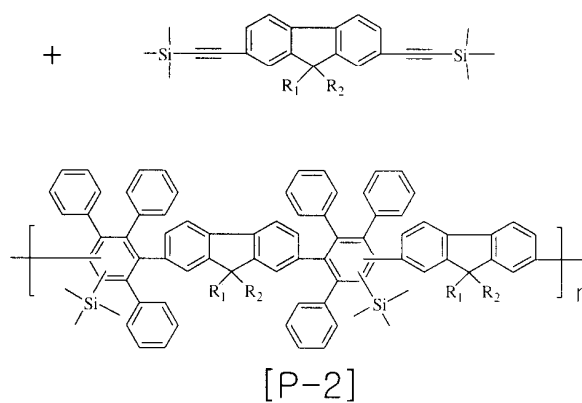
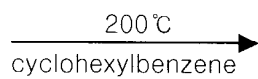
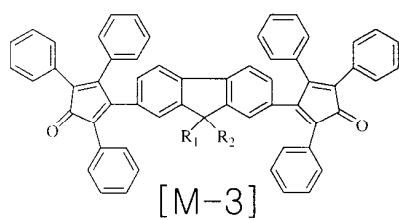
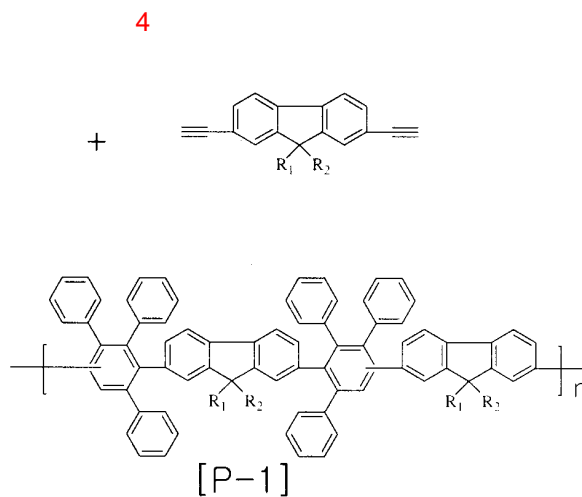
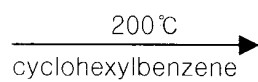
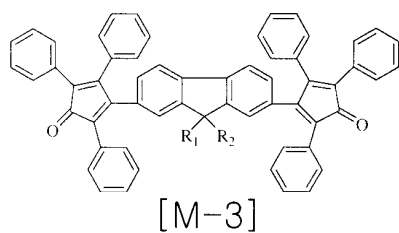
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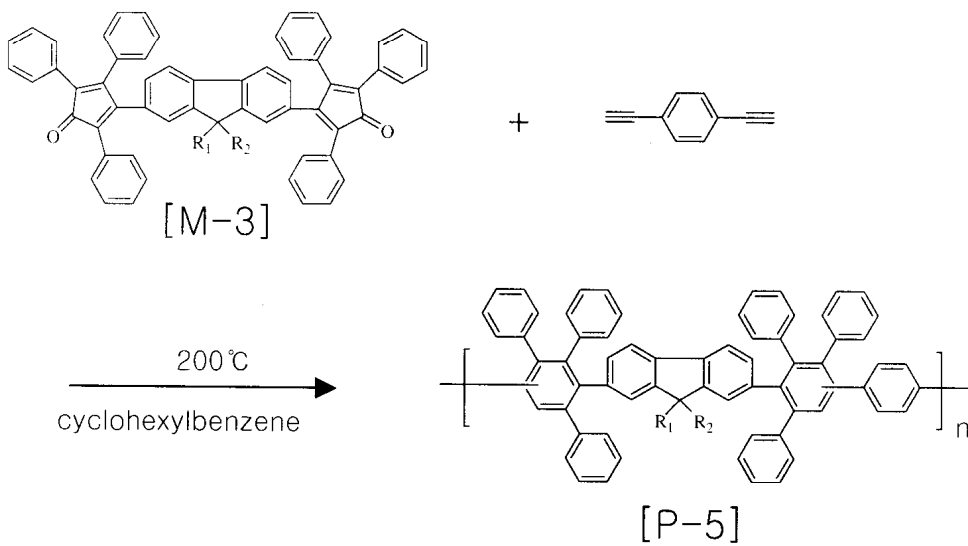
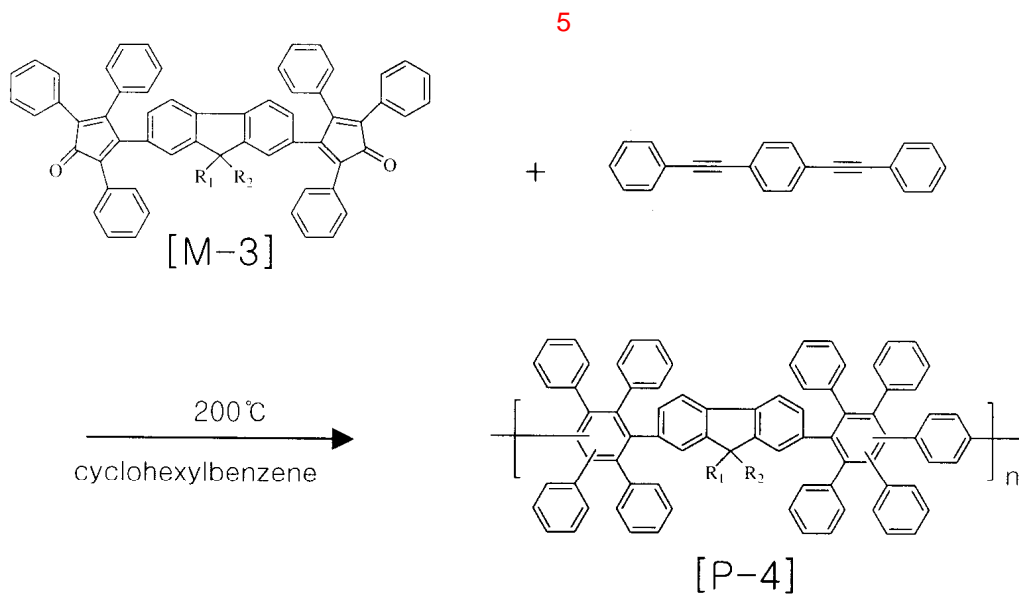
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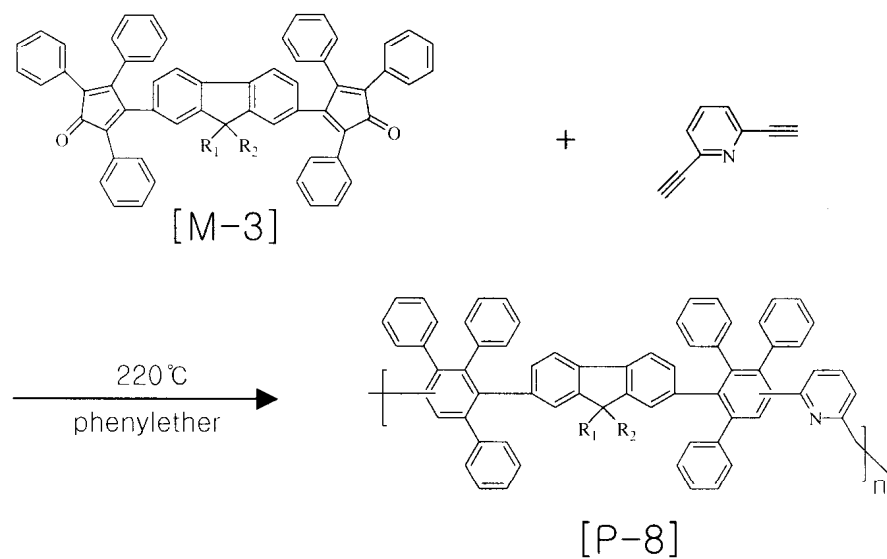
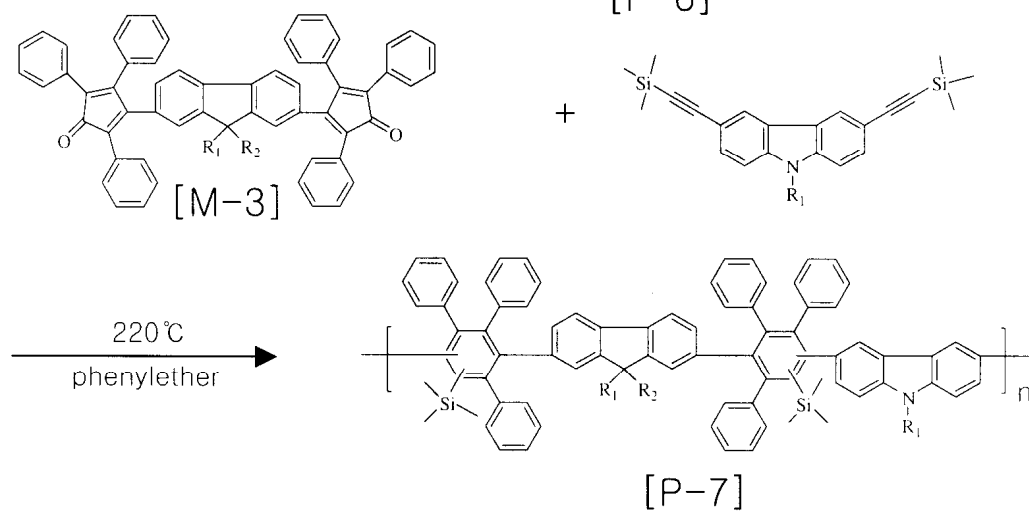
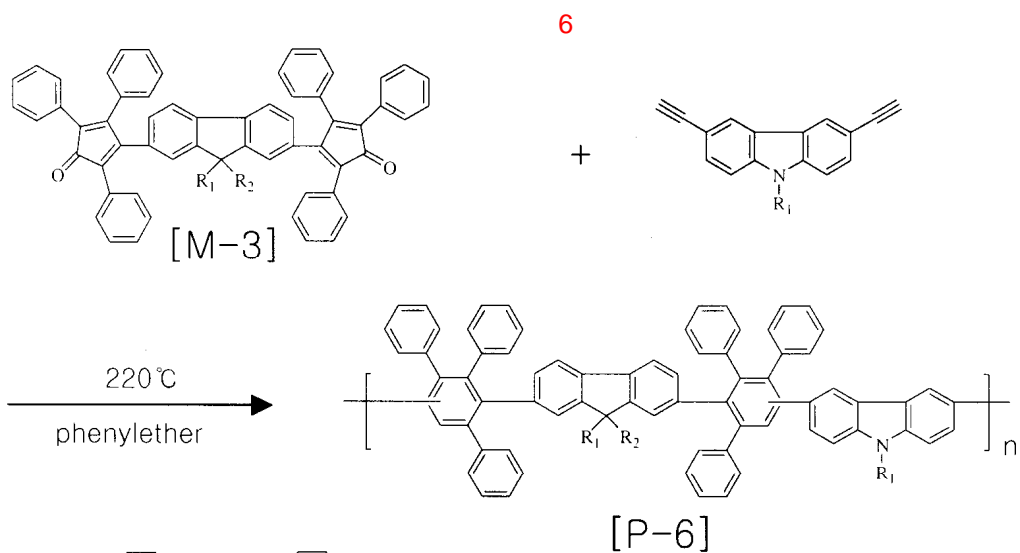
, 가 EL



