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(12)

(KR)
(A)

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(43)

2002 - 0026355
2002 04 09

(21)	10 - 2002 - 7000687
(22)	2002 01 17
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(86)	PCT/EP2000/06879
(86)	2000 07 19

(87)	WO 2001/07962
(87)	2001 02 01

(81)

가

가 가

가

가

AP ARIPO : 가

EA :

EP :

OA OAPI :

가

(30) 19933571.0 1999 07 22 (DE)

(71)

64293 250

(72)

- 64625	14	
- 63808	13	
- 64665	-	14
- 64291	81	

(74)

⋮

(54)

[illegible]

1a

n) 가 $\lambda/2$, $0.06\mu\text{m}$, $0.43\mu\text{m}$, $\lambda/4$, 2 , $(d \cdot \lambda/4)^2$, 2 .

sonal digital assistants) (PDA) (per

가 .

TN(twisted nematic)
 (Schadt, M. and Helfrich, W. Appl. Phys. Lett.18, pp.127 ff(1974)) DE 30 22 818
 150nm 600 nm (d • n) 가 , STN(supertwisted nematic)
 (, GB 2.123.163, Waters, C.M., Brimmel, V, and Raynes, E. Pproc. 3rd Int. Display Resea
 rch Conference, Kobe 1983, pp. 396 ff and Proc. SID25/4, pp.261 ff, 1984, Scheffer, T.J.and Nehring, J.
 Appl. Phys. Lett.45, pp. 1021 ff, 1984 and J.Appl.Phys.58, pp.3022 ff, 1985, DE 34 31 871, DE 36 08 91
 1 and EP 0 260 450), IPS(in - planeswitching) (, DE 40 00 451 EP 0 588 568), V
 AN(vertically aligned nematic) (, Tanaka, Y. et al., Taniguchi, Y., Sasaki, T., Takeda, A.,
 Koibe, Y., and Okamoto, K.SID 99 Digest pp. 206 ff(1999), Koma, N., Noritake, K., Kawabe, M., and Yon
 eda, K., International Display Workshop(IDW) '97 pp. 789 ff(1997) and Kim, K.H., Lee, K., Park, S.B., So
 ng, J.K., Kim, S., and Suk, J.H., Asia Display 98, pp. 383 ff, (1998)) .

가 ,
 가 ,
 CRT (cathode ray tubes)
 STN TN
 IPS(" in - plane switching") VAN(" vertically aligned nematic")
 가 ,
 32ms , 16ms

가 ,
 가 ,
 가 ,
 90 ° 가

가 ,
 가

DE 30 22 818 , 0.2 μ m 0.6 μ m d • n 가 TN

가 .

IPS , VAN 가 ,
 (homeotropic) , (filling) VAN .

EP 0 264 667 0.2 μ m 0.7 μ m d • n 가 10 ° 80 ° (φ , "
 ") 가 TN . 90 ° 가 TN
 TN , EP 0 264 667 TN

(Raynes, E.P., Mol.Cryst.Liq.Cryst.4,p.1,ff,1986) 0° 270° 가
 " ") 가 (Ψ_M , " "

DE 40 10 503 WO 92/17831 , 0° 90° 가 TN
 . 22.5° 가 ,
 가 . ,

DE 42 12 744 0.1 0.5 d/P 가 (P)가 ,
 0.15 μ m 0.70 μ m d · n 90° 가 TN
 . DE 42 12 744 TN EP 0 264 667
 . EP 0 264 667 TN , TN
 DE 42 12 744 (saturation voltage) 가 .

WO 91/06889 5.319.478 $\lambda/2$ $\lambda/4$,
 가 .

(Van Haaren et al., Phys. Rev. E, Vol.53, No.2, pp.1701 1713) $\lambda/4$ 가
 , ZLI - 4729(Merck KGaA) (k₁₃)

{Tillin et al., SID 98 Digest, pp, 311 - 314(1998)} 가
 . , , $\frac{1}{2}$ (d · n/ λ) $\frac{1}{4}$, $\frac{1}{4}$ 0
 가 , 가 , $\frac{1}{2}$ (d · n/ λ) 가 , 4/55 (d · n/ λ) 가
 가 1/3 (d · n/ λ) 가 , 0
 ° 90° 가 가 , 가 ,
 . 가 가 .

가 , 가
 (half - tone colours) 가 ,

4 , $\lambda/2$ $\lambda/4$, $\lambda/4$ $\lambda/2$, $\lambda/$

1 , , (, $\lambda/4$) 가

1a . , .
 , ,
 (, "BL") , ,
 () . , ,
 45°

1b , , 1a z -
 , 1a 가 . Ψ_{PP} (90°)
 Ψ_{PL} (45°) . $\lambda/4$ (n) (director)
 (Φ) , 0° , 90° , 180° , 270° , Ψ_{PD} 0° .
 (Θ) (Φ Φ') 2 (Φ')
 n 가 $\Phi' = 0^\circ$, Φ'
 Φ 45° .

$\lambda/4$, 가 (cf. 1b) $\lambda/4$
 $\lambda/4$ $\lambda/2$.

가 .
 . (degree of polarisation)

가 , 가
 .

. - , , , ,

가 .

, , 5" 3" 가
 , 14" 18" 가 ,
 가 .

0.3mm 1.1mm, 0.4mm 0.7mm .

가

, DE 42 12 744

(θ)

, DE 30 22 818

가

가

가 ,

(,)

가 ,

가

가

가

가

가

(Ψ_{PP}) 75 ° 105 ° ,

89 ° 91 ° ,

90 °

85 ° 95 ° ,

88 ° 92 ° ,

- 5 ° 5 ° ,

- 2 ° 2 ° ,

- 1 ° 1 °

- 15 ° 1

0 ° .

(-)

(Ψ_{PL}) 35 ° 55 ° ,

40 ° 50 ° ,

43 ° 47 ° ,

44

° 46 °

45 ° .

, Ψ_{PL}

$\lambda/4$ $\lambda/2$

/

(φ) ,

$\lambda/4$

$\lambda/2$,

$\lambda/4$ 가

- 20 ° 20 ° ,

- 10 ° 10 ° ,

- 5 ° 5 ° ,

- 2 ° 2 ° 가

- 1 ° 1 ° .

$\lambda/4$ $\lambda/2$
 -1.0° 1.0° , -6° 6° (φ) 0.0°
 -0.5 0.5 ,
 (rubbing)
 iO_x S
 ("VA")
 STN TN
 STN() VAN()
 가 STN() TN
 가 가 IPS
 STN
 0.1° 5° (ψ_0 , " ") 0° 15° , 0° 10° ,
 0.2° 5° 가 0.3° 3°
 0.5° 3°
 (ITO)
 (photoalignm
 ent)
 가
 (" ")
 가
 가
 가 0° 가
 2 4 2
 (ψ_M ,)
 disclination)
 가
 가
 가
 (reset) MIM
 (TFT)
 , TFT가 TFT

- Si . , (a - Si), (- Si) (CdSe), a - Si
 0.34 μ m, 0.25 μ m 0.31 μ m, 0.14 μ m 0.42 μ m, 0.22 μ m
 28 μ m 가 0.27 μ m 0.29 μ m 0.
 , (n) 0.02 0.09,
 0.04 0.08, 0.05 0.075, 0.055 0.070
 0.060 0.065 .
 1 μ m 10 μ m, 2 μ m 7 μ m, 3 μ m 6 μ m
 4 μ m 5 μ m .
 6" 가 , 1 μ m 4 μ m 2 μ m
 3 μ m 3 μ m 6 μ m 4 μ m 5 μ m 10"
 가 가 ,
 , 0.20 μ m 0.37 μ m, 0.25 μ m 0.32 μ m, 0.26 μ m 0.30 μ m,
 0.27 μ m 0.29 μ m, 가 0.28 μ m (d · n) 가 .
 - , $\lambda / 4$.
 , , 45 ° - - ,
 . $\lambda / 4$, (Θ) (Θ)
 가 . , $\lambda / 4$ 가 (1 2 9a 9b , ,
 (Θ) (Θ)).
 - , $\lambda / 4$, 0.10 μ m 0.
 45 μ m, 0.20 μ m 0.37 μ m, 0.25 μ m 0.32 μ m, 0.26 μ m
 0.30 μ m, 0.27 μ m 0.29 μ m 가 0.28 μ m [(d · n)_{LC}] 가
 (d · n)_{LC} 0.28 μ m , 0.10 μ m $\lambda / 2$.
 14 μ m 0.25 μ m 0.32 μ m 0.42 μ m, 0.27 μ m 0.30 μ m 0.45 μ m, 0.
 0.22 μ m 0.25 μ m, 0.32 μ m 0.34 μ m
 .
 , (λ) , 554nm 가

$\lambda / 4$ $\lambda / 4$, $\lambda / 2$ $\lambda / 2$
 . $\lambda / 4$ $\lambda / 2$ λ $\lambda \pm 30\%$, $\lambda \pm 20\%$, $\lambda \pm 10\%$,
 $\lambda \pm 5\%$ $\lambda \pm 2\%$ 가 ,
 554nm . $\lambda / 4$ $\lambda / 2$

$\lambda/4$ $\lambda/2$, (PET)

가

n

n 가

가

[$n_{LC}(T)$] , $\lambda/4$

$n_{LC}(T)$

가

가

$0.12\mu m$

$0.16\mu m$,

$0.07\mu m$
 $0.13\mu m$

$0.21\mu m$,
 $0.15\mu m$

$0.11\mu m$

$0.17\mu m$,
 $0.14\mu m$

가

$\lambda/2$

$\lambda/4$

가

(n)

0.09,
0.065

0.04
0.060

0.08,

0.05

0.07,

0.02
0.055

$0.5\mu m$

$7\mu m$,

$1\mu m$

$5\mu m$,

$1.5\mu m$

$4\mu m$

$2\mu m$

$2.5\mu m$

가

0.5"

6"

1"

4"

$\lambda/4$,

$\lambda/2$

$\lambda/4$

$[(d \cdot n)_{LC}]$ $0.14\mu m$
 , $\lambda/4$,

$\lambda/2$

$0.07\mu m$
가

$0.12\mu m$

$0.16\mu m$

0.

