

(19)
(12)

(KR)
(A)

(51) 。 Int. Cl.⁷
C08F 20/18

(11)
(43)

10-2004-0090403
2004 10 22

(21) 10-2004-0008113
(22) 2004 02 06

(30) 1020030024193 2003 04 16 (KR)

(71) 133

(72) 133

133

133

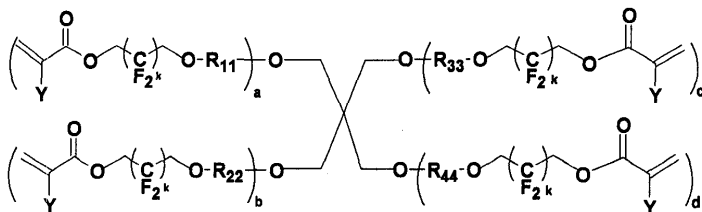
(74)

:

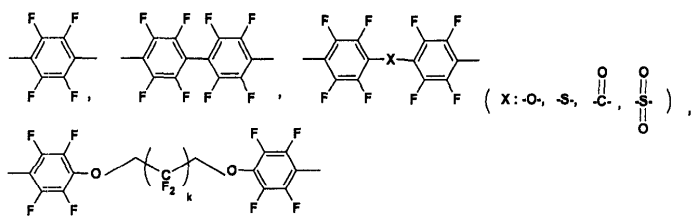
(54) 가 가 . ,

가 , 1.3μm 1.5μm , [1] [2] ,
가 가 가

[화학식 1]



(R₁₁ , R₂₂ , R₃₃ R₄₄ ,



Y H, F, CF₃, Cl

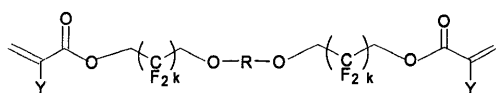
a, b, c, d 0 4

, a+b+c+d= 4

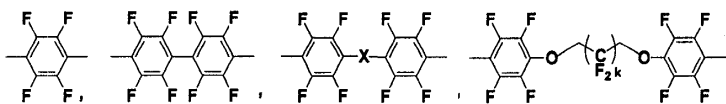
k 2 10

, 4가 .)

[화학식 2]



R



Y k X [1]

1

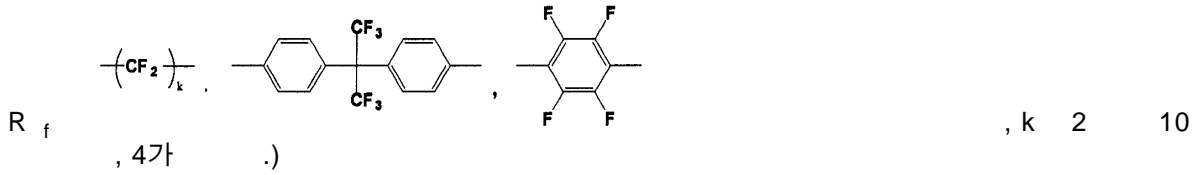
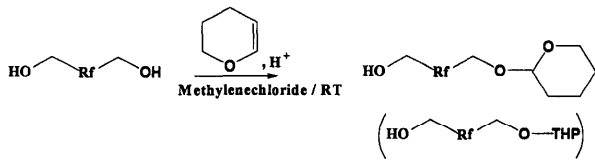
1 KBr (T4F8A/B4F8FA 70 :30)

IR .

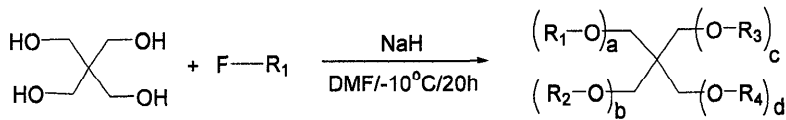
2 가

가 가 . 가
 , , 1.3μm 1.5μm
 , .
 가 21 . (~ 10⁹ Hz) (~ 10¹⁵ Hz)
 Akzo 가 BeamBOX[®]
 PMMA 가 PMMA
 NTT 1.3μm 0.08dB/cm PMMA T_g 가 1
 00 (Electron. Lett.,
 30, 958 (1994)), NTT Amoco Chemical
 , Ultradel 9000D (photolithography)
 가 (photo-crosslinking) 가 Allied Signal UV
 가 (US 6,306,563).
 1.1 1.6μm 1.34μm 가 1.55μm (C, H)
 가 C-H stretching 2 3 band 가
 가 dn/dT C-H C-D C
 -F (Makromol. Chem., 189, 2861 (1988)). PMM
 A, Polyimide (Macromolecules, 27, 6665 (1994)).
 , (dielect
 ric properties)
 (Photocuring) 10 가
 가
 (multifunctional acrylate)
 interconnect applications 가 가
 가
 Halofluorinated
 가

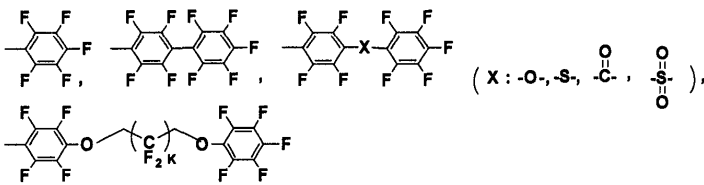
[반응식 1]



[반응식 2]



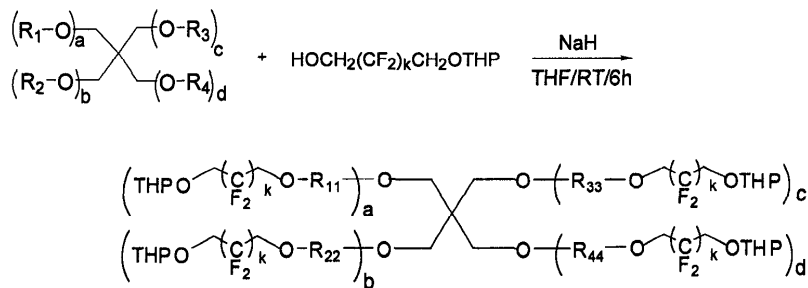
R₁, R₂, R₃, R₄



a, b, c, d = 0, 4, a+b+c+d=4

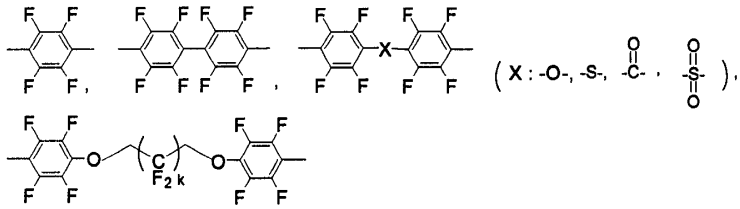
k = 2, 10, 4가 .