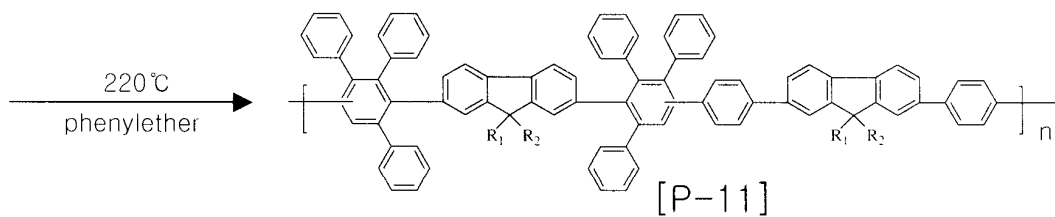
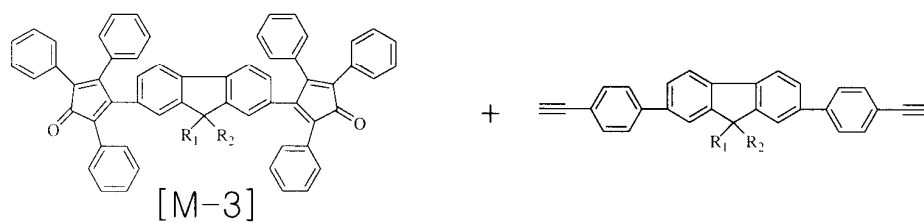
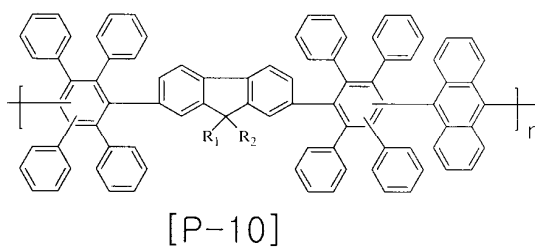
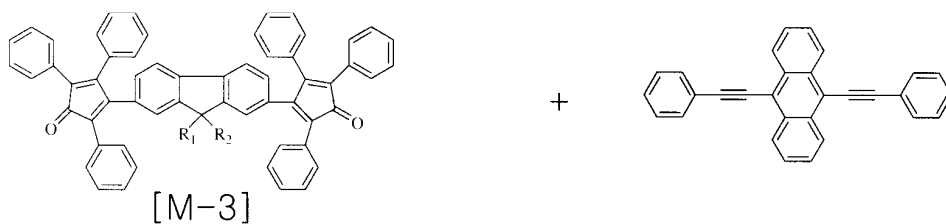
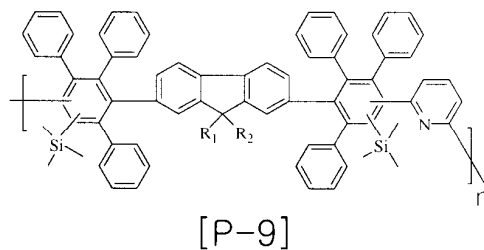
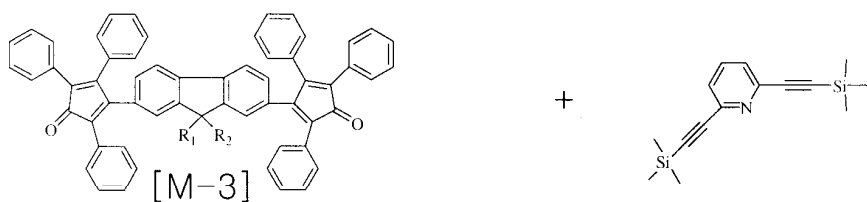


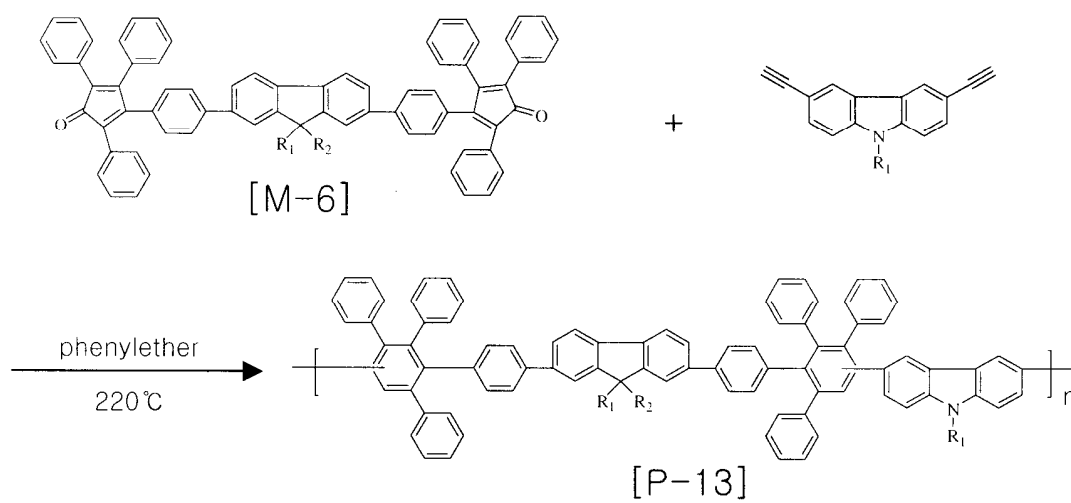
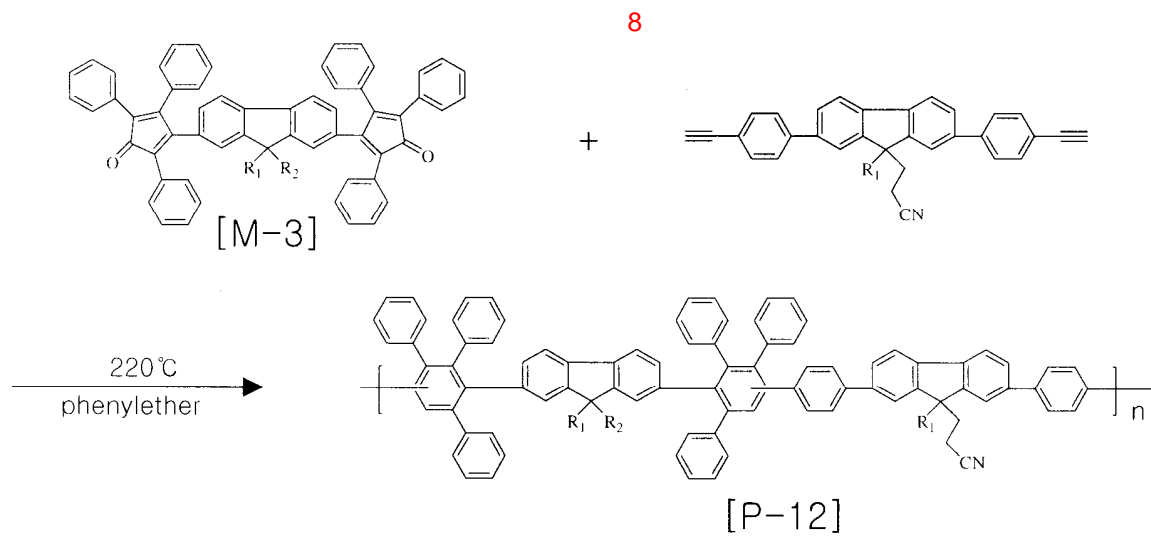