$21\mu m$

가

가

가

가

가

$\lambda/4$

2

가

가

(1a 1c) .

[1] :

$(d \cdot n)_{LC} / \mu m$		$\Psi_{PP} / ^\circ$		$\Psi_{PL} / ^\circ$	
0.220 0.276	$\lambda / 4$	0 10	90 70	45 +/- 10	45 +/- 5
0.277	$\lambda / 4$	0 +/- 5	90 +/- 5	45 +/- 10	45 +/- 5
0.278 0.335	$\lambda / 4$	0 15	90 110	45 +/- 10	45 +/- 5
0.110 0.138	$\lambda / 2$	0 15	90 70	45 +/- 10	45 +/- 5
0.1385	$\lambda / 2$	0 +/- 5	90 +/- 5	45 +/- 10	45 +/- 5
0.139 0.168	$\lambda / 2$	0 15	90 110	45 +/- 10	45 +/- 5
: $\lambda / 2$ $\lambda / 4$.					

[2] : 가

$(d \cdot n)_{LC} / \mu m$		$\Psi_{PP} / ^\circ$	$\Psi_{PL} / ^\circ$
0.110 0.138	$\lambda / 4$	90 70	45 +/- 5
0.1385 +/- 0.0004	$\lambda / 4$	90 +/- 5	45 +/- 5
0.139 0.168	$\lambda / 4$	90 110	45 +/- 5

[3] : 가

$(d \cdot n)_{LC} / \mu m$		$\Psi_{PL} / ^\circ$
0.110 0.138	$\lambda / 4$	45 +/- 5
0.1385 +/- 0.0004	$\lambda / 4$	45 +/- 5
0.139 0.168	$\lambda / 4$	45 +/- 5

 Ψ_{PD} $0^\circ \pm 5^\circ$, $0^\circ \pm 2^\circ$ $0^\circ \pm 1^\circ$.

(2a 2b) , , 가

[4] : 가

$(d \cdot n)_{LC}$	$(d \cdot n)_{DS}$	$\varphi / ^\circ$		
$\lambda / 2$	$\lambda / 4$	0 +/- 20	0 +/- 8	0 +/- 4
$\lambda / 4$	$\lambda / 2$	0 +/- 20	0 +/- 8	0 +/- 4
$\lambda / 4$	$2^* (\lambda / 4)$	0 +/- 20	0 +/- 8	0 +/- 4

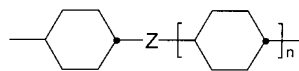
[5]

$(d \cdot n)_{LC} / \lambda$		$\varphi / ^\circ$		
1/2	0	0 +/- 6	0 +/- 0.5	0 +/- 0.3
1/4	0	0 +/- 6	0 +/- 0.5	0 +/- 0.3

가
1 2
" (" "). 가
가 , 가
가
0nm 가 0nm
가
0 ° 가 " ,
" (BEF)
가
가 가
가
가
(3).

3 27, 10 21
i 1.4' - 12 18
:

i



(,
Z , -CH₂CH₂ - -CF₂CF₂ - ,
n 1 2)

.

,
 $-CH_2-$ 가 $-CH=CH-$ 가

6 - 가 , 1.
 4 - ,

$n \geq 2$ i

- 2 6 - 가 A,

- 3 6 - 가 B, ,

- 4 6 - 가 C .

A, B , C

- I :

I

(,

R^{11} 가 1 5 n - ,

R^{12} 가 1 5 n - , 1E - , 가 1 6 n -)

- II II' :

II

(,

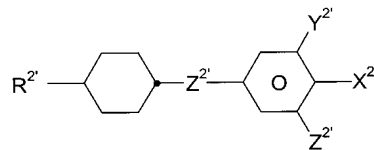
R^{21} 가 3 7 2 8, 5 7 4 6 n - 1E - ,

Z^2 $-CH_2CH_2-$,

- 12 -

X^2 OCF_3 , CF_3 $\text{CH}_2\text{CH}_2\text{CF}_3$, CF_3 $\text{CH}_2\text{CH}_2\text{CF}_3$)

III'



(,

$R^{2'}$ 가 3 7 2 8, 5 7 4 6 n- 1E- ,

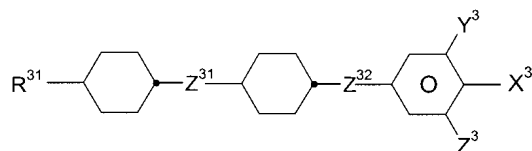
$Z^{2'}$ - CH_2CH_2 - ,

$X^{2'}$ OCF_2H , OCF_3 F, F ,

$Y^{2'}$ $Z^{2'}$ H F)

- III :

III



(,

R^{31} 가 2 7, 2 5 n- 1E- ,

Z^{31} Z^{32} Z^{31} Z^{32} - CH_2CH_2 - CF_2CF_2 - , - CH_2CH_2 - ,

X^3 OCF_2 , OCF_3 F ,

Y^3 Z^3 H F ,

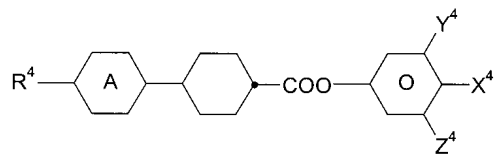
$X^3 = \text{OCF}_2$, Y^3 Z^3 F ,

$X^3 = \text{F}$, Y^3 Z^3 F ,

$X^3 = \text{OCF}_3$, Y^3 Z^3 F , H)

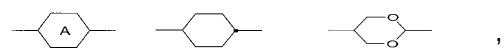
- IV V :

IV



(,

R^4 가 2, 5, 2, 5 n- 1E- ,



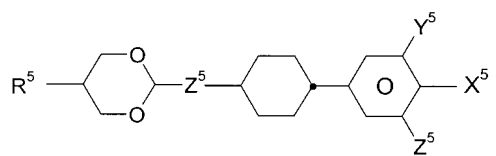
X^4 OCF_2H , OCF_3 F, F OCF_3 ,

Y^4 Z^4 H F ,

$X = F$, Y^4 Z^4 F ,

$X = OCF_3$, , Y^3 Z^3 F , H)

V



(,

R^5 가 2, 5 n- 1E- ,

Z^5 - CH_2CH_2 - ,

X^5 F, OCF_3 OCF_2H ,

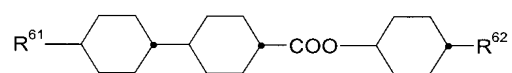
Y^5 Z^5 H F ,

X^5, Y^5, Z^5 F)

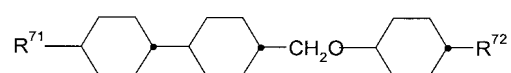
,

- VI XI :