[반응식 3]



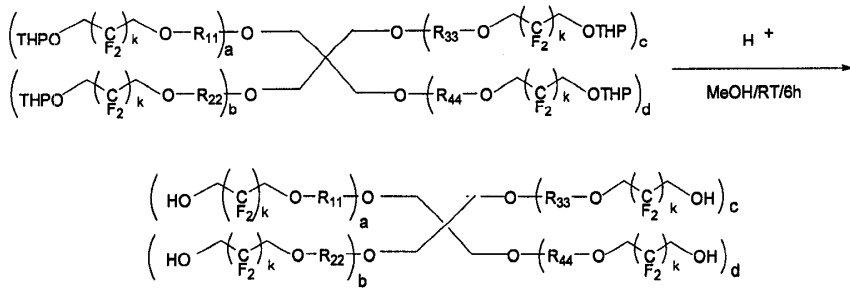
(R₁, R₂, R₃, R₄, a, b, c, d

, R₁₁, R₂₂, R₃₃, R₄₄



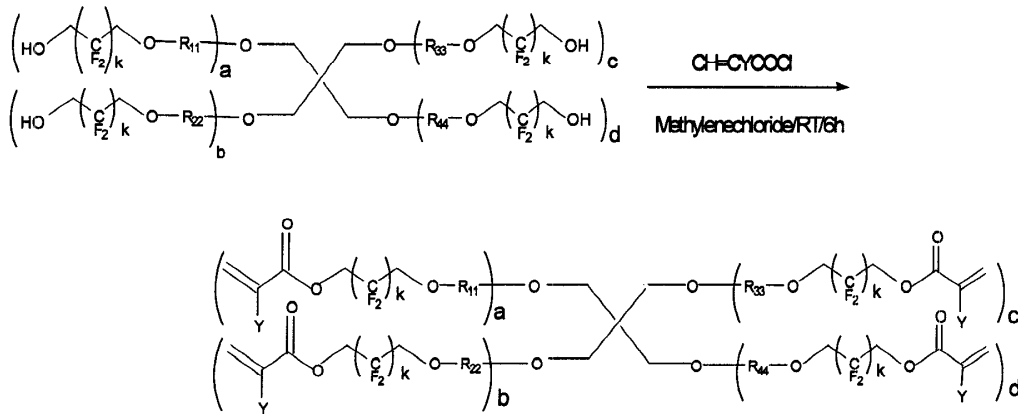
k 2 10 , 4가 .)

[반응식 4]



(, .)

[반응식 5]

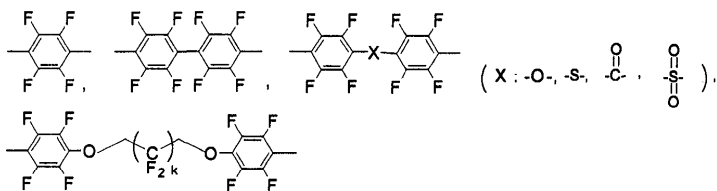


(, Y H, F, CF₃, Cl , .)

[반응식 6]



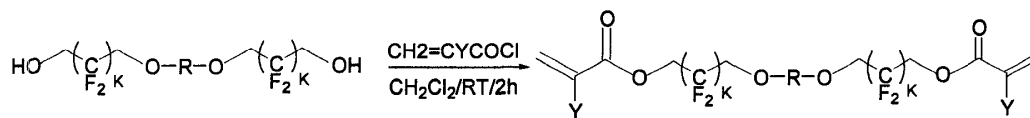
(, R .)



, k 2 10

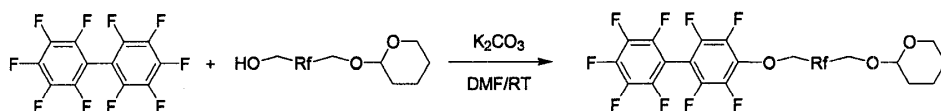
, 4가 .)

[화학 반응식 7]

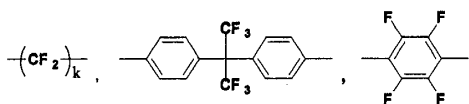


R, k Y

[화학 반응식 8]

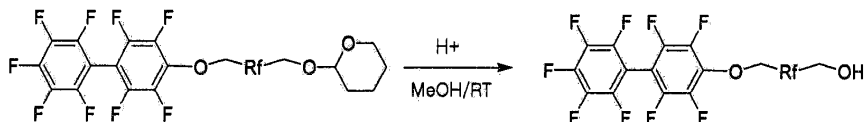


R_f



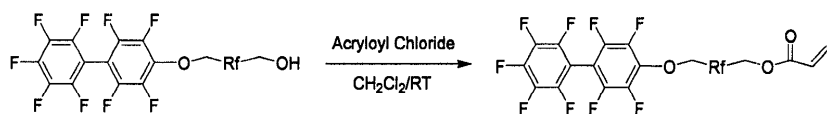
k 2 10

[화학 반응식 9]



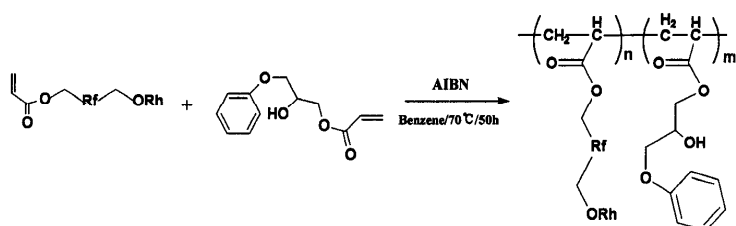
, R_f

[화학 반응식 10]