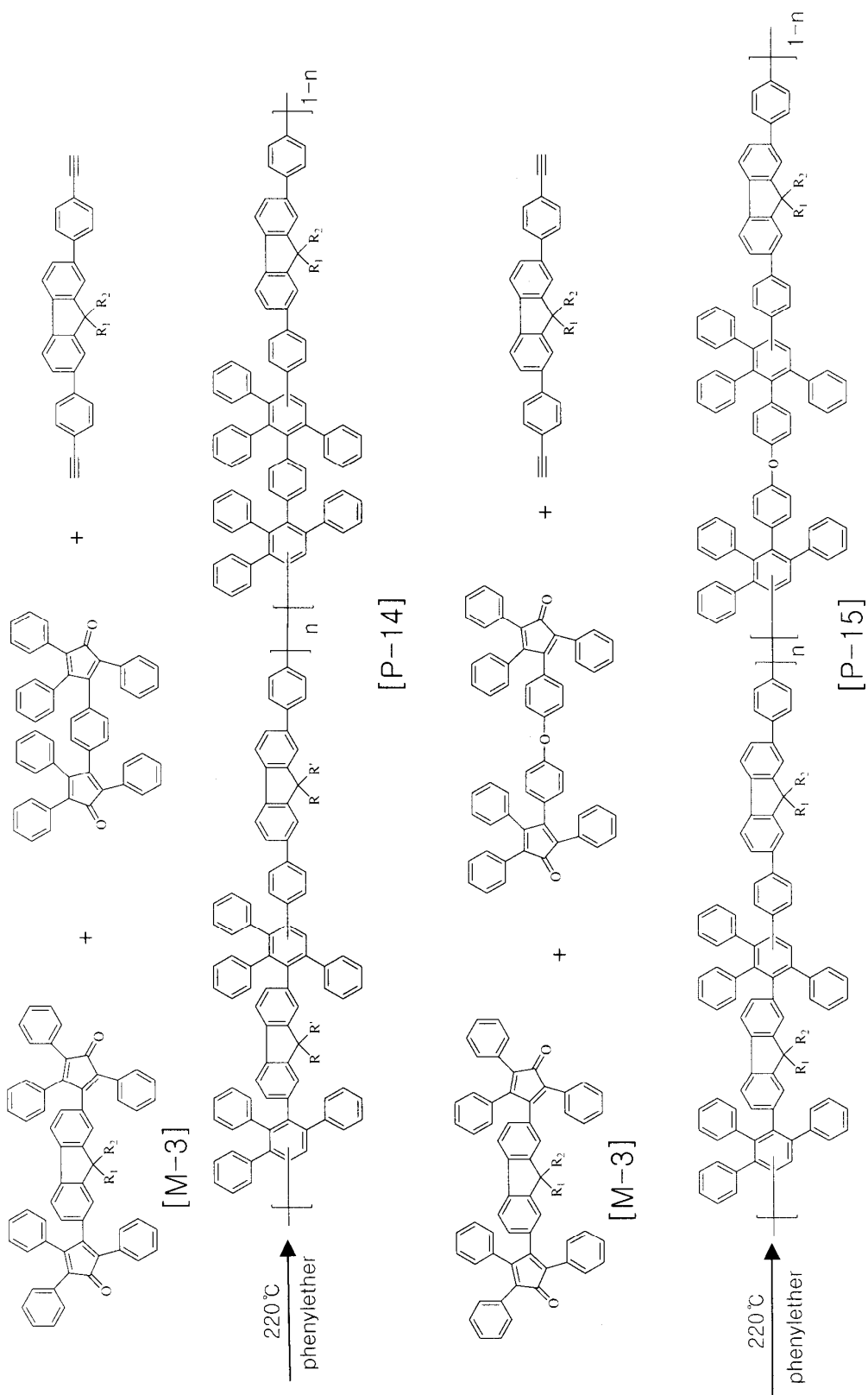


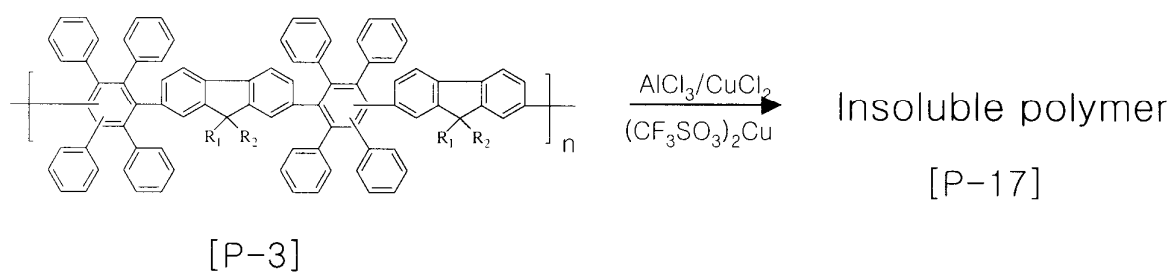
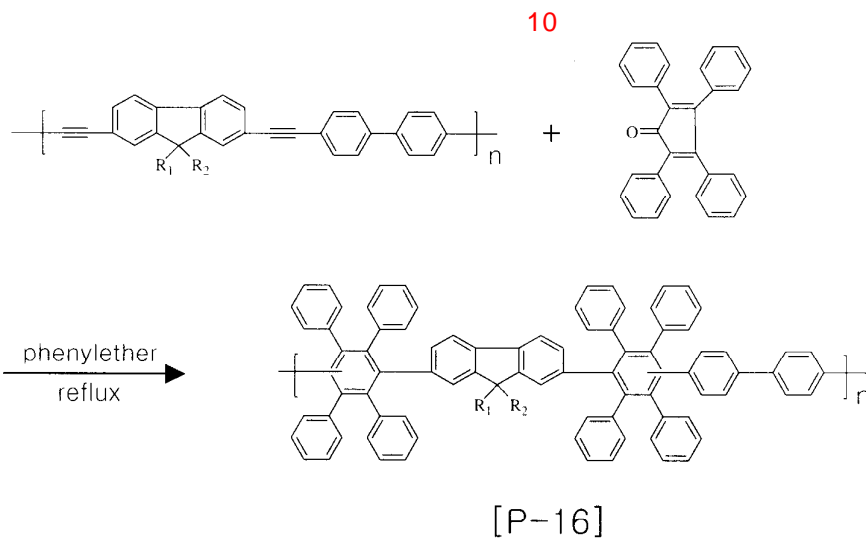