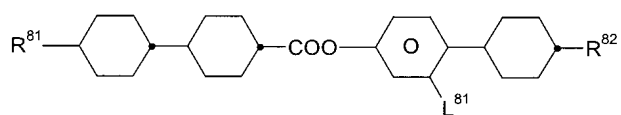
VI



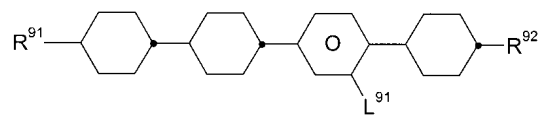
VII



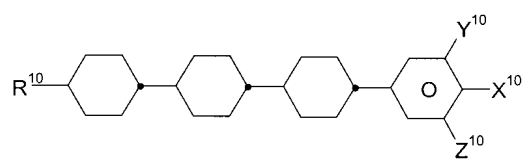
VIII



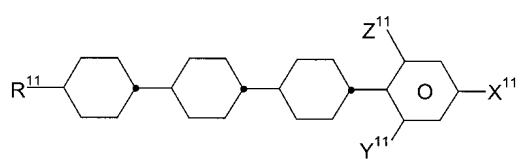
IX



X



XI



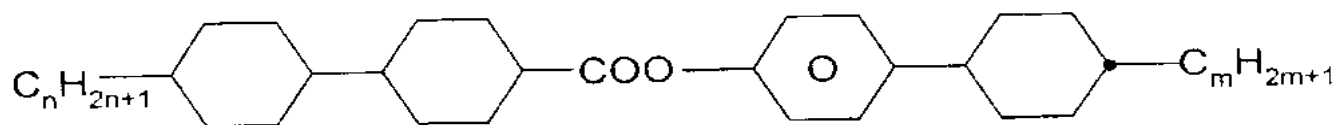
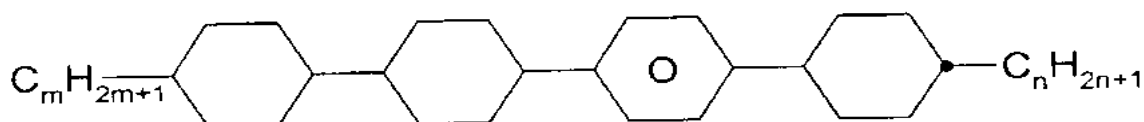
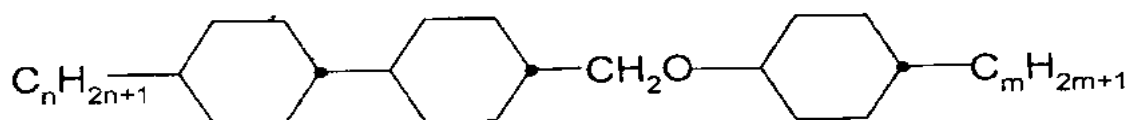
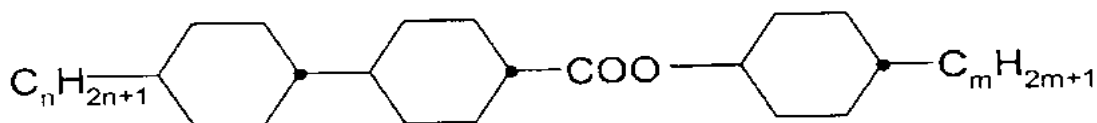
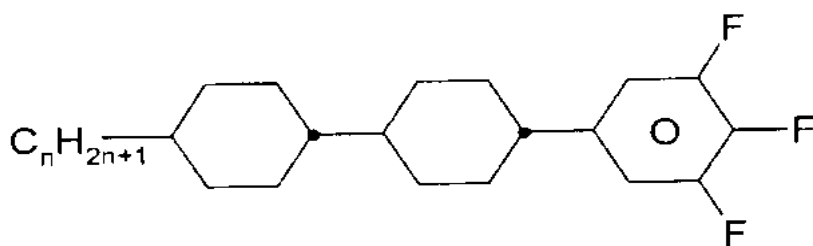
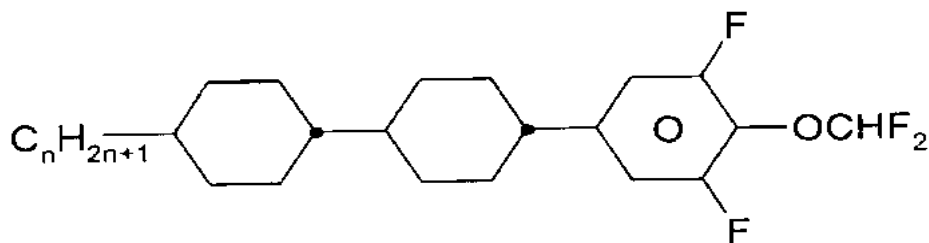
(
 $R^{71}, R^{72}, R^{81}, R^{82}, R^{91}, R^{92}, R^{10}, R^{11}$
 I, R^{11}, R^{12}
 $L^{81}, L^{91}, H, F,$
 $X^{10}, Y^{10}, Z^{10}, X^{11}, Y^{11}, Z^{11}$
 III, X^3, Y^3, Z^3
)

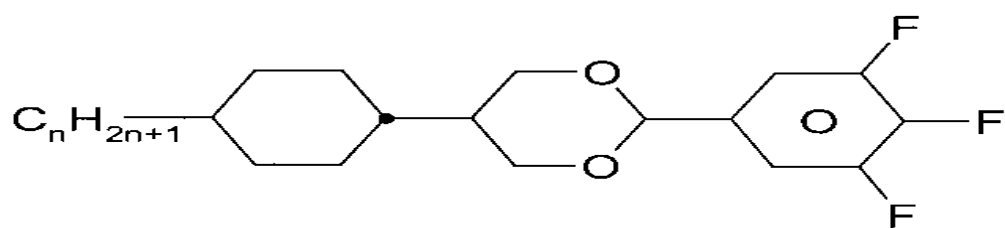
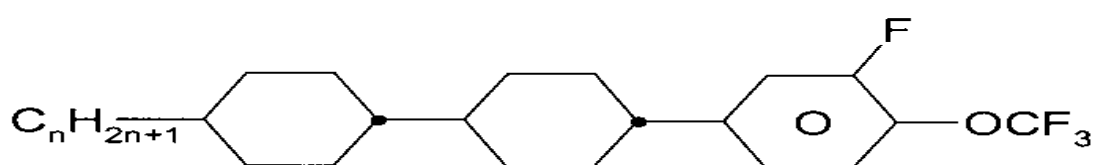
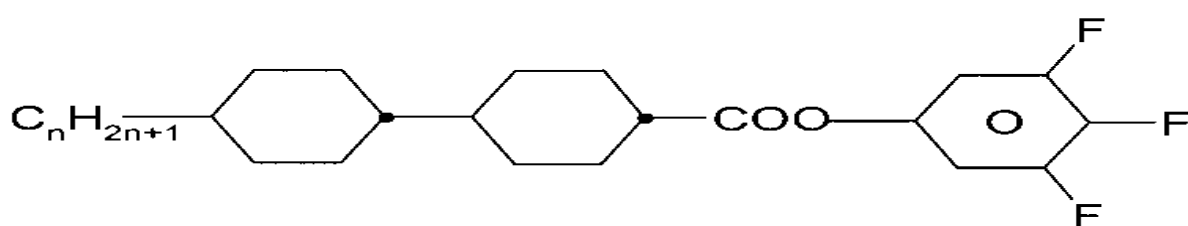
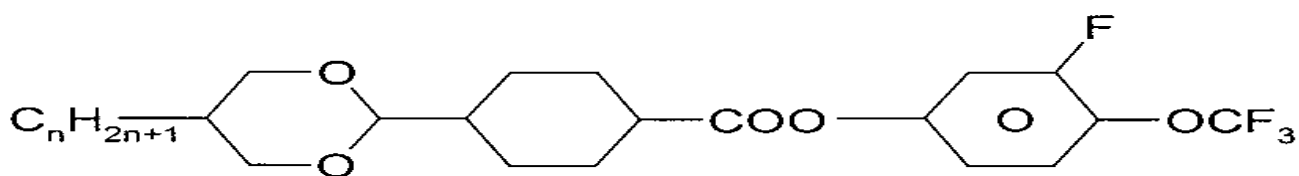
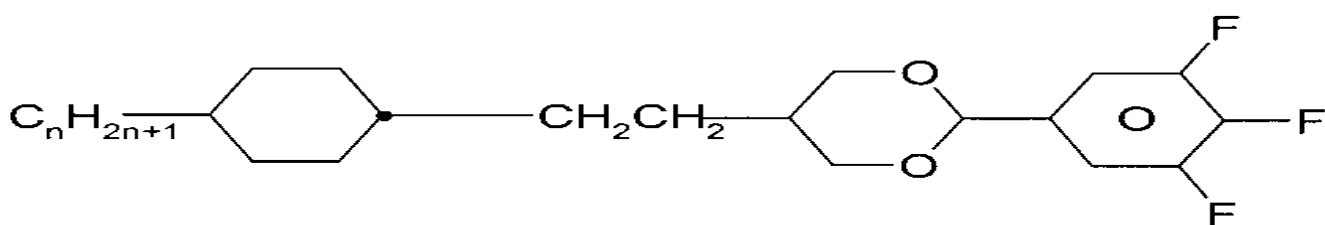
가 .

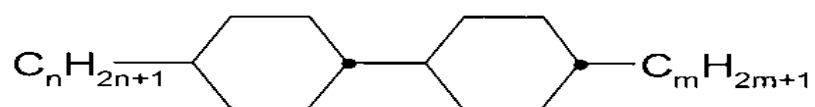
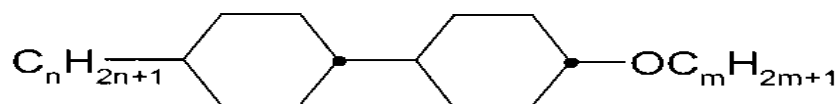
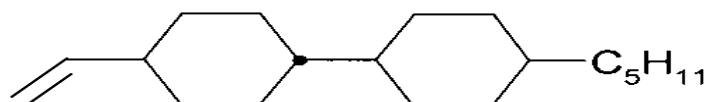
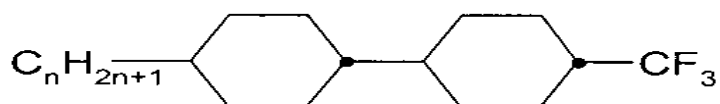
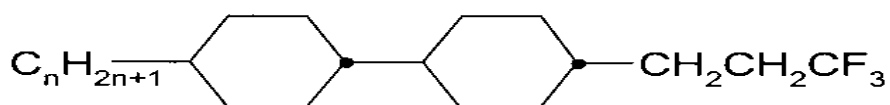
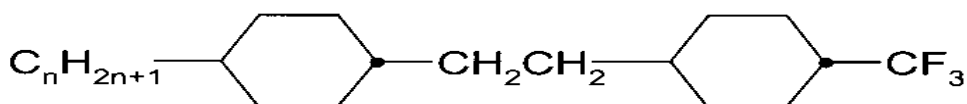
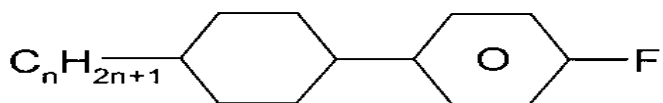
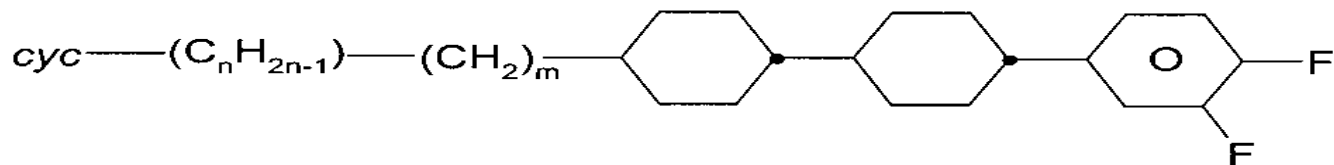
4 36 , 6 25
 7 20 .