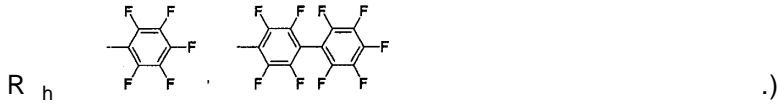


, R_f

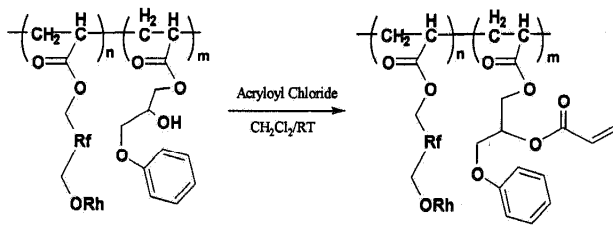
[화학 반응식 11]



(R_f

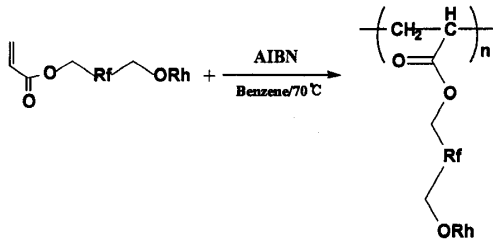


[화학 반응식 12]



(R_f R_h .)

[화학 반응식 13]



(R_f R_h .)

가 가

(pentafluorophenyl sulfide), 2-
dispersion in mineral oil),
)
-d6 Aldrich
te) Dow chemical

2,2,3,3,4,4,5,5-
-2H- (2.6ml, 28.5mmol)
가

2,2,3,3,4,4,5,5-
-1,6- (15g, 57.2mmol)
가

100ml) 1
8.9g(90%)

2-
-1,6-
(4-
-d6,
(1-Methoxy-2-propanol aceta
. N,N-
, p-
, n-
1 H-NMR 13

Perkin-Elmer Spectrom
(Thermogravimetric Analyzer: T
가 10
(Refractive Index) (Birefringe
)

3
(50ml×2)
(: =3:1)

1 :

2,2,3,3,4,4,5,5-
3,3,4,4,5,5-
-2H- (2.6ml, 28.5mmol)
가

2,2,3,3,4,4,5,5-
-1,6- (15g, 57.2mmol)
가

100ml) 1
8.9g(90%)

2-
-1,6-
(4-
-d6,
(1-Methoxy-2-propanol aceta
. N,N-
, p-
, n-
1 H-NMR 13

Perkin-Elmer Spectrom
(Thermogravimetric Analyzer: T
가 10
(Refractive Index) (Birefringe
)

3
(50ml×2)
(: =3:1)

$^1\text{H-NMR}$ (300MHz, CDCl_3): 1.59 1.85 (m, 6H), 3.12 (s, OH), 3.8 4.1 (m, 6H), 41.75 (s, 1H); $^{19}\text{F-NMR}$: -120.5 (d, 2F), -123.07 (t, 2F), -124.44 (m, 4F).

2 : (2,3,5,6-)

(2g, 14.7mmol) (50ml)
 (60% dispersion in mineral oil)(2.64g, 66.1mmol) 가 2
 (7.6ml, 66.1mmol) (100ml)
 10 가 가 20 TLC
 () 9.4g(80%)

$^1\text{H-NMR}$ (300MHz, CDCl_3): 4.56 (s, 2H, CH₂); $^{19}\text{F-NMR}$: -157.15(d, 2F), -162.26(t, 1F), -162.86(t, 2F)

3 :

-{4'-[6-(2-)]-2,2,3,3,4,4,5,5,6,6-]-2,3,5,6-
 }

(30ml) (2,3,5,6-) (1g, 1.25mmol)
 (60% dispersion in mineral oil) (0.21g, 5.37mmol) 가
 30 2,2,3,3,4,4,5,5- (10ml) (6- -2-)- 가
 1- (1.86g, 5.37mmol) 가 20 TLC
 (: =3:1) 2.5g(95%)

$^1\text{H-NMR}$ (300MHz, CDCl_3): 1.53 1.84 (m, 6H), 3.57 (t, 1H), 3.79 (m, 1H), 3.96 (t, 1H), 4.75 (m, 4H), 4.76 (s, 1H); $^{19}\text{F-NMR}$: -120.36 (s, 2F), -121.58 (t, 2F), -123.96 (m, 4F), -155.87 (d, 2F), -157.07 (d, 2F)

-{4'-[8-(2-)]-2,2,3,3,4,4,5,5,6,6,7,7,8,8-]-2,3,5,6-
 }

(30ml) (2,3,5,6-) (1g, 1.25mmol)
 (60% dispersion in mineral oil) (0.21g, 5.37mmol) 가
 30 2,2,3,3,4,4,5,5,6,6,7,7- (10ml) -8-(-2-)-
)- 1- (3.90g, 8.75mmol) 가 20 TLC
 가 가 (: =3:1) 2.0g(70%)

$^1\text{H-NMR}$ (300MHz, CDCl_3): 1.53 1.84 (m, 6H), 3.58 (t, 1H), 3.80 (m, 1H), 4.02 (t, 1H), 4.72 (m, 4H), 4.96 (s, 1H); $^{19}\text{F-NMR}$: -121.26 (s, 2F), -121.78 (t, 2F), -124.02 (m, 8F), -155.87 (d, 2F), -157.07 (d, 2F)

4 :

-[4'(6- -2,2,3,3,4,4,5,5,6,6-)-2,3,5,6- -)]

-{4'-[6-(2- -)]-2,2,3,3,4,4,5,5,6,6-]-2,3,5,6-
 } (1.54g, 0.73mmol) (20ml) p- (150mg) 가
 6 TLC
 (20ml) (50ml x 2) MgSO_4
 (: =3:1) 1.2g(86%)
 %)

$^1\text{H-NMR}$ (300MHz, Acetone-d_6): 3.62 (s, OH), 4.12 (t, 2H), 4.70 (s, 2H), 4.87 (m, 2H); $^{19}\text{F-NMR}$: -121.2 (t, 2F), -121.9 (t, 2F), -122.1 (m, 4F), -157.88(d, 2F), -158.87 (d, 2F)

5 :

[4'-(6- -2,2,3,3,4,4,5,5-)-2,3,5,6-]
(T4F8A)

- [4'(6- -2,2,3,3,4,4,5,5,6,6-)-2,3,5,6-
가)] (1.24g, 0.70mmol) (20 ml) (0.27g, 4.3mmol) 가 . TL
C 30 (20ml) (50ml×2)
MgSO₄ .
=3:1) 0.97g(70%)

¹H-NMR(300MHz, CDCl₃): 4.64-4.79 (m, 6H), 5.97-6.00 (d, *J*= 10 Hz, 1H), 6.14-6.24 (dd, *J*= 17, 10 Hz, 1 H), 6.50-6.56 (d, *J*= 17 Hz, 1H); ¹⁹F-NMR: -120.11(t, 2F), -121.54 (t, 2F), -124.13(m, 4F), -155.84 (d, 2F), -157.58 (d, 2F).