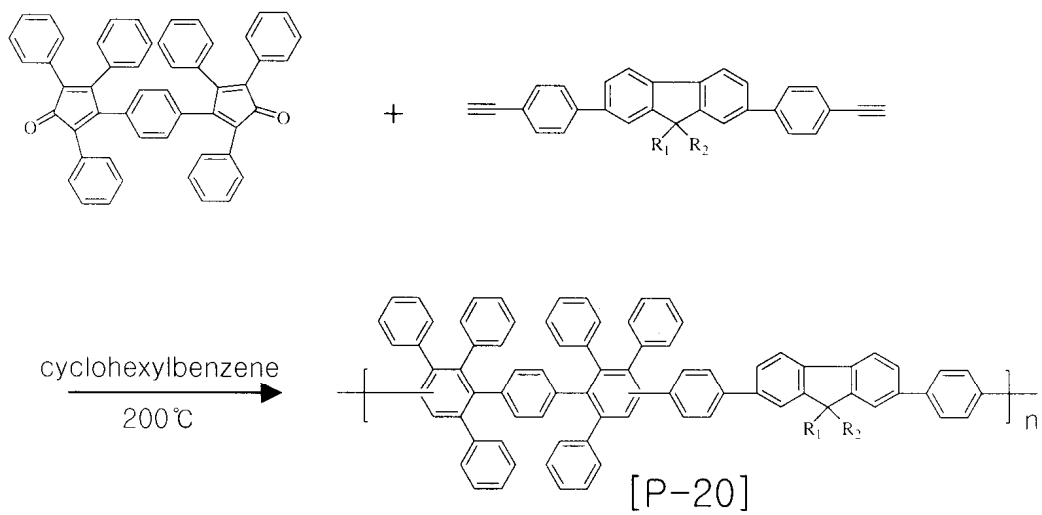
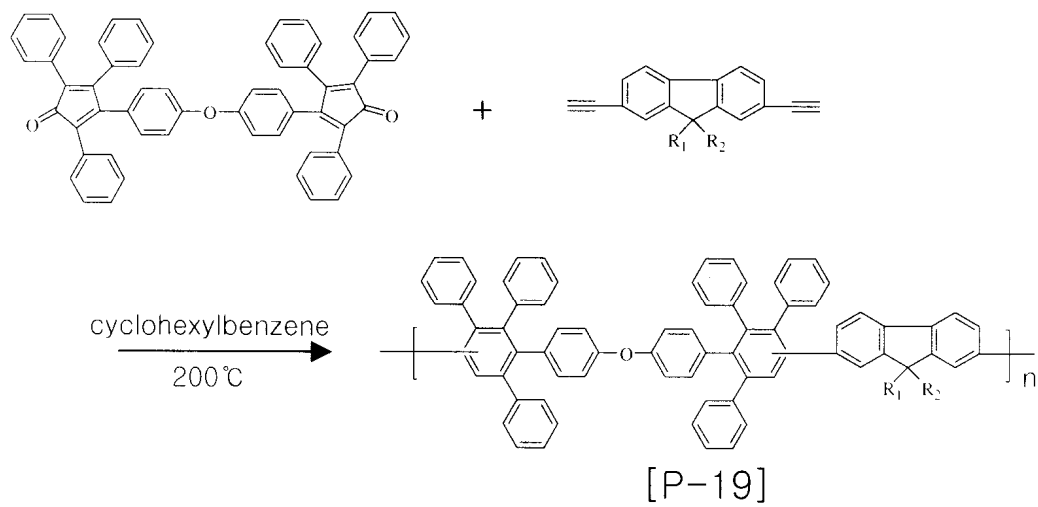
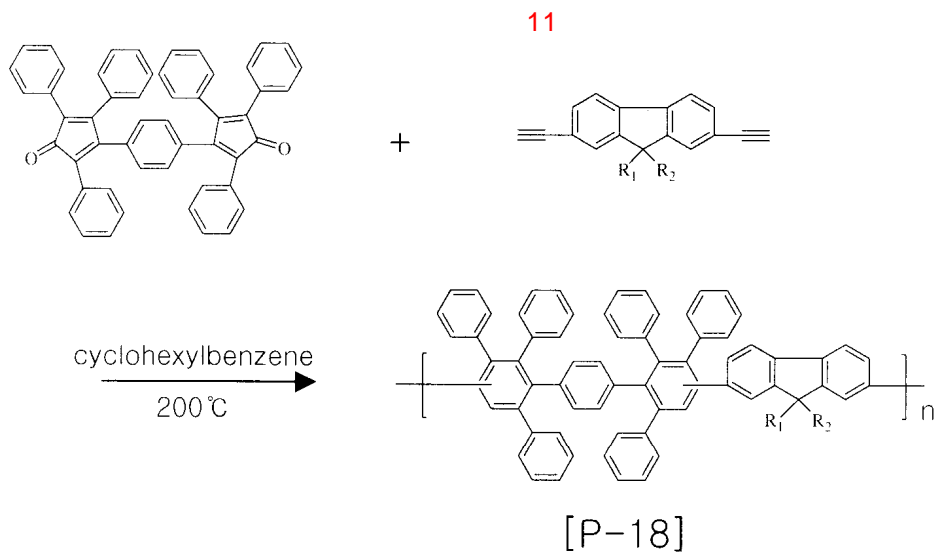
7



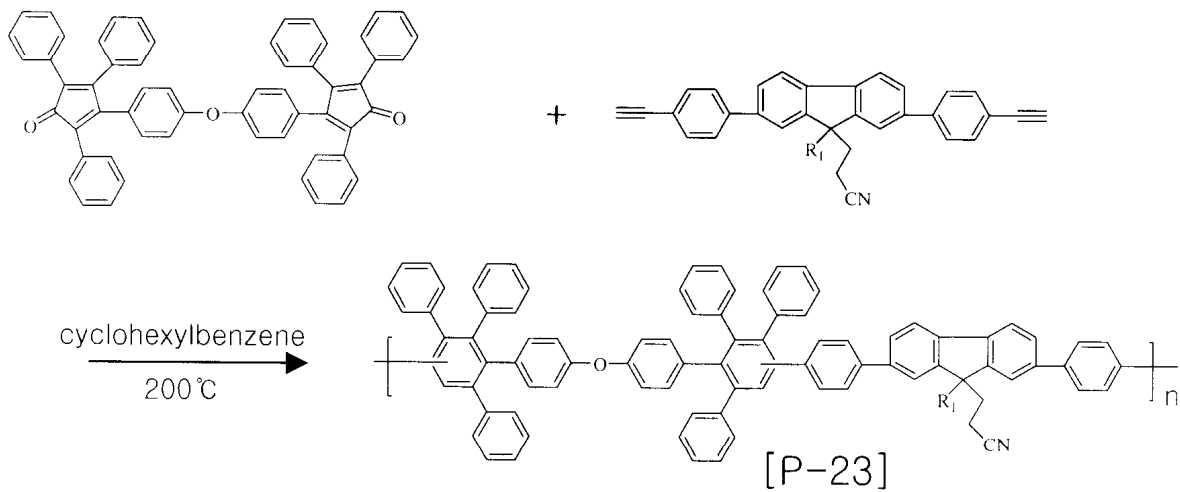
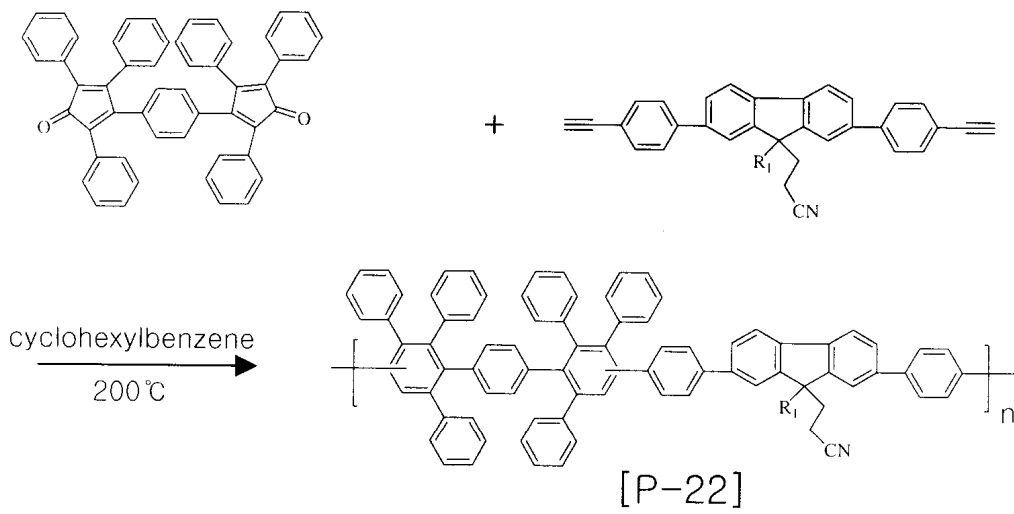
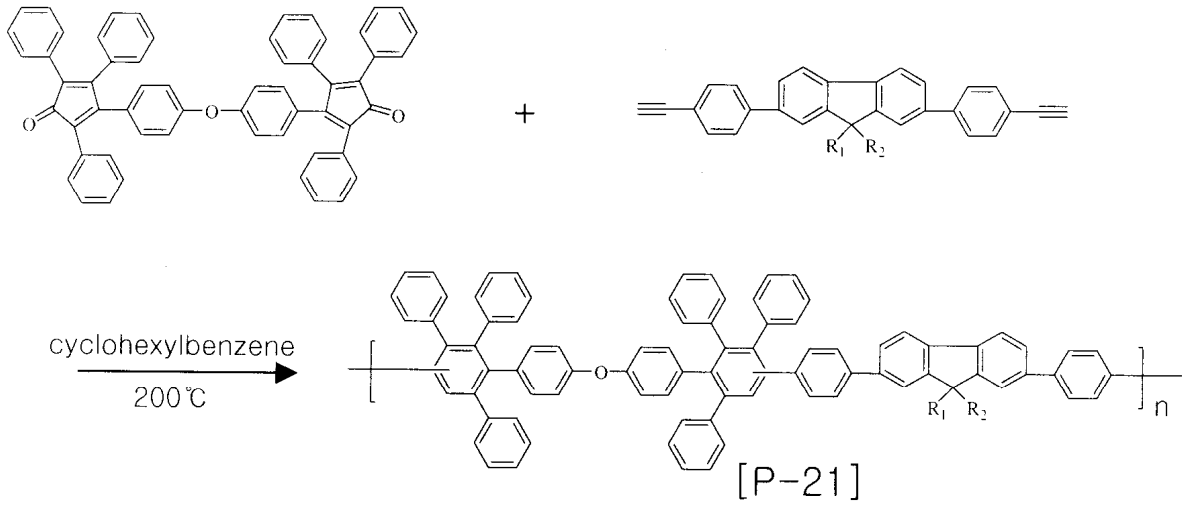








12



가

EL

(1)

(12)

2,7- ()-9,9- -n- (M-2)[1]

가 250ml 3 , 2,7- ()-9,9- -n- 5g (9.6mmol) , 60ml DMSO 가 , 48% HBr 7.6ml
 100 가 4 , (2/1)
 40 5.1g(88%) 9
 1 - 93 356nm

¹ H-NMR (CDCl₃), ?? 0.5(br, 4H, CH₂), 0.71-0.78(t, 6H, CH₃), 0.9-1.1(m, br, 12H, CH₂), 1.95-2.05(t, br, 4H, CCH₂), 7.50-8.05 (m, 16H, Aromatic)