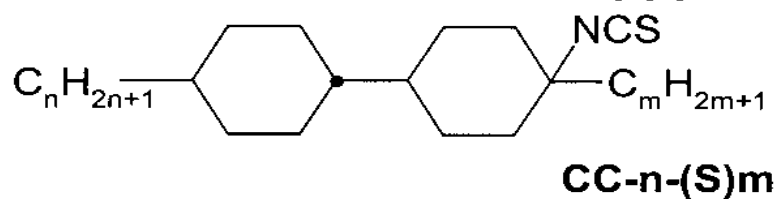
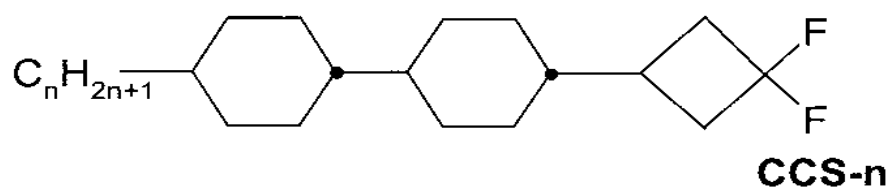
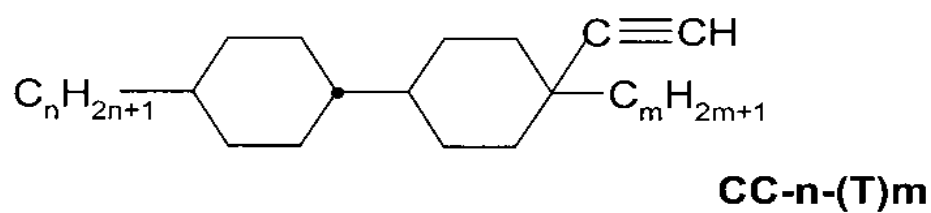
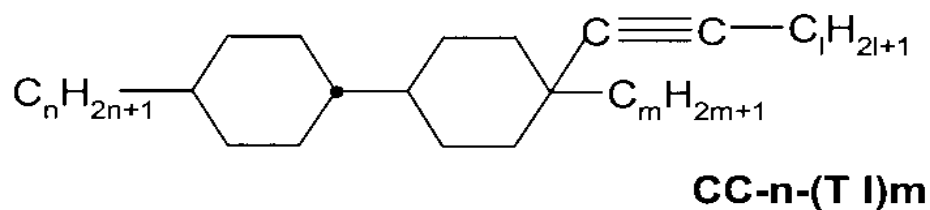
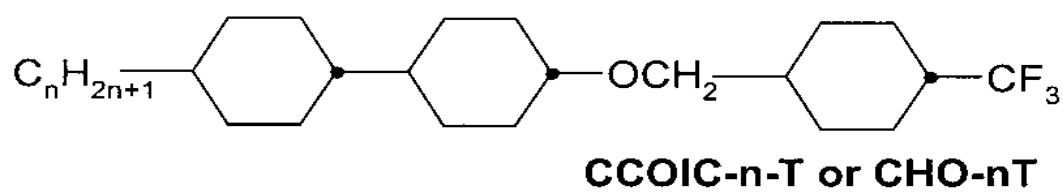
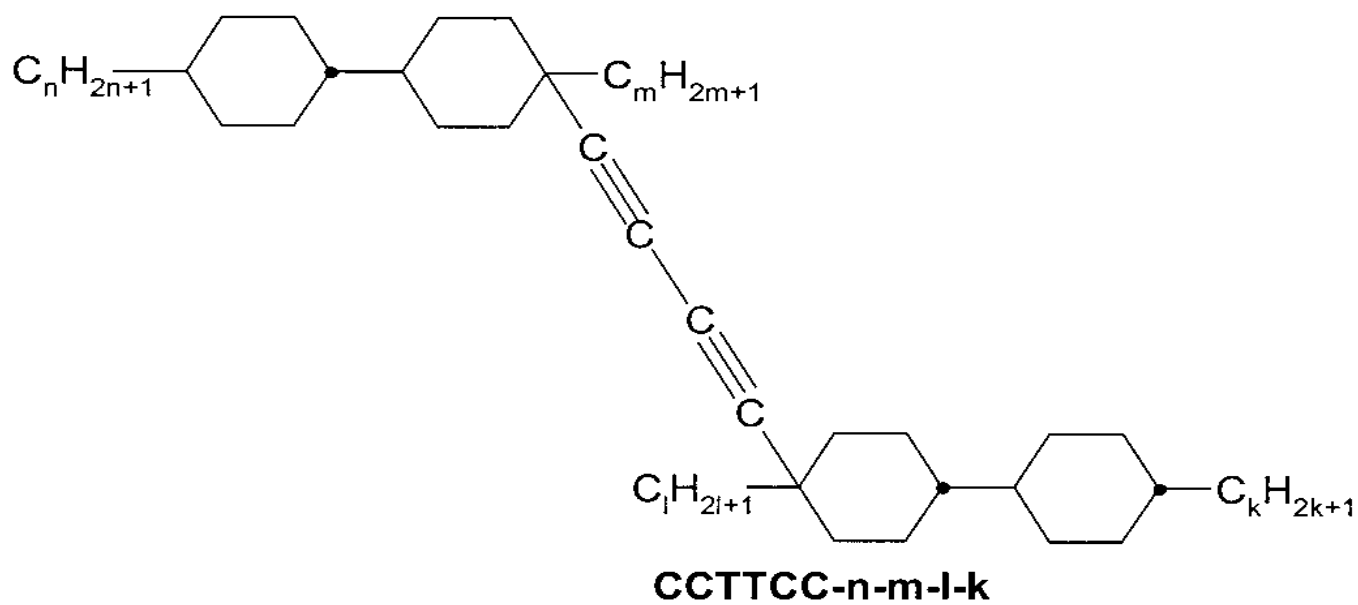
3
 3a 3d ,
 .

바람직한 화합물

**CCPC-nm****CPCC-n-m,****CCOC-n-m****CH-nm****CCP-nF.F.F****CCP-nOCF2.F.F**

**CDU-n-F****CCP-nOCF3****CCP-nOCF3.F****CCZU-n-F****DCZG-n-OT****CEDU-n-F**

**CCH-nm****CCH-nOm****CC-n-V****CCH-nCF3****CCH-n2T****ECCH-nCF3****PCH-nF****CCG-(c n)m-F**



80 - 20 60 , - 30 70 - 40
 0.054 0.063 0.040 0.070, 0.050 0.065
 a s 90 139 mPa s 60 170 mPa s, 80 150 mP
 0.9V 2.7V, 1.1V 2.5V 1.2V 2.0V (V₁₀)
 V₁₀ V₉₀ 100ms,
 80ms, 60ms 50ms ,
 45ms , 40ms , 40ms 30 ms .

I, II, II' III XI

25, 5 20 6 3 35 , 4
 15
 d/P - 0.25 0.25 . 가 가 , - 0.1 0.1 , 0
 d/P가 0.15 0.24 d/P , 0.1 0.25,

- (Merck Liquid Crystal, Physical Properties of Liquid Crystals, Description of the Measurement Methods, Ed.W.Becker, Status Nov. 1997)

- 20 ,
- , ,
- % ,
- $n(n = n - n)$ 589.3nm ,
- $n(\varepsilon = \varepsilon - \varepsilon)$ 1kHz ,
- V_1 : ,
- k_{ij} : ,
- λ 576nm ,
- V_0 : ,
- V_{10} : (10% , $\Theta = 0^\circ$)
- V_{50} : - (50% , $\Theta = 0^\circ$)
- V_{90} : (90% , $\Theta = 0^\circ$)

- τ : 0% 10% ,
- τ : 0% 10% ,
- τ : 0% 90% - ,
- τ : 90% 10% - ,
- τ : $= \tau + \tau$,
- $\Phi \quad \Phi'$: ,
- Θ : ,
- φ : ,
- ψ : ,
- ψ_0 : ,
- ψ_M : ,
- $\psi_{PP} (\psi_{PA})$: ,
- ψ_{PD} : ,
- $\psi_{PL} \quad \psi_{AL}$: ,
- - 60Hz ,
- (rms) ,
- " 0" , 0 +/- 1, 0 +/- 0.1 0 +/- 0.1 ,
- " " +/- 10% ,
+/- 5% +/- 2% 가 ,
- " ~ " 10% ,
5% 2% ,
- , +/- ,
- , ,
- $> =$ $< =$, $> / =$ $< / =$, $\geq$ $\leq$,
- +/- .