6 :

-(2,3,5,6,2',3',4',5',6'- -4-)

2 58%

¹H-NMR(300MHz, CDCl₃): 4.86 (s, 2H, CH₂): ¹⁹F-NMR: -137.86(d, 2F), -138.90(t, 2F), -150.24(t, 1F), 156.22(d, 2F), -160.85(t, 2F)

7 :

-{4'-[6-(2- -)-2,2,3,3,4,4,5,5,6,6-]-2,3,5,6,2',3',5',6'-
-(4-) }

3 92%

¹H-NMR(300MHz, Acetone-d₆): 2.98 (s, OH), 4.17 (t, 2H), 5.02-5.15 (m, 4H); ¹⁹F-NMR (300 MHz, Acetone-d₆): -122.02 (t, 2F), -122.93 (t, 2F), -124.51(m, 4F), -141.20 (m, 4F), -157.10 (d, 2F), -157.78(d, 2F).

8 :

-[4'-(6- -2,2,3,3,4,4,5,5-)-2,3,5,6,2',3',5',6'- - (4-)]

4 92%

¹H-NMR(300MHz, Acetone-d₆): 2.9 (s, OH), 4.08 4.19(d, 2H), 5.02 5.16(m, 4H): ¹⁹F-NMR: -122.02(t, 2F), -122.93(t, 2F), -124.51(d, 4F), -141.25(d, 2F), -141.4(d, 2F), -157.03(d, 2F), -157.8(d, 2F)

9 :

[4'-(6- -2,2,3,3,4,4,5,5-)-2,3,5,6,2',3',5',6'- - (4-)] (T8F8A)

5 50%

¹H-NMR(300MHz, CDCl₃): 4.56 (s, 2H, CH₂), 5.97-6.00 (d, *J*= 10 Hz, 1H), 6.14-6.24 (dd, *J*= 17, 10 Hz, 1 H), 6.50-6.56 (d, *J*= 17 Hz, 1H); ¹⁹F-NMR: -120.24(t, 2F), -121.56(t, 2F), -124.22(m, 4F), -138.96(t, 2F), -139.38(t, 2F), -156.08(d, 2F), -156.79(d, 2F).

10 :

-[2,3,5,6- - (4-)-]

2 50%

$^1\text{H-NMR}$ (300MHz, CDCl_3): 4.56 (s, 2H, CH_2); $^{19}\text{F-NMR}$: -158.8(d, 2F), -159.3(d, 4F), -162.26(t, 1F), -162.86(t, 2F)

11 :

-{4'-(6-(2-)-2,2,3,3,4,4,5,5,6,6-)-2,3,5,6-
-(4-)- }

3 90%

$^1\text{H-NMR}$ (300MHz, CDCl_3): 1.53 1.84 (m, 6H), 3.57 (t, 1H), 3.79 (m, 1H), 3.96 (t, 1H), 4.75(m, 4H), 4.76(d, 1H); $^{19}\text{F-NMR}$: -121.2(s, 2F), -121.9(s, 2F), -122.1(d, 4F), -157.17(d, 2F), -157.65(d, 2F), -158.8(d, 2F), -159.3(d, 2F)

12 :

-[4'-(6- -2,2,3,3,4,4,5,5,6,6-)- 2,3,5,6- -(4-)-]

4 92%

$^1\text{H-NMR}$ (300MHz, Acetone-d_6): 4.05 4.12(m, 2H), 4.67 4.84(m, 3H), 5.12(t, 1H); $^{19}\text{F-NMR}$: -122.1(d, 2F), -123.07(d, 2F), -124.74(d, 4F), -121.2(s, 2F), -121.9(s, 2F), -122.1(d, 4F), -157.17(d, 2F), -157.65(d, 2F), -158.8(d, 2F), -159.3(d, 2F)

13 :

[4'-(6- -2,2,3,3,4,4,5,5-)-2,3,5,6- -(4-)-]

5 70%

$^1\text{H-NMR}$ (300MHz, CDCl_3): 4.64 4.79(m, 6H), 5.97-6.00 (d, $J=10$ Hz, 1H), 6.14-6.24 (dd, $J=17, 10$ Hz, 1H), 6.50-6.56 (d, $J=17$ Hz, 1H); $^{19}\text{F-NMR}$: -119.8(t, 2F), -121.9(t, 2F), -123.92(d, 4F), -138.5(d, 2F), -138.87(d, 2F), -155.69(d, 2F), -156.38(d, 2F), -157.17(d, 2F), -157.65(d, 2F)

14 :

-[2,3,5,6- -(4-)-]

2 40%

$^1\text{H-NMR}$ (300MHz, CDCl_3): 4.56 (s, 2H, CH_2); $^{19}\text{F-NMR}$: -158.8(d, 2F), -159.3(d, 4F), -162.26(t, 1F), -162.86(t, 2F)

15 :

-{4'-(6-(2-)-2,2,3,3,4,4,5,5,6,6-)-2,3,5,6-
-(4-)- }

3 97%

$^1\text{H-NMR}$ (300MHz, CDCl_3): 1.53 1.84 (m, 6H), 3.57 (t, 1H), 3.79 (m, 1H), 3.96 (t, 1H), 4.75(m, 4H), 4.76(d, 1H); $^{19}\text{F-NMR}$: -121.2(s, 2F), -121.9(s, 2F), -122.1(d, 4F), -157.17(d, 2F), -157.65(d, 2F), -158.8(d, 2F), -159.3(d, 2F)

16 :



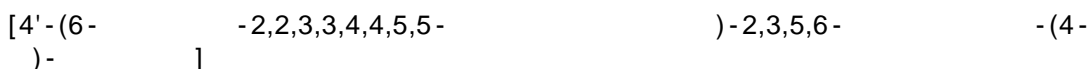
4

92%

.