3

2,7- ()-9,9- -n- (M-2)[2]

가 250ml 2 , 2,7- ()-9,9- -n- 5g (9.6mmol) , DMSO 150ml 가 , NBS 7.0g (39.2mmol) 가 .
 24 , (2/1)
 40 3.0g(5.36%)
¹ H-NMR 2

4

2,7- ()-9,9- -n- (M-2)[3]

가 1 1 , 2,7- ()-9,9- -n- 4.0g (7.4mmol) , 700ml 가 , 3.4g 가 0.34g 가 120ml 가 , 48 가 MnO₂
 가 7.1g 2 , (2/1)
 40 3.0g(67%)
¹ H-NMR 2

5

2,7- ()-9,9- -n- (M-2)[4]

가 250ml 3 , 2,7- ()-9,9- -n- 5.0g (9.3mmol) , DMSO 200ml 가 , 0.42g (II) 가 ,
 140 24 , (2/1)
 40 4.0g(71.5%)
¹ H-NMR 2

6

2,7- (2,4,5- -3-)-9,9- -n- (M-3)

가 250Mℓ 3 150Mℓ , , 2,7
 ()-9,9- -n- 4.6g (7.6mmol) 1,3- 3.4g (16.1mmol) 가 ,
 가 , 3 가 , 6.2Mℓ , 0.31g 가 , 가
 40 , 4.5g(62%) , 235 - 237
 308nm 401nm ,

¹ H-NMR (CDCl₃), ?? 0.25(br, 4H, CH₂), 0.82-0.90(m, 10H, CH₂CH₃), 0.95-1.05 (m, 4H, CH₂), 1.15-1.20(m, 4H, CH₂), 1.42-1.50(t, br, 4H, CCH₂), 6.81-7.45 (m, 36H, Aromatic)

7

2,7- [()]-9,9- -n- (M-4)
 , , 9,9- -n- 30.0g (61.6mmol),
 가 19.0g (0.14mol) 500Mℓ ,
 가 가 22.0g (0.14mol) 100Mℓ , 6
 , 20% , 10% 가
 , 40 , 36.0g(81%) ,
 129 - 131 417nm 354nm ,

¹ H-NMR (CDCl₃), ?? 0.65-0.75(m, 10H, CH₂CH₃), 1.05-1.15(m, 12H, CH₂), 2.01-2.07(t, br, 4H, CCH₂), 4.35(s, 4H, CH₂), 7.22-8.15(m, 24H, Aromatic)

8

2,7- ()-9,9- -n- (M-5)
 , 가 500Mℓ 3 , , 2,7- ()-9,9- -n-
 12.0g (12.4mmol) , 250Mℓ DMSO 가 , 48% HBr 13.5Mℓ 가
 . 100 가 4 , ,
 , 가 , / ,
 , 40 , 10.0g(80%) ,
 138 - 139 370nm ,

¹ H-NMR (CDCl₃), ?? 0.65-0.75(m, 10H, CH₂CH₃), 1.05-1.15(m, 12H, CH₂), 2.01-2.07(t, br, 4H, CCH₂), 7.50-8.10(m, 24H, Aromatic)

9

2,7- (2,4,5- -3-)-9,9- -n- (M-6)
 , 가 250Mℓ 3 , , 2,7- ()-9,9- -n-
 12.0g (16.0mmol), 1,3- 7.4g (35.2mmol) 200Mℓ ,
 가 , (40%) 2g , 가
 가 , 5 가 , 가
 , 40 , 10.0g(57%) ,

¹H-NMR (CDCl₃), ?? 0.65-0.75(m, 10H, CH₂CH₃), 1.05-1.15(br, 12H, CH₂), 2.01-2.07(br, 4H, CCH₂), 7.00-7.75 (m, 44H, Aromatic)

10

2,7- (2,4,5- (P-1))-9,9- -n- (M-7)
 가 50Mℓ , 2,7- (2,4,5- -3-)-9,9- -n-
 0.4g (0.42mmol) 0.13g (1.26mmol) (xylene) 5Mℓ 가 .
 (freeze-pump-thaw) (degassing) ,
 4 . , 40
 0.31g(67%) , 134 - 136 .
 325nm , 379nm .

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2,7- -9,9- -n- (M-7)
 가 20Mℓ , - - - - 0.5g(1.3mmol) 2,7- -9,9- -n-
 1.27g (3.3mmol) , 5Mℓ 가 .
 , , / (200 24
 (800ml/200ml)
 , 40
 1.06g(75%) , 157 - 160 .
 327nm , 377nm .

¹H-NMR(CDCl₃), ?? 0.11-0.38(br, s, CH₃), 0.76-1.22(br, m, CH₂), 1.38-1.60(br, s, CCH₂), 6.65-7.61(m, Aromatic)

12

2,7- (2,4,5- (P-1))-9,9- -n- 2,7- -9,9- -n-
 가 50Mℓ , 2,7- (2,4,5- -3-)-9,9- -n-
 0.5g (0.52mmol) 2,7- -9,9- -n- 0.2g (0.52mmol) , 2.6
 Mℓ (0.4mol/L) 가 . " ,
 , 200 40 , 200 가 5 , (end- capped
 ng) , , 가 , / (300ml/70
 0ml) , , 가 , ,
 , 40 , 0.6g ,
 334nm , 443nm .

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2,7- (2,4,5- (P-2))-9,9- -n- 2,7- ()-9,9- -n-
 가 50Mℓ , 2,7- (2,4,5- -3-)-9,9- -n-
 0.4g (0.42mmol) 2,7- ()-9,9- -n- 0.22g (0.42mmol) ,
 1Mℓ (0.8mol/L) 가 . ,
 , , , 220 4 ,
 , , 0.02g 가 , 200 5

가 / (300ml/700ml)
 40 330nm 433nm 0.54g

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2,7- (2,4,5- (P-3) -3-)-9,9- -n- 2,7- ()-9,9- -n-
 가 50Mℓ , 2,7- (2,4,5- -3-)-9,9- -n-
 0.5g (0.52mmol) 2,7- ()-9,9- -n- 0.28g (0.52mmol)
 2.6Mℓ (0.4mol/L) 가
 200 40
 0.01g 가 , 200 5
 가 / (300ml/700ml)
 0.7g 40 330nm
 m 450nm

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2,7- (2,4,5- (P-3) -3-)-9,9- -n- 2,7- ()-9,9- -n-
 가 50Mℓ 2 , 2,7- (2,4,5- -3-)-
 9,9- -n- 0.4g (0.42mmol) 2,7- ()-9,9- -n- 0.225g (0.42mmol)
 3Mℓ 가
 2 가
 / (300ml/700ml)
 0.37g 40 14

16

2,7- (2,4,5- -3-)-9,9- -n- 1,4- () (P-4)
 가 50Mℓ , 2,7- (2,4,5- -3-)-9,9- -n-
 0.5g (0.52mmol) 1,4- () 0.147g (0.52mmol) 2.6Mℓ (0.4
 mol/L) 가
 200 40
 0.01g 가 , 200 5
 가 / (300ml/700ml)
 0.5g 40 322nm
 m 453nm

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2,7- (2,4,5- -3-)-9,9- -n- 1,4- (P-5)
 가 50Mℓ , 2,7- (2,4,5- -3-)-9,9- -n-
 0.5g (0.52mmol) 1,4- 66.5 g (0.52mmol) 2.6Mℓ (0.4mol/L)
 가
 200 40
 0.01g 가 , 200 5
 가 / (300ml/700ml)

434nm 0.5g 40 324nm

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2,7- (2,4,5- (P-6) -3-)-9,9- -n- 3,6- -n-(2-)

가 50Mℓ , 2,7- (2,4,5- -3-)-9,9- -n-
 0.4g (0.42mmol) 3,6- -n-(2-) 0.126g (0.42mmol) 2.1Mℓ (0.4mol/L) 가

220 3 , 200 5 / (300ml/700ml)
 0.02g 가 가

40 308nm 487nm 0.44g

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2,7- (2,4,5- (P-7) -3-)-9,9- -n- 3,6- ()-n-(2-)

가 50Mℓ , 2,7- (2,4,5- -3-)-9,9- -n-
 0.4g (0.42mmol) 3,6- ()-n-(2-) 0.187g (0.42mmol) 1Mℓ (0.8mol/L) 가

220 3 , 200 5 / (300ml/700ml)
 0.02g 가 가

40 303nm 472nm 0.5g

20

2,7- (2,4,5- (P-8) -3-)-9,9- -n- 2,6- (P-8)

가 50Mℓ , 2,7- (2,4,5- -3-)-9,9- -n-
 0.4g (0.42mmol) 2,6- 0.05 g (0.42mmol) 2.1Mℓ (0.4mol/L) 가

220 3 , 200 5 / (300ml/700ml)
 0.02g 가 가

40 324nm 484nm 0.41g

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2,7- (2,4,5- (P-9) -3-)-9,9- -n- 2,6- ()

가 50Mℓ , 2,7- (2,4,5- -3-)-9,9- -n-
 0.4g (0.42mmol) 2,6- () 0.114g (0.42mmol) 1Mℓ (0.8mol/L) 가