20
33 mPa • s .

ZLI - 4792(Merck KGaA)

1

- (Merck KGaA) :

:

: 1.1mm (Pilkington)

ITO: 100 / (Ω /)

: AL - 1054 (Japan Synthetic Rubber , Japan)

: 1 ° 2 ° (Merck KGaA ZLI - 4792),

: 0 ° (),

d/P: 0 ().

- (Autronic - Melchers, Karlsruhe, Germany(DMS 301 DMS 703)) (Merck KGaA) .

(Merck KGaA) , $\lambda/4$

, (Merck Ltd, Great Britain) $\lambda/4$.

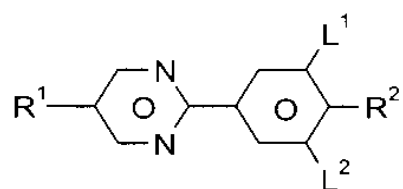
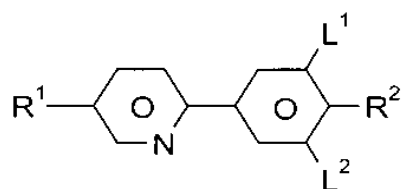
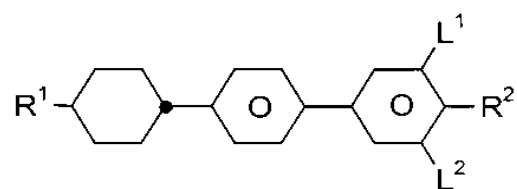
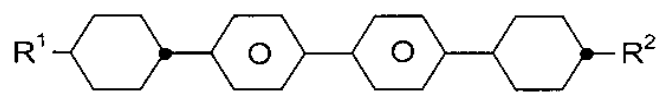
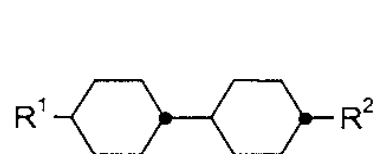
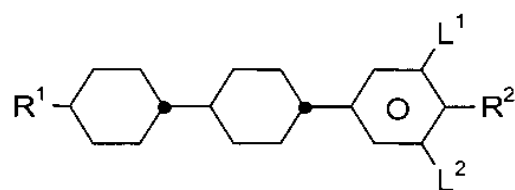
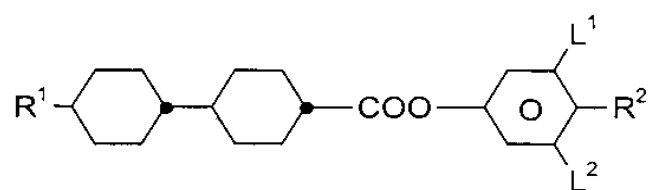
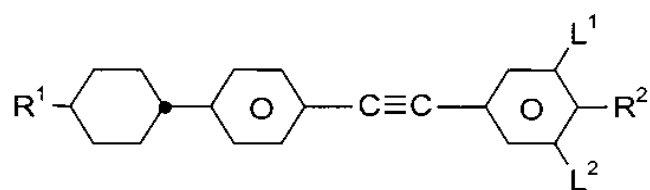
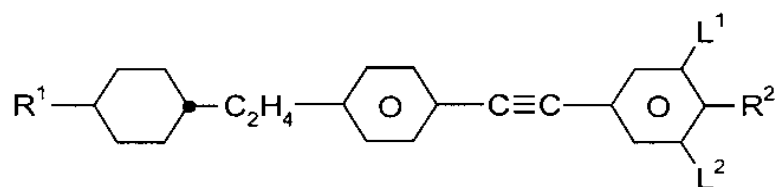
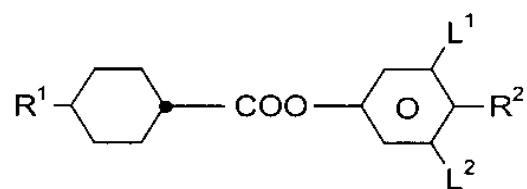
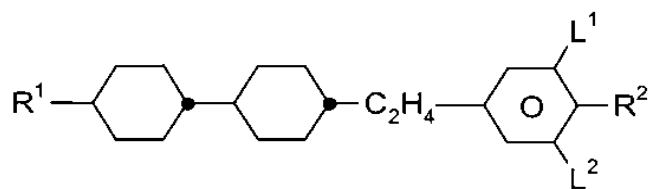
. DMS 703

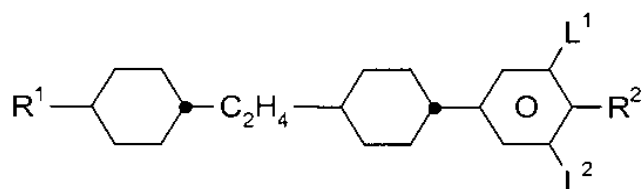
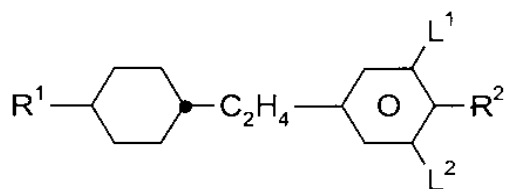
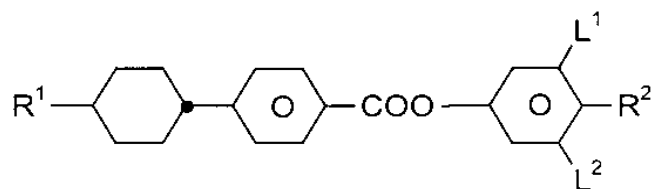
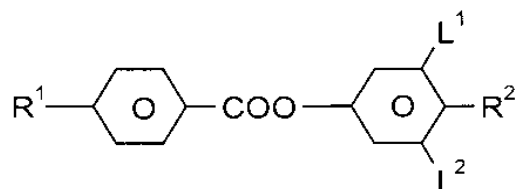
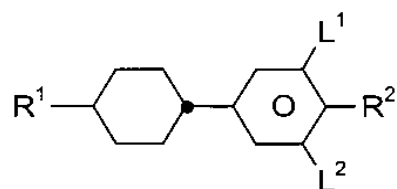
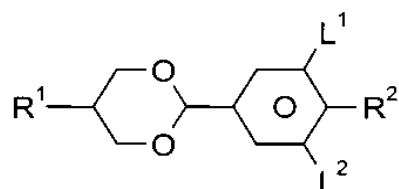
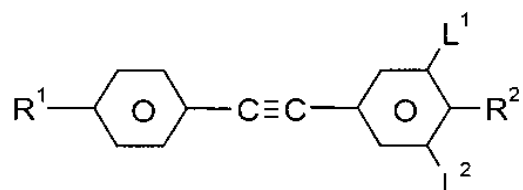
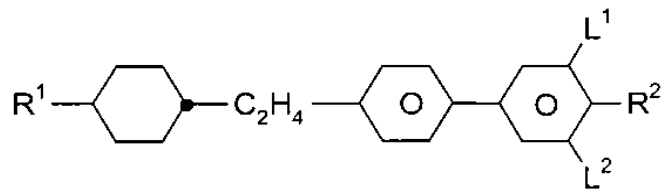
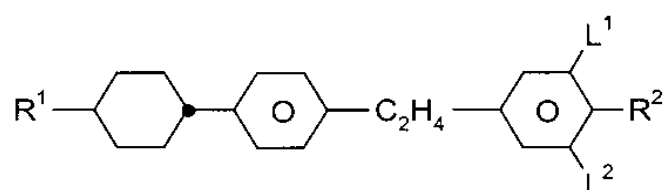
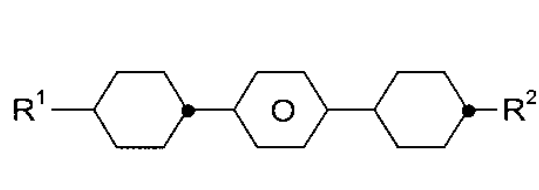
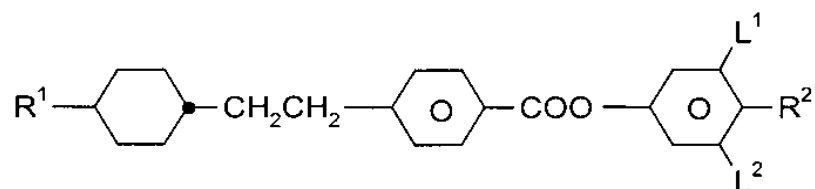
, , Aa Ac Ba
Bj , $C_n H_{2n+1}$, $C_m H_{2m+1}$ $C_l H_{2l+1}$ $C_k H_{2k+1}$ n, m, l k
가 . Ba Bj . Aa Ac

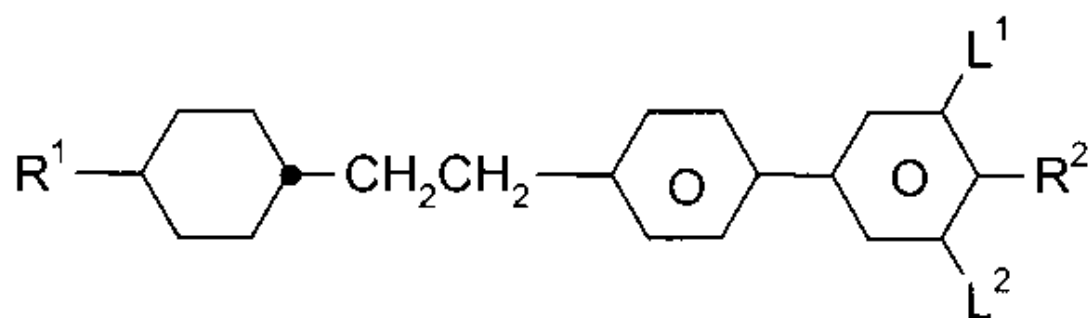
R^1, R^2, L^1

L^2 .