$^1\text{H-NMR}$ (300MHz, Acetone- d_6): 4.05 4.12(m, 2H), 4.67 4.84(m, 3H), 5.12(t, 1H); $^{19}\text{F-NMR}$: -122.1(d, 2F), -123.07(d, 2F), -124.74(d, 4F), -121.2(s, 2F), -121.9(s, 2F), -122.1(d, 4F), -157.17(d, 2F), -157.65(d, 2F), -158.8(d, 2F), -159.3(d, 2F)

17 :



5

70%

.

$^1\text{H-NMR}$ (300MHz, CDCl_3): 4.55 4.71(m, 6H), 5.97-6.00 (d, $J=10$ Hz, 1H), 6.14-6.24 (dd, $J=17, 10$ Hz, 1H), 6.50-6.56 (d, $J=17$ Hz, 1H); $^{19}\text{F-NMR}$: -119.8(t, 2F), -121.9(t, 2F), -123.92(d, 4F), -138.5(d, 2F), -138.87(d, 2F), -155.69(d, 2F), -156.38(d, 2F), -157.17(d, 2F), -157.65(d, 2F)

18 :



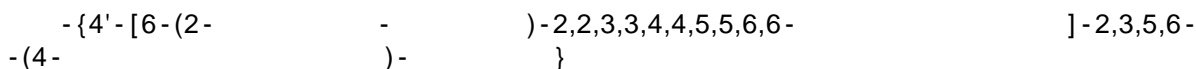
2

40%

.

$^1\text{H-NMR}$ (300MHz, CDCl_3): 4.56 (s, 2H, CH_2); $^{19}\text{F-NMR}$: -158.8(d, 2F), -159.3(d, 4F), -162.26(t, 1F), -162.86(t, 2F)

19 :



3

97%

.

$^1\text{H-NMR}$ (300MHz, CDCl_3): 1.53 1.84 (m, 6H), 3.57 (t, 1H), 3.79 (m, 1H, 3.96 (t, 1H), 4.75(m, 4H), 4.76(d, 1H); $^{19}\text{F-NMR}$: -121.2(s, 2F), -121.9(s, 2F), -122.1(d, 4F), -157.17(d, 2F), -157.65(d, 2F), -158,8(d, 2F), -159,3(d, 2F)

20 :



4

92%

.

$^1\text{H-NMR}$ (300MHz, Acetone- d_6): 4.05 4.12(m, 2H), 4.67 4.84(m, 3H), 5.12(t, 1H); $^{19}\text{F-NMR}$: -122.1(d, 2F), -123.07(d, 2F), -124.74(d, 4F), -121.2(s, 2F), -121.9(s, 2F), -122.1(d, 4F), -157.17(d, 2F), -157.65(d, 2F), -158.8(d, 2F), -159.3(d, 2F)

21 :



5 65%

$^1\text{H-NMR}$ (300MHz, CDCl_3): 4.55 4.71(m, 6H), 5.97-6.00 (d, $J=10$ Hz, 1H), 6.14-6.24 (dd, $J=17$, 10 Hz, 1H), 6.50-6.56 (d, $J=17$ Hz, 1H); $^{19}\text{F-NMR}$: -119.8(t, 2F), -121.9(t, 2F), -123.92(d, 4F), -138.5(d, 2F), -138.87(d, 2F), -155.69(d, 2F), -156.38(d, 2F), -157.17(d, 2F), -157.65(d, 2F)

22 :

- [2,3,5,6- (2,2,3,3,4,4,5,5,6-)-]

2 42%

$^1\text{H-NMR}$ (300MHz, CDCl_3): 4.56 (s, 2H, CH₂); $^{19}\text{F-NMR}$: -121.2(s, 2F), -121.9(s, 2F), -122.1(d, 4F), -157.17(d, 2F), -157.65(d, 2F), -158.8(d, 2F), -159.3(d, 2F)

23 :

- {4'- [6- (2,2,3,3,4,4,5,5,6,6-)-2,3,5,6-]-2,3,5,6- }
-4-(2,2,3,3,4,4,5,5,6-)-6- }

3 97%

$^1\text{H-NMR}$ (300MHz, CDCl_3): 1.53 1.84 (m, 12H), 3.57 (t, 2H), 3.79 (m, 2H), 3.96 (t, 2H), 4.75(m, 8H), 4.76(d, 2H); $^{19}\text{F-NMR}$: -121.2(s, 4F), -121.9(s, 4F), -122.1(d, 8F), -157.17(d, 2F), -157.65(d, 2F), -158.8(d, 2F), -159.3(d, 2F)

24 :

- [4'- (6- (2,2,3,3,4,4,5,5,6,6-)-2,3,5,6-)-4-(2,2,3,3,4,4,5,5,6-)-6-]

4 90%

$^1\text{H-NMR}$ (300MHz, Acetone- d_6): 4.05 4.12(m, 2H), 4.67 4.84(m, 6H), 5.12(t, 2H), $^{19}\text{F-NMR}$: -121.2(s, 4F), -121.9(s, 4F), -122.1(d, 8F), -157.17(d, 2F), -157.65(d, 2F), -158.8(d, 2F), -159.3(d, 2F)

25 :

[4'- (6- (2,2,3,3,4,4,5,5,6,6-)-2,3,5,6-)-4-(2,2,3,3,4,4,5,5,6-)-6-]

5 65%

$^1\text{H-NMR}$ (300MHz, CDCl_3): 4.55 4.71(m, 10H), 5.97-6.00 (d, $J=10$ Hz, 1H), 6.14-6.24 (dd, $J=17$, 10 Hz, 1H), 6.50-6.56 (d, $J=17$ Hz, 1H); $^{19}\text{F-NMR}$: -120.08(t, 4F), -121.9(t, 4F), -124.1(d, 8F), -157.1(d, 2F), -157.6(d, 2F), -158.8(d, 2F), -159.3(d, 2F)

26 :

4-4'- (6- (2,2,3,3,4,4,5,5,6,6-)-2,3,5,6,2',3',5',6'-)

41.9mmol) 20 (50ml×2) : . TLC : =3:1) MgSO₄ 14.6g(90%) (5g, 19.1mmol) (12.7g, 38.1mmol) (30ml) 가 (13.7g, 가 (

¹H-NMR(300MHz, CDCl₃): 3.94 (m, 2H), 4.63 (s, OH), 4.72 (m, 2H); ¹⁹F-NMR(300 MHz, CDCl₃): -121.64 (t, 2F), -122.85 (t, 2F), -124.36 (m, 4F), -141.20(t, 4F), -157.05(d, 4F).