220 3 , 200 5 / (300ml/700ml)
 0.02g 가 가

가 / (300ml/700ml)
 40
 0.32g
 414nm
 322

22

2,7- (2,4,5- -3-)-9,9- -n- 9,10- ()-
 (P-10)
 가 50Mℓ , 2,7- (2,4,5- -3-)-9,9- -n-
 0.4g (0.42mmol) 9,10- ()- 0.16g (0.42mmol) , 1Mℓ (0.
 8mol/L) 가
 220 3
 0.02g 가 , 200 5
 가 / (300ml/700ml)

40
 0.48g
 442nm
 324

23

2,7- (2,4,5- -3-)-9,9- -n- 2,7- (4-)-9,9- -n-
 (P-11)
 가 50Mℓ , 2,7- (2,4,5- -3-)-9,9- -n-
 0.4g (0.42mmol) 2,7- (4-)-9,9- -n- - 0.225g (0.42mmol)
 4.2Mℓ (0.42mol/L) 가
 220 3
 0.02g 가 , 200 5
 가 / (300ml/700ml)

40
 337nm , 416nm 0.58g

24

2,7- (2,4,5- -3-)-9,9- -n- 2,7- (4-)-9,9- -n- -9
 -(-2-) (P-12)
 가 50Mℓ , 2,7- (2,4,5- -3-)-9,9- -n-
 0.4g (0.42mmol) 2,7- (4-)-9,9- -n- -9-(-2-) 0.21 g (0.42mmol)
 2.1Mℓ (0.4mol/L) 가
 220 3
 0.02g 가 , 200 5
 가 / (300ml/7

00ml)
 40
 335nm , 496 541nm 0.49g

25

2,7- (2,4,5- -3-)-9,9- -n- 3,6- -n-(2-)
 (P-13)
 가 50Mℓ , 2,7- (2,4,5- -3-)-9,9- -n-
 0.5g (0.45mmol) 3,6- -n-(2-) 0.13 g (0.45mmol) , 2.1Mℓ (
 0.4mol/L) 가

220 3
 0.02g 가 , 200 5 / (300ml/700ml)
 가 40
 nm 473nm 0.44g 304

26

2,7- (2,4,5-) 2,7- (4-)-9,9- -n- , 3,3- (1,4-) (2,4,5-) (P-14)
 가 50Mℓ , 2,7- (2,4,5-) -3-)-9,9- -n-
 0.2g (0.21mmol), 3,3- (1,4-) (2,4,5-) 0.145g (0.21mmol) 2,7-
 (4-)-9,9- -n- 0.225g (0.42mmol) , 4.2Mℓ (0.2mol/L) 가
 200 3
 0.02g 가 , 200 5 / (300ml/700ml)
 가 40
 nm 442nm 0.54g 339nm

27

2,7- (2,4,5-) 2,7- (4-)-9,9- -n- , 3,3-(-1,4-) (2,4,5-) (P-15)
 가 50Mℓ , 2,7- (2,4,5-) -3-)-9,9- -n-
 0.2g (0.21mmol), 3,3-(-1,4-) (2,4,5-) 0.165g (0.21mmol) 2
 ,7- (4-)-9,9- -n- 0.225g (0.42mmol) , 4.2Mℓ (0.2mol/L)
 가
 200 3
 0.02g 가 , 200 5 / (300ml/700ml)
 가 40
 nm 339nm 0.58g 428, 490, 549nm

28

(9,9'- -2,7-) (P-16)
 가 50Mℓ 2 , (9,9'- -2,7-) 0.2g
 0.4g (1mmol) , 3Mℓ 가
 가 / (300ml/700ml)
 가 40
 nm 345nm 0.2g 416, 493, 569nm

29

P-3 (P-17)
 가 50Mℓ 2 , 0.2g, (II) 3.36g (10.6m
 mol) 1.43g(10.6mmol) , 25Mℓ 가 500Mℓ
 24

0.19g , , 40 가 . ,
30
 3,3-(1,4-) (2,4,5-) 2,7- -9,9- -n- (P-18)
 가 50Mℓ , 3,3-(1,4-) (2,4,5-) 0.5g (
 0.72mmol) 2,7- -9,9- -n- 0.3g (0.80mmol) , 5Mℓ 가 .
 200 24 . , , /
 (800ml/200ml) , , ,
 , 40 , 0.77g ,
 328nm , 407nm .

31
 3,3-(- -) (2,4,5-) 2,7- -9,9- -n- (P-19)
 가 50Mℓ , 3,3-(- -) (2,4,5-))
 0.5g (0.64mmol) 2,7- -9,9- -n- 0.28g (0.73mmol) , 5Mℓ 가)
 . , , , ,
 / 200 24 . , , , ,
 (800ml/200ml) , , , ,
 , 40 , 0.74g ,
 . 320nm , 460nm .

32
 3,3-(1,4-) (2,4,5-) 2,7- (4-)-9,9- -n-
 (P-20)
 가 50Mℓ , 3,3-(1,4-) (2,4,5-) 0.47g
 (0.68mmol) 2,7- (4-)-9,9- -n- 0.4g (0.74mmol) , 5Mℓ 가
 . , , , ,
 / 200 24 . , , , ,
 (800ml/200ml) , , , ,
 , 40 , 0.74g ,
 . 342nm , 408nm .

33
 3,3-(- -) (2,4,5-) 2,7- (4-)-9,9- -n-
 (P-21)
 가 50Mℓ , 3,3-(- -) (2,4,5-))
 0.53g (0.67mmol) 2,7- (4-)-9,9- -n- 0.4g (0.73mmol) , ,
 5Mℓ 가 . , , , ,
 . 200 24 . , , , ,
 / (800ml/200ml) , , , ,
 , , , , , 40 , 0.74g ,
 . 342nm , 410nm .

m
34

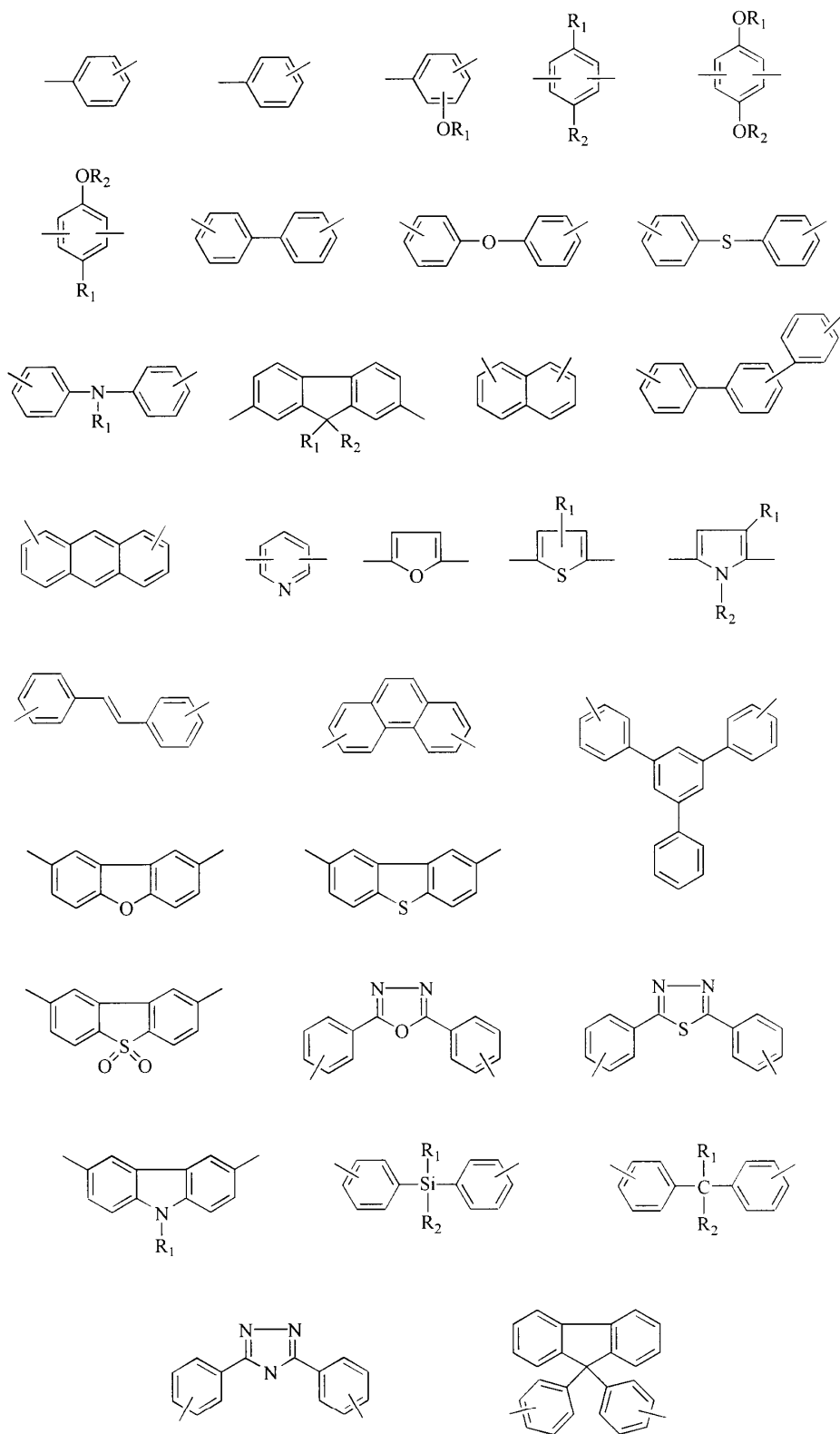
3,3-(1,4-) (2,4,5-) 2,7- (4-)-9-n- -9-(-2-)
 (P-22)
 가 50Mℓ , 3,3-(1,4-) (2,4,5-) 0.47g
 (0.68mmol) 2,7- (4-)-9,9- -n- 0.4g(0.74mmol) , 5Mℓ 가
 200 24
 / (800ml/200ml)
 , 40 가 ,
 340nm , 0.74g ,
 409nm