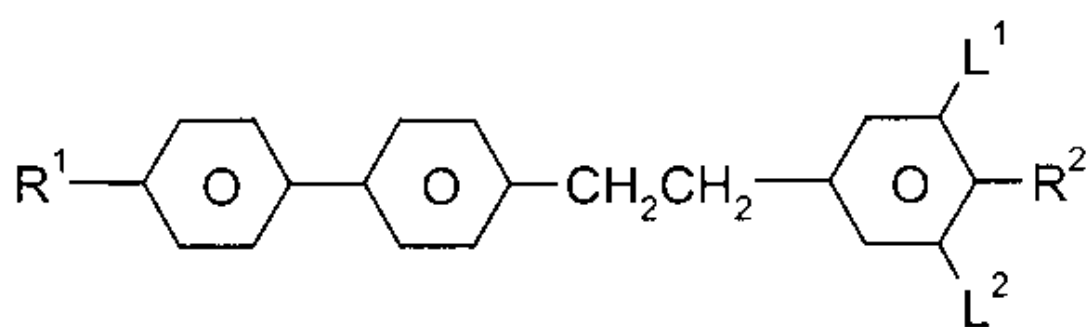
R ¹ , R ² , L ¹ , L ² 에 대한 코드	R ¹	R ²	L ¹	L ²
nm	C _n H _{2n+1}	C _m H _{2m+1}	H	H
nOm	C _n H _{2n+1}	OC _m H _{2m+1}	H	H
nO.m	OC _n H _{2n+1}	C _m H _{2m+1}	H	H
n	C _n H _{2n+1}	CN	H	H
nN.F	C _n H _{2n+1}	CN	F	H
nOF	OC _n H _{2n+1}	F	H	H
nCl	C _n H _{2n+1}	Cl	H	H
nCl.F	C _n H _{2n+1}	Cl	F	H
nCl.F.F	C _n H _{2n+1}	Cl	F	F
nF	C _n H _{2n+1}	F	H	H
nF.F	C _n H _{2n+1}	F	F	H
nF.F.F	C _n H _{2n+1}	F	F	F
nmF	C _n H _{2n+1}	C _m H _{2m+1}	F	H
nCF ₃	C _n H _{2n+1}	CF ₃	H	H
nOCF ₃	C _n H _{2n+1}	OCF ₃	H	H
nOCF ₃ .F	C _n H _{2n+1}	OCF ₃	F	H
nOCF ₃ .F.F	C _n H _{2n+1}	OCF ₃	F	F
nOCF ₂	C _n H _{2n+1}	OCHF ₂	H	H
nOCF ₂ .F	C _n H _{2n+1}	OCHF ₂	F	H
nOCF ₂ .F.F	C _n H _{2n+1}	OCHF ₂	F	F
nS	C _n H _{2n+1}	NCS	H	H
nVsN	C _r H _{2r+1} -CH=CH-C _s H _{2s} -	CN	H	H
nEsN	C _r H _{2r+1} -O-C _s H _{2s} -	CN	H	H
nAm	C _n H _{2n+1}	COOC _m H _{2m+1}	H	H

**PYP****PYRP****BCH****CBC****CCH****CCP****CP****CPTP****CEPTP****D****ECCP**

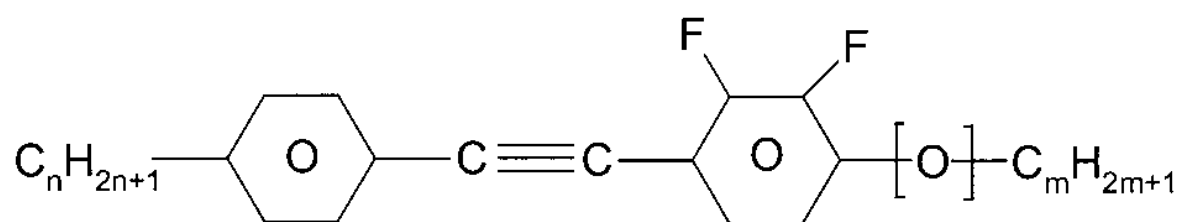
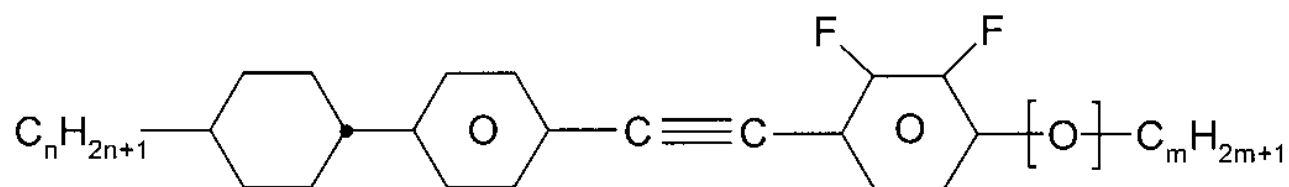
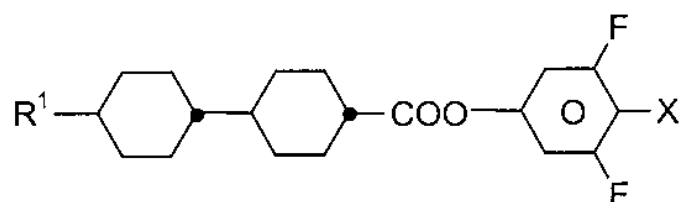
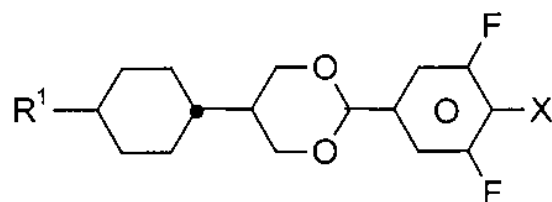
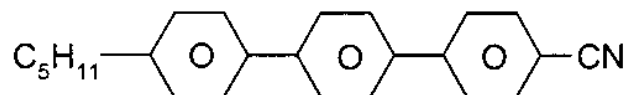
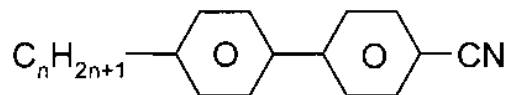
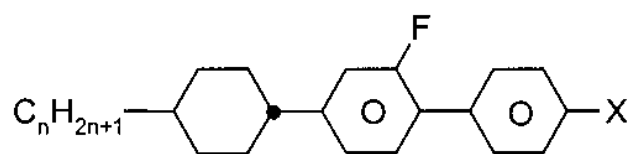
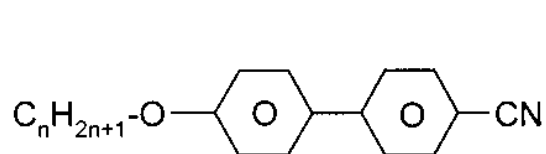
**CECP****EPCH****HP****ME****PCH****PDX****PTP****BECH****EBCH****CPC****EHP**

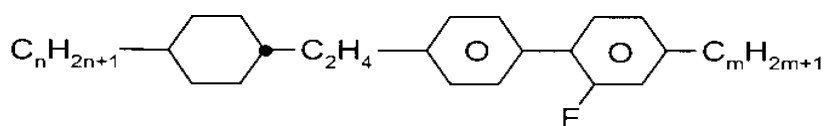
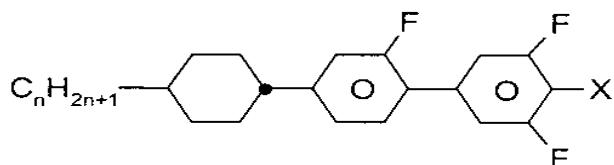
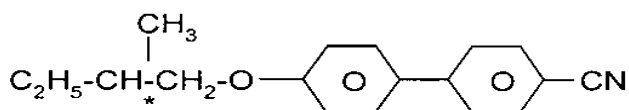
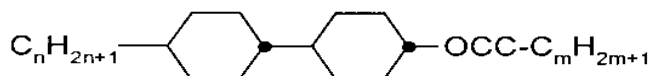
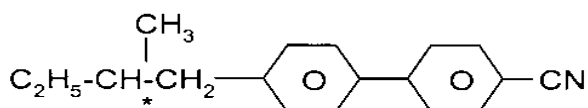
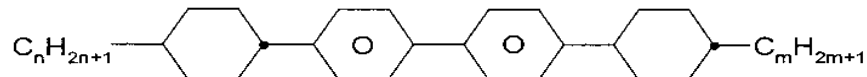
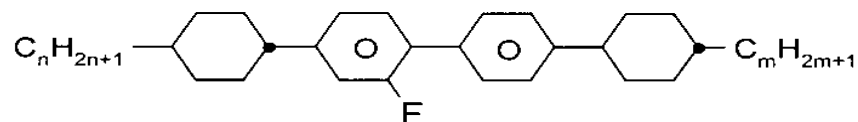
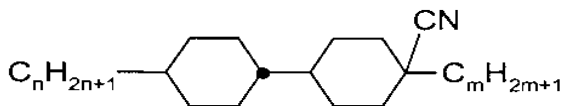
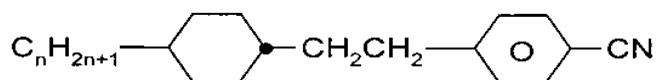
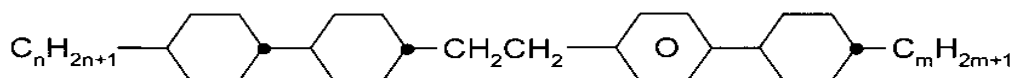