27 :

4-4'- (6- -2,2,3,3,4,4,5,5-)-2,3,5,6,2',3',5',6'- (B4F8FA)

5 80%

¹H-NMR: H-NMR(300MHz, CDCl₃): 4.61-4.79 (m, 4H), 5.94-5.97 (d, *J*= 10 Hz, 1H), 6.13-6.23 (dd, *J*= 17, 10 Hz, 1H), 6.47-6.52 (d, *J*= 17 Hz, 1H); ¹⁹F-NMR (300 MHz, CDCl₃): -120.05 (t, 2F), -121.32 (t, 2F), -123.92-124.15 (m, 4F), -138.57 (t, 4F), -155.67 (d, 4F).

28 :

4-4'- (6- -2,2,3,3,4,4,5,5-)-2,3,5,6- -(4-

26 85%

¹H-NMR(300MHz, CDCl₃): 3.94(m, 2H), 4.63(s, OH), 4.72(m, 2H); ¹⁹F-NMR: -121.64(d, 2F), -122.85(d, 2F), -124.36(d, 4F), -157.17(d, 2F), -157.65(d, 2F), -158.8(d, 2F), -159.3(d, 2F)

29 :

4-4'- (6- -2,2,3,3,4,4,5,5-)-2,3,5,6- -(4-

5 80%

¹H-NMR: H-NMR(300MHz, CDCl₃): 4.61-4.79(m, 4H), 5.97-6.00 (d, *J*= 10 Hz, 1H), 6.14-6.24 (dd, *J*= 17, 10 Hz, 1H), 6.50-6.56 (d, *J*= 17 Hz, 1H); ¹⁹F-NMR: -120.05(t, 2F), -121.32(t, 2F), -123.92-124.15(d, 4F), -157.17(d, 2F), -157.65(d, 2F), -158.8(d, 2F), -159.3(d, 2F)

30 :

4-4'- (6- -2,2,3,3,4,4,5,5-)-2,3,5,6- -(4-

26 85%

¹H-NMR(300MHz, CDCl₃): 3.94(m, 2H), 4.63(s, OH), 4.72(m, 2H); ¹⁹F-NMR: -121.64(d, 2F), -122.85(d, 2F), -124.36(d, 4F), -157.17(d, 2F), -157.65(d, 2F), -158.8(d, 2F), -159.3(d, 2F)

31 :

4-4'- (6- -2,2,3,3,4,4,5,5-)-2,3,5,6- -(4-

5 80%

¹H-NMR: H-NMR(300MHz, CDCl₃): 4.61-4.79(m, 4H), 5.97-6.00 (d, *J*= 10 Hz, 1H), 6.14-6.24 (dd, *J*= 17, 10 Hz, 1H), 6.50-6.56 (d, *J*= 17 Hz, 1H); ¹⁹F-NMR: -120.05(t, 2F), -121.32(t, 2F), -123.92-124.15(d, 4F), -157.17(d, 2F), -157.65(d, 2F), -158.8(d, 2F), -159.3(d, 2F)

32 :

4-4'- (6- -2,2,3,3,4,4,5,5-)-2,3,5,6- -(4-

26 85%

¹H-NMR(300MHz, CDCl₃): 3.94(m, 2H), 4.63(s, OH), 4.72(m, 2H); ¹⁹F-NMR: -121.64(d, 2F), -122.85(d, 2F), -124.36(d, 4F), -157.17(d, 2F), -157.65(d, 2F), -158.8(d, 2F), -159.3(d, 2F)

33 :

4-4'- (6- -2,2,3,3,4,4,5,5-)-2,3,5,6- -(4-

5 80%

¹H-NMR: H-NMR(300MHz, CDCl₃): 4.61 4.79(m, 4H), 5.97-6.00 (d, J= 10 Hz, 1H), 6.14-6.24 (dd, J= 17, 10 Hz, 1H), 6.50-6.56 (d, J= 17 Hz, 1H), ¹⁹F-NMR: -120.05(t, 2F), -121.32(t, 2F), -123.92 124.15(d, 4F), -157.17(d, 2F), -157.65(d, 2F), -158.8(d, 2F), -159.3(d, 2F)

34 :

4-4'- (6- -2,2,3,3,4,4,5,5-)-2,3,5,6- -4-(2,2,3,3,4,4,5,5,-

26 85%

¹H-NMR(300MHz, CDCl₃): 3.94(m, 4H), 4.1(m, 4H), 4.63(s, OH), 4.72(m, 4H); ¹⁹F-NMR: -121.64(d, 6F), -122.85(d, 6F), -124.36(d, 12F), -157.17(d, 2F), -157.65(d, 2F), -158.8(d, 2F), -159.3(d, 2F)

35 :

4-4'- (6- -2,2,3,3,4,4,5,5-)-2,3,5,6- -4-(2,2,3,3,4,4,5,5,-

5 80%

¹H-NMR: H-NMR(300MHz, CDCl₃): 4.61 4.79(m, 14H), 5.97-6.00 (d, J= 10 Hz, 1H), 6.14-6.24 (dd, J= 17, 10 Hz, 1H), 6.50-6.56 (d, J= 17 Hz, 1H); ¹⁹F-NMR: -121.64(d, 6F), -122.85(d, 6F), -124.36(d, 12F), -157.17(d, 2F), -157.65(d, 2F), -158.8(d, 2F), -159.3(d, 2F)