35

3,3-(- -)- (2,4,5-) 2,7- (4-)-9-n- -9-(-
 2-) (P-23)
 가 50Mℓ , 3,3-(- -) (2,4,5-)
 0.56g (0.72mmol) 2,7- (4-)-9-n- -9-(-2-) 0.4g (0.79mmol) ,
 5Mℓ 가
 200 24
 / (800ml/200ml)
 , 40 ,
 74g , 338nm ,
 390nm . 0.

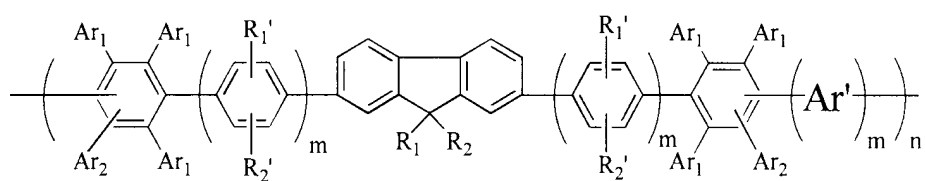
36

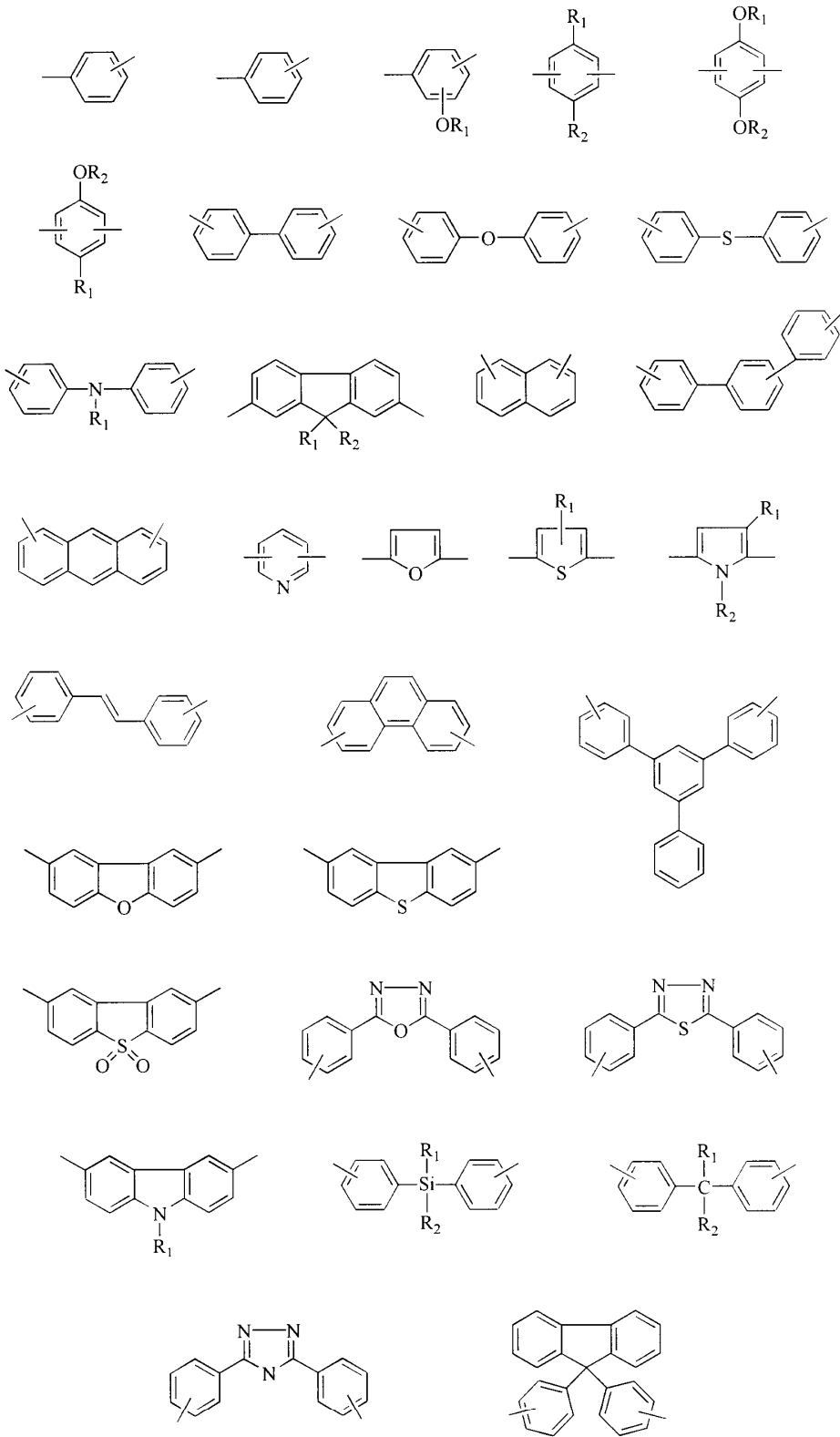
1 3 6 17 (M-3) (P-5)
 2 6 (M-3) (Ultraviolet-Visible, 'UV-Vis' .) 4
 17 (P-5) UV-Vis PL
 PL
 (P-5) 0.1g 5ml , 0.2
 가 100nm 가 (900-1200rpm) - UV-Vis
 PL , 4 UV-Vis
 , 가 ITO/ / EL , EL
 ,
 ,
 , ITO . EL UV-Vis PL
 (P-5) 100nm EL
 5



4.

(cyclopentadienone)