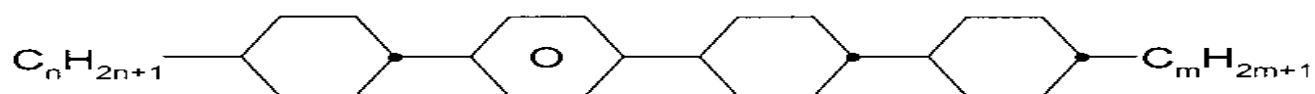
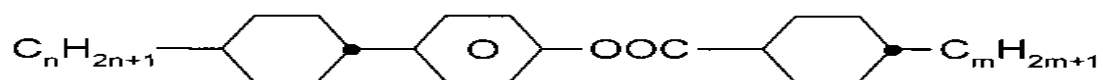
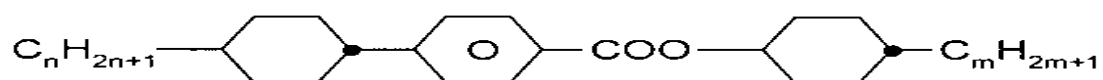
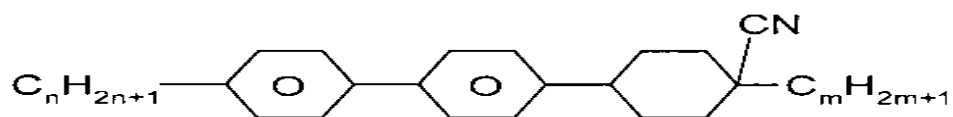
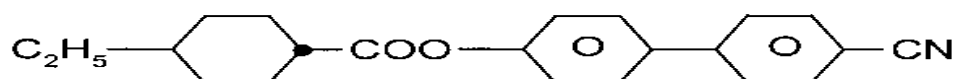
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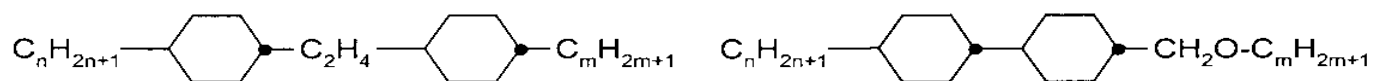
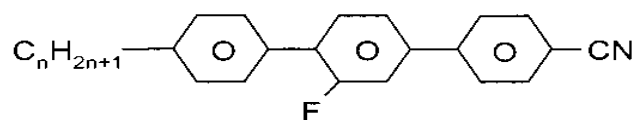
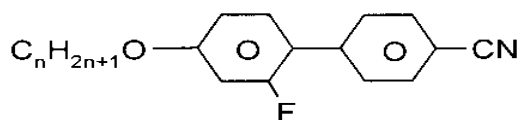
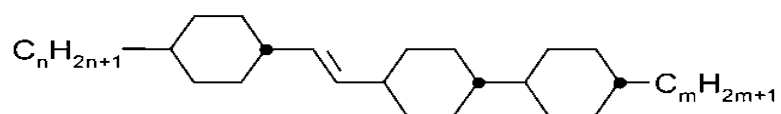
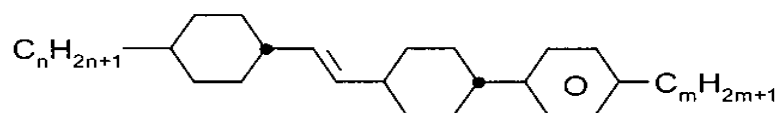
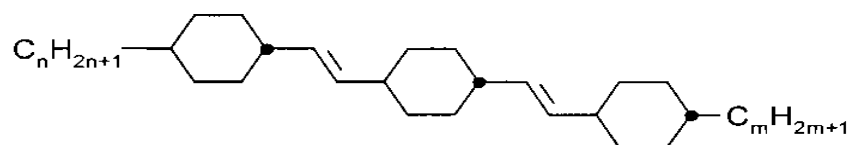
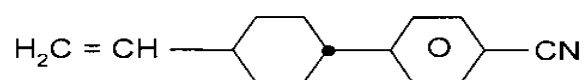
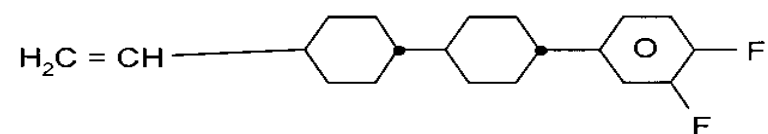


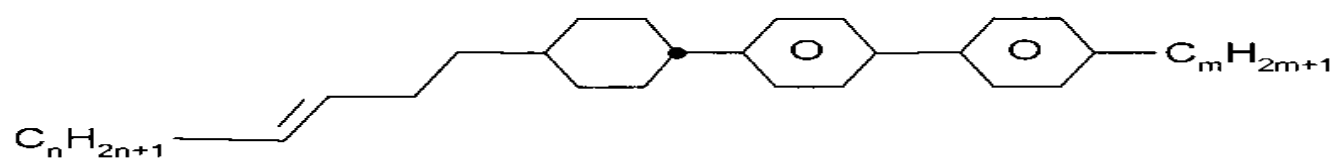
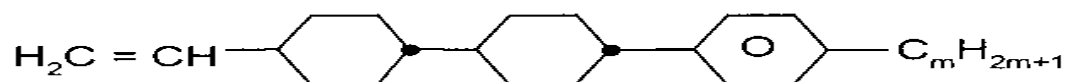
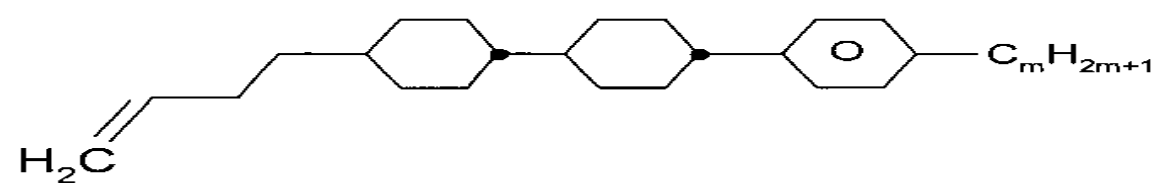
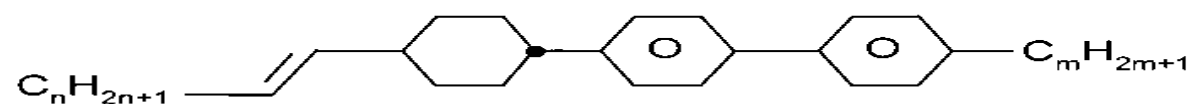
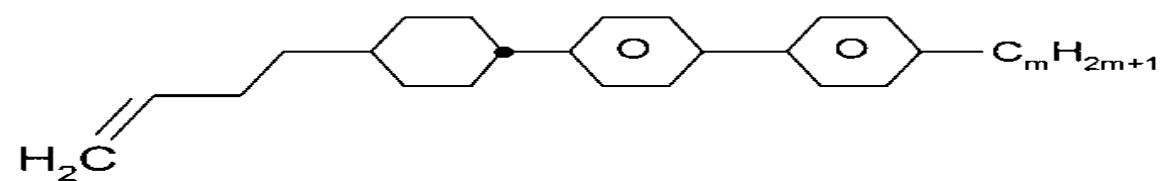
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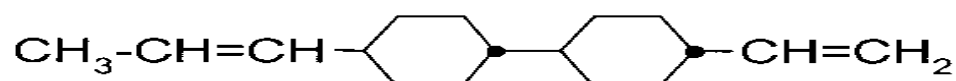
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M3n**BCH-n.FX****Inm****CGU-n-X****C-nm****C15****CB15****CBC-nm****CBC-nmF****CCN-nm****G3n****CCEPC-nm**

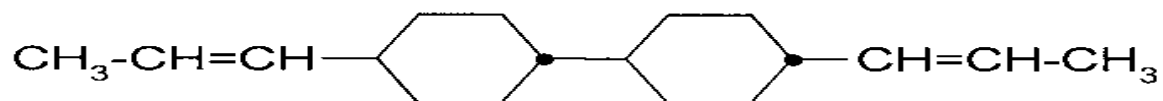
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ECBC-nm**ECCH-nm****CCH-n1EM****T-nFN****B-nO.FN****CVCC-n-m****CVCP-n-m****CVVC-n-m****CP-V-N****CC-n-V**