36 : 가

T4F8A/ B4F8FA T8F8A/ B4F8FA (10 : 90, 20 : 80, 30 : 70, 50 : 50, 70 : 30, 80 : 20) TA2-107 [2- -(1, 3) -5- -4,6- - -(1,3,5)] 1 % 80 % PGMEA () (Silicon Wafer) 1,100rpm 30 12 80 10 100 W/cm 1 m/min 250 2

FT-IR 가 1 T4F8 A/B4F8FA 70: 30 (a) 가 (b), 가 (c) (CH-streching 1650 cm⁻¹ 가 (conversion) 90%

가 (photocrosslinked perfluorinated copolyacrylates) 가 가 (Refractive Index)

(Birefringence) PCA-200 1.55 nm
 1.441 1.400 (T4F8A/B4F8FA= 2 : 8)
 0.0002 T4F8A, T8F8A B4F8FA 가 T4F8A, T8F8A B4F8FA
 가 (T_d) 360 (TGA)
 (T_g)

[] UV 가

물비	굴절율 (@ 1550 nm)			T _d (°C) ^d
	nTE	nTM	nTE-TM	
(7 : 3) ^a	1.4423	1.4387	0.0035	369
(2 : 8) ^a	1.4336	1.4334	0.0002	368
(7 : 3) ^b	1.4116	1.4128	0.0012	375
(2 : 8) ^b	1.4401	1.4404	0.0003	346

^a T4F8FA & B4F8FA, ^b T8F8FA & B4F8FA, ^c From DSC thermograms measured in N₂, ^d 5% weight loss, N₂

2 (PMMA) 가
 (NIR) 1,300 1,550 nm 가

37 :

2,2,3,3,4,4,5,5- -6-(2,3,5,6,2',3',4',5',6'- -4-)- -1-

58g, 11.4mmol) 2,2,3,3,4,4,5,5- -1,6- (6.0g, 22.9mmol) (1.
 24 (60ml) (3.82g, 11.4mmol) 가
 (50ml×2) . TLC (30ml) 가
 (: =3:1) MgSO₄ 3.0g(46%)

¹H-NMR(300MHz, CDCl₃): 4.0-4.1 (m, 2H), 5.01-5.11(t, 2H); ¹⁹F-NMR (300 MHz, CDCl₃), -122.0 (t, 2F), -123.0 (t, 2F), -124.53-124.73(d, 4F), -140.59(m, 2F), -141.07-141.17(m, 2F), -152.93(t, 1F), -156.89(d, 2F), -163.11-163.30(dt, 2F)

2,2,3,3,4,4,5,5- -6-(2,3,5,6,2',3',4',5',6'- -4-)- -1-

2,2,3,3,4,4,5,5- -6-(2,3,5,6,2',3',4',5',6'- -4-)- -1-
 (1.0g, 1.69mmol) (20 ml) (0.47ml, 3.38mmol) 가
 30 (0.18ml, 2.19mmol)) 가 . TLC
 (20ml) (50ml×2)
 (: =3:1) 0.74g(70%)

¹H-NMR(300MHz, CDCl₃): 4.82-4.91 (t, 2H), 5.09-5.18 (t, 2H), 6.05-6.09 (d, *J*= 10 Hz, 1H), 6.21-6.30 (dd, *J*= 17, 10 Hz, 1H), 6.46-6.53 (d, *J*= 17 Hz, 1H); ¹⁹F-NMR (300 MHz, CDCl₃): -122.50 (t, 2F), -121.93 (t, 2F), -124.35-124.64(d, 4F), -139.98-140.06(m, 2F), -141.04-141.13(m, 2F). -152.95(t, 1F), -156.89(d, 2F), -163.15-163.28(dt, 2F)

38 : (F9BPH-HPP)

2,2,3,3,4,4,5,5- -6-(2,3,5,6,2',3',4',5',6'-

-4- (3ml) (1.0g, 0.79mmol) 2- (5mg) 가 70 -3- 50

peak (F9BPH-HPP) 1.0g(83%) 1 H-NMR
5.7 × 10⁻⁴ (g/mol) 1 : 1 4.0-4.9

¹H-NMR(300MHz, CDCl₃): 7.18(2H), 6.88(3), 5.06(2H), 4.72(2H), 4.19(3H), 3.99(2H), 2.68(2H), 1.67(4H);
¹⁹F-NMR: -120.53(2F), -121.88(2F), -124.62(4F), -140.01(2F), -141.06(2F), -152.90(1F), -156.93(2F), -163.17(2F)

39 : 가 (F9BPH-HPP)

(F9BPH-HPP) 1.0g (20ml) (2ml)
(0.15ml) 가 12 (1:1) 50ml
1 (F9BPH-HPP) 0.7g(70%) 7.3 × 10⁻⁴ (g/mol) 가
3.1-3.4 (TGA)
(Td) 350

¹H-NMR(300MHz, CDCl₃): 1.67(4H), 2.68(2H), 3.99(2H), 4.19(3H), 4.72(2H), 5.06(2H), 5.55-5.67(1H), 5.82-6.20(1H), 6.31-6.39(1H); ¹⁹F-NMR: -120.53(2F), -121.88(2F), -124.62(4F), -140.01(2F), -141.06(2F), -152.90(1F), -156.93(2F), -163.17(2F)

40 : (HBP)

2,2,3,3,4,4,5,5- (1.0g, 0.79mmol) -6-(2,3,5,6,2',3',4',5',6')- (3ml)
(5mg) 가 70 -3- 50
HBP) 0.9g(90%) 3.3 × 10⁻⁴ (g/mol) 3.1
(TGA) 350

¹H-NMR(300MHz, CDCl₃): 5.00-5.09(2H), 4.74-4.82(2H), 4.19(3H), 3.99(2H), 2.68(1H), 1.68(2H); ¹⁹F-NMR: -120.53(2F), -121.88(2F), -124.62(4F), -140.01(2F), -141.06(2F), -152.90(1F), -156.93(2F), -162.17(2F)