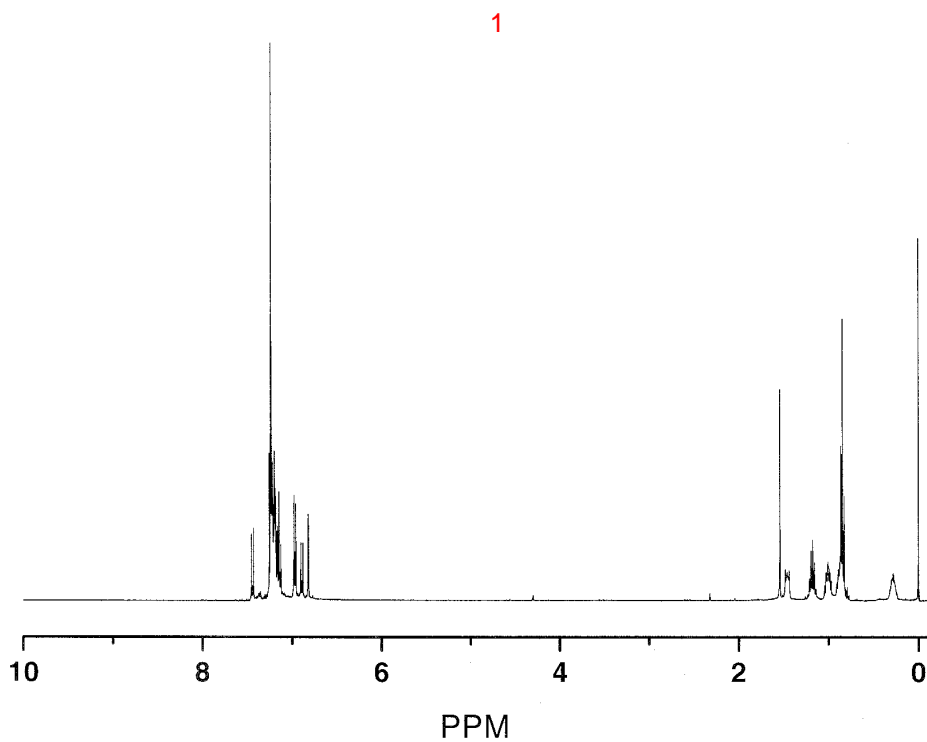


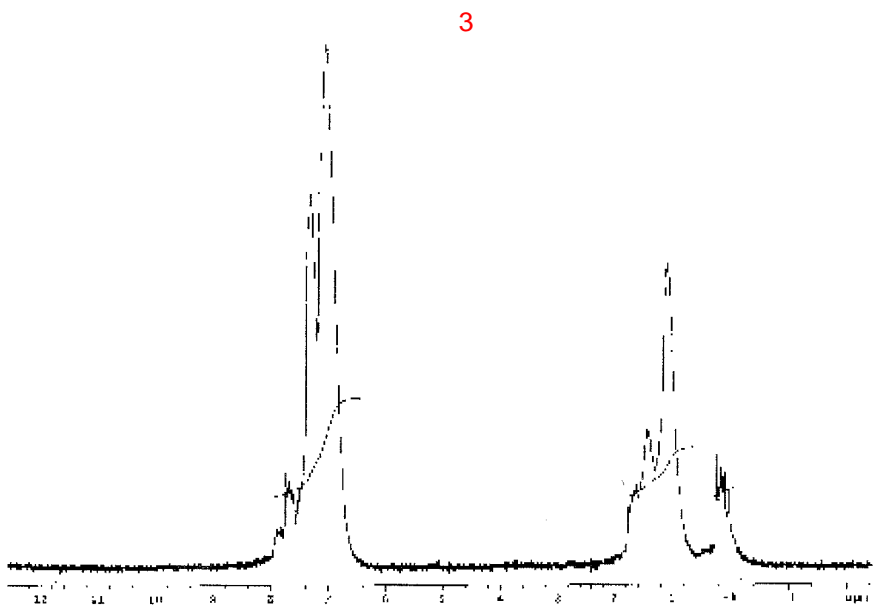
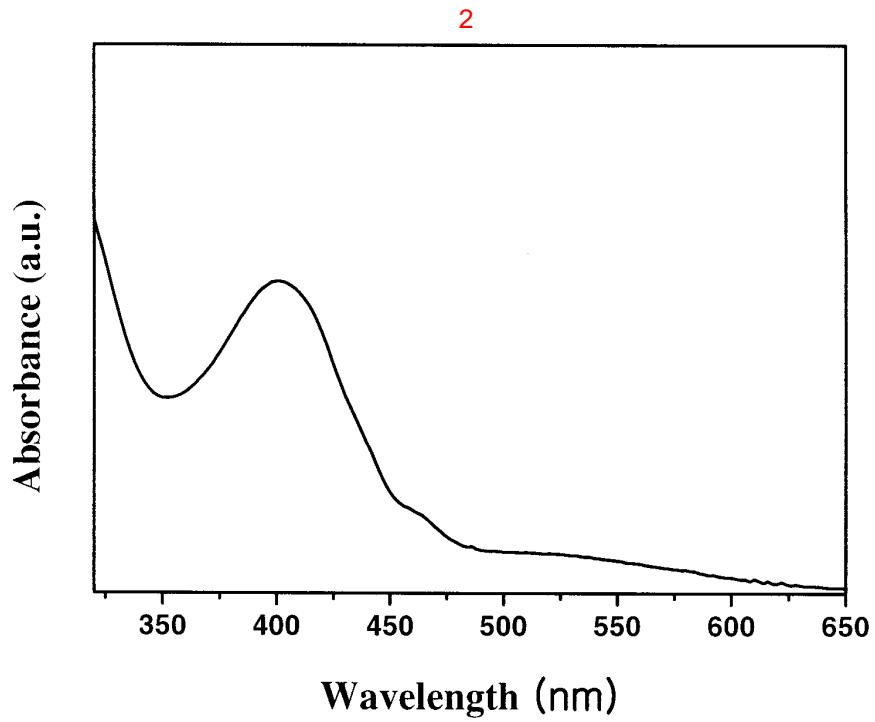
9. 4 , 가 (homopolymer)
(copolymer)

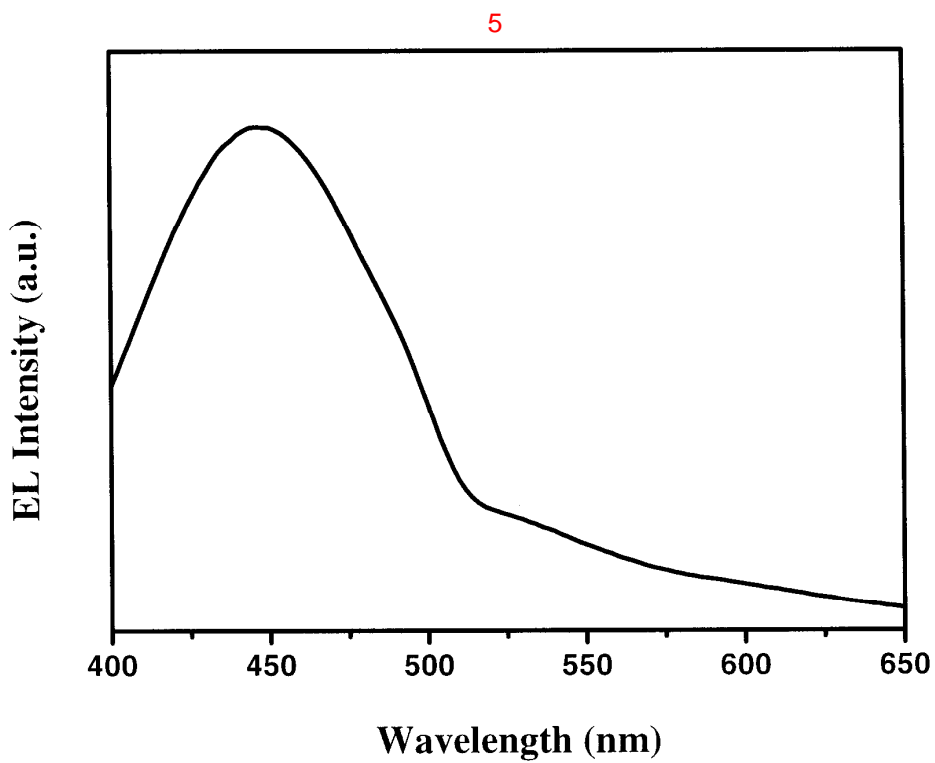
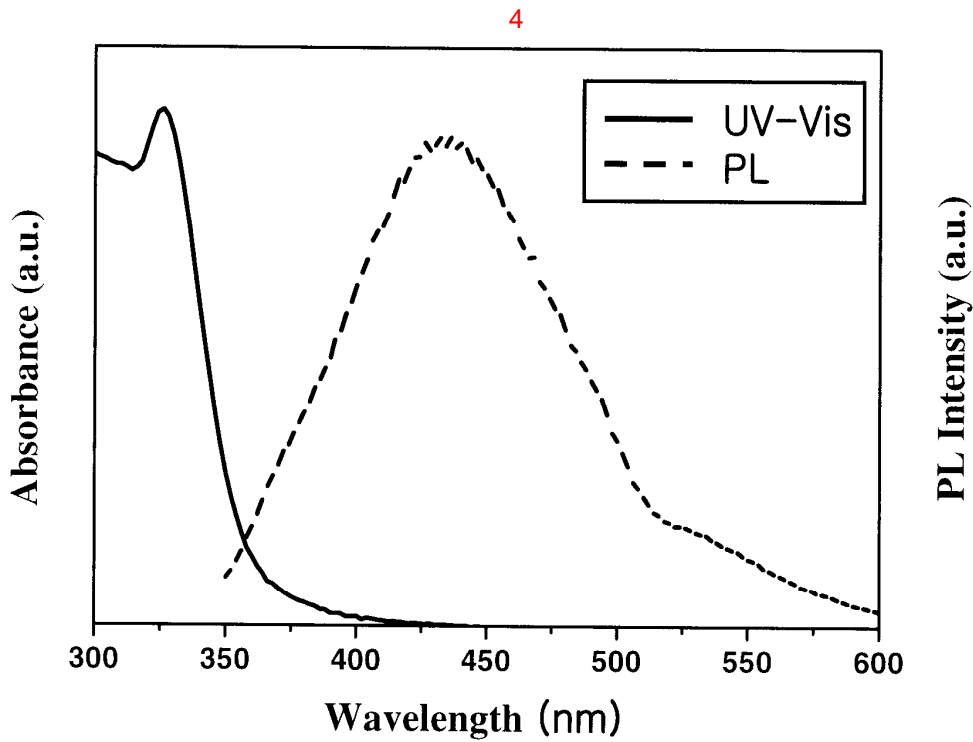
10. 4 9

11. 10 , 가 / / . / / / / /

11 12. / 가
11 13. 3 (1,4- -2,5-
, (3-),
, ABS, 가







专利名称(译)	具有聚亚苯基的苧基化合物，其聚合物和含有它们的EL器件		
公开(公告)号	KR1020030034659A	公开(公告)日	2003-05-09
申请号	KR1020010066330	申请日	2001-10-26
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IPC分类号	C09K11/06 C08G73/10 C07D285/12		
CPC分类号	Y10S428/917 C08G73/10 Y10T428/31507 Y10T428/31855		
其他公开文献	KR100411465B1		
外部链接	Espacenet		

摘要(译)

本发明涉及制备有机和聚合物电致发光器件和/或有机电致发光器件的方法，该器件通过具有至少一个环戊二烯酮基团的化合物和具有至少一个乙炔基团的化合物的Diels-Alder反应制备，一种具有聚亚苯基的氟基化合物，其聚合物，以及使用该苧系化合物或其聚合物作为发光材料的EL器件。五指数方面 环戊二烯，乙炔，苧类化合物，苧类聚合物，聚亚苯基，电致发光，发光材料，EL器件