41 : (HBP) 가

HBP (T8F8A/ B4F8FA) HBP (T8F8A/ B4F8FA)
F8FA) (20 : 80, 30 : 70, 50 : 50, 70 : 30, 80 : 20) (T
8F8A/ B4F8FA) (50: 50) TA2-107 [2-- -(1,3) -5- -4,6-
-(1,3,5)] 1 % 80 %
(Silicon Wafer) 1,10
0rpm 30 12 250 80 10
100 W/cm 1m/min

가 FT-IR
conversion) 90% CH-streching 1650 cm⁻¹ 가

가 가 가
A) (photocrosslinked perfluorinated copolyacrylates) HBP (T8F8A/ B4F8F
50 : 50 (, (50: 50))
(Refractive Index) (Birefringence) PCA-200
1.55 nm TE 1.4468 TM 1.4563

Td) 390 (HBP) 0.0005 (HBP) (HBP) 0.0017 (TGA) 0.0005 ()

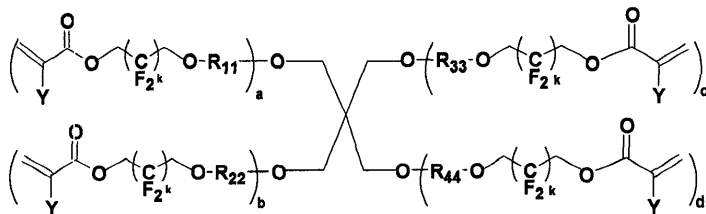
가 가
가

(57)

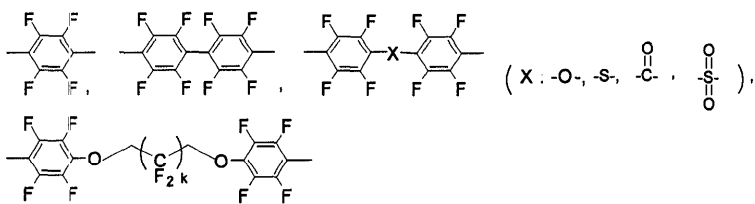
1.

[1] 가

[화학식 1]



(R₁₁, R₂₂, R₃₃, R₄₄)



Y H, F, CF₃, Cl

a, b, c, d 0 4 , a+b+c+d=4

k 2 10 , 4가 .)

2.

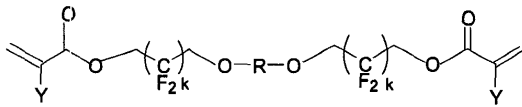
1 ,

R₁₁, R₂₂, R₃₃, R₄₄ 가 가

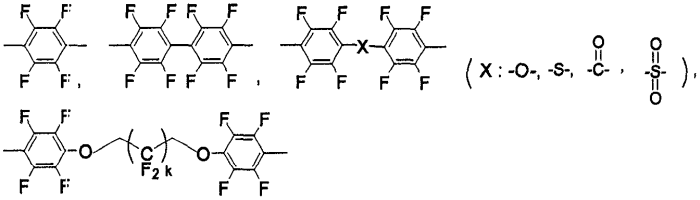
3.

[2] 가

[화학식 2]



(R



Y H, F, CF₃, Cl

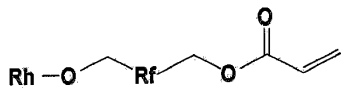
k 2 10

4가 .)

4.

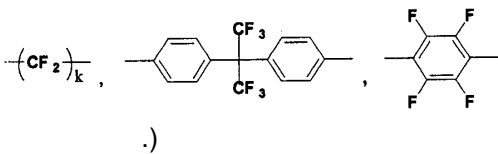
[3] 가

[화학식 3]



(R_h

R_f

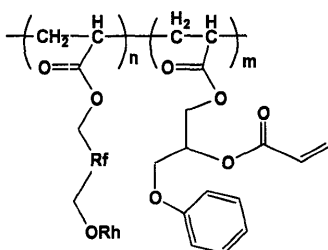


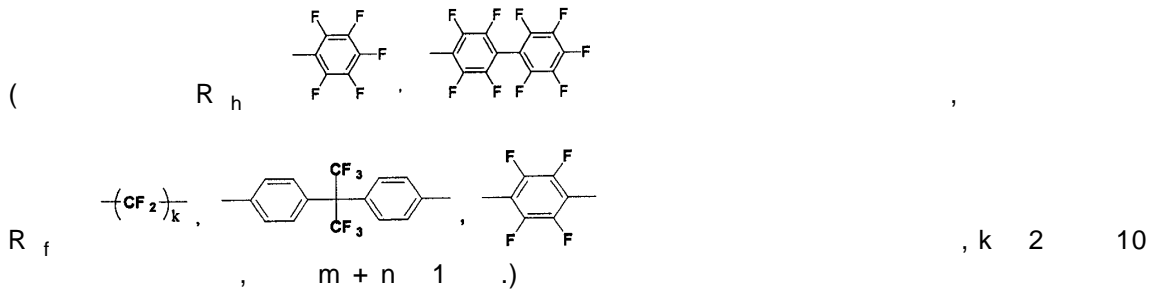
, k 2 10

5.

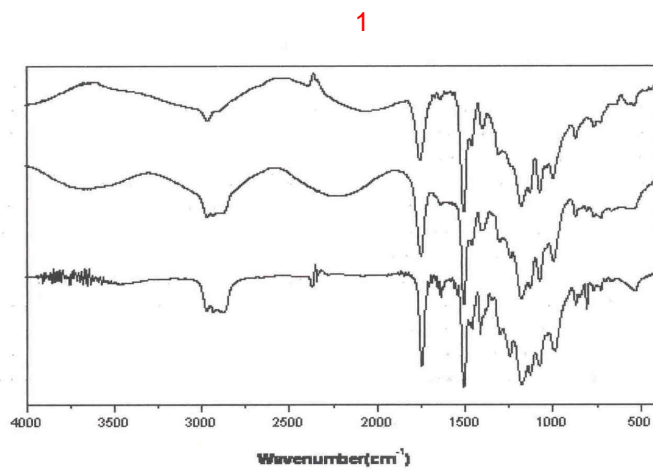
[4] 가

[화학식 4]





6. 5 ,
- m 0 .
7. 5 6 ,
- 1 [1] 2 2 .
8. 7 가 .



(a) 공단량체 블렌드물 (b) UV 경화한 후 (c) 열 경화 후

2