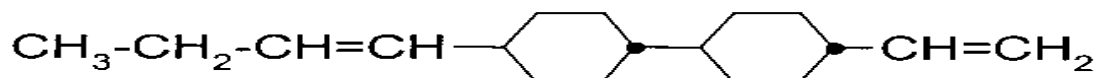
CCG-V-F**CPP-nV2-m****CCP-V-m****CCP-V2-m****CPP-V-m****CPP-nV-m****CPP-V2-m****CC-V-V**



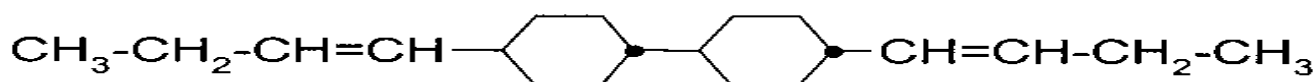
CC-1V-V



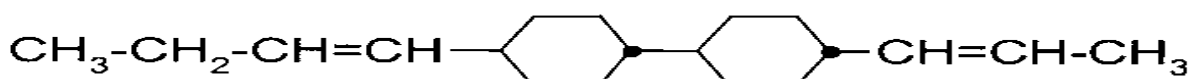
CC-1V-V1



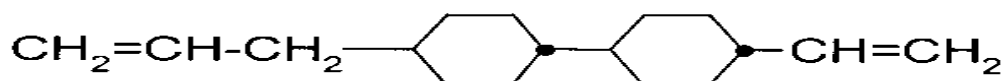
CC-2V-V



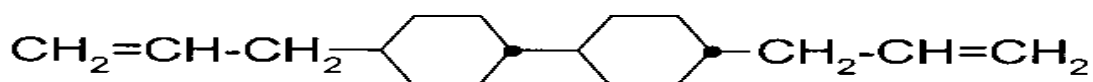
CC-2V-V2



CC-2V-V1



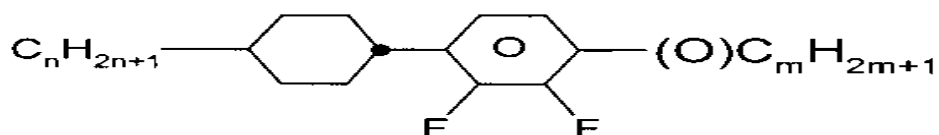
CC-V1-V



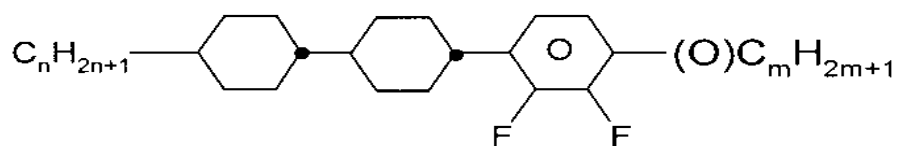
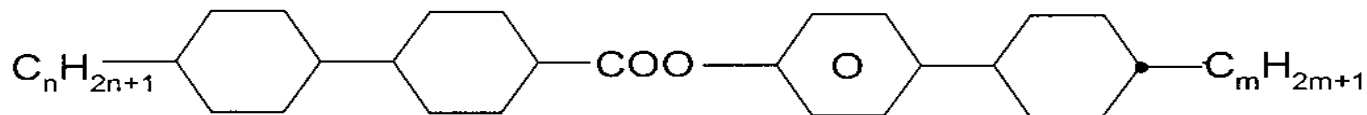
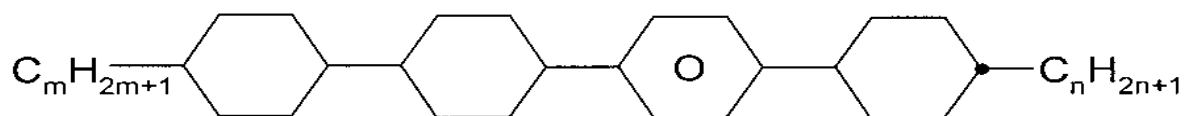
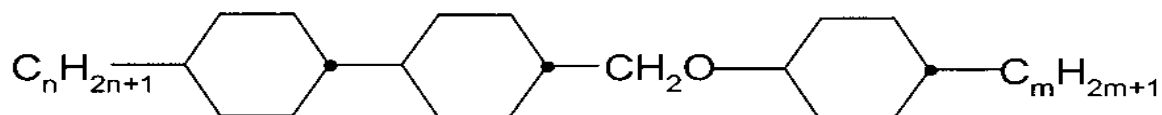
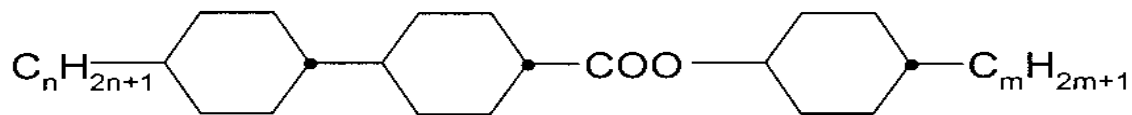
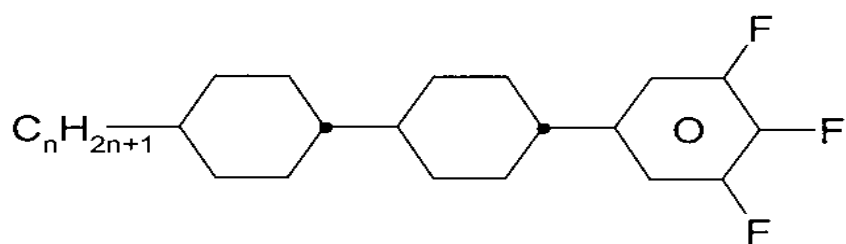
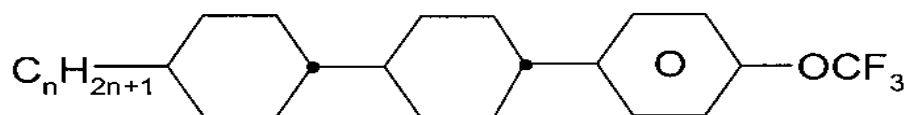
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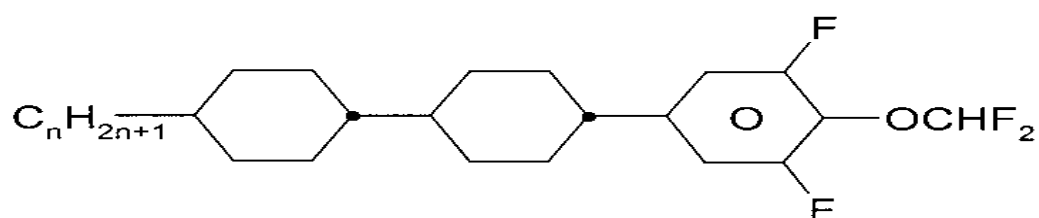
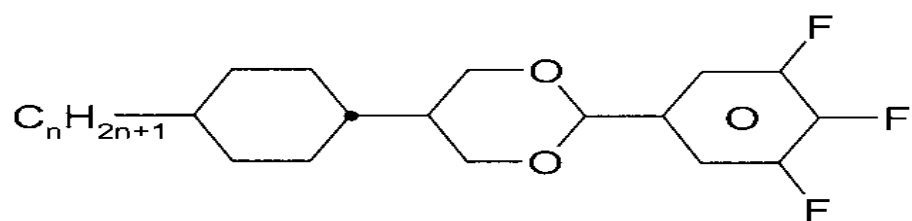
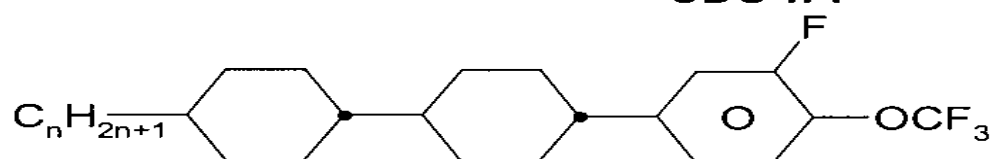
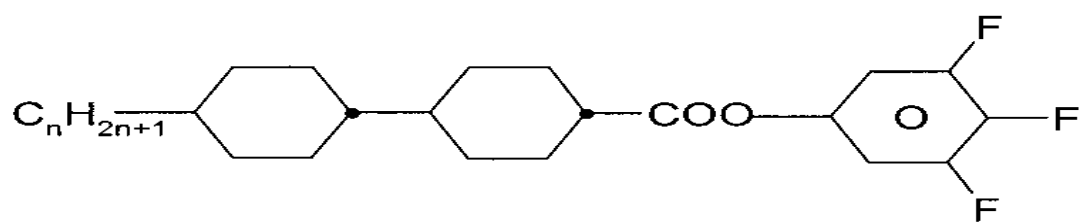
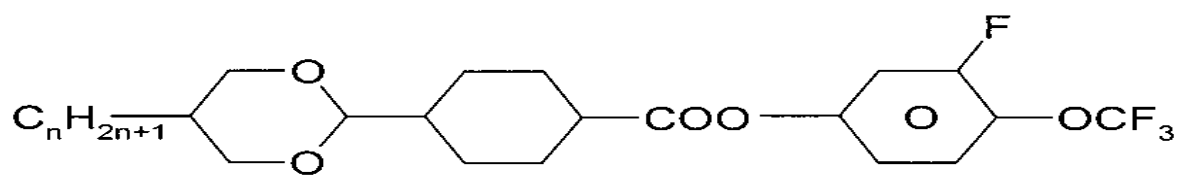
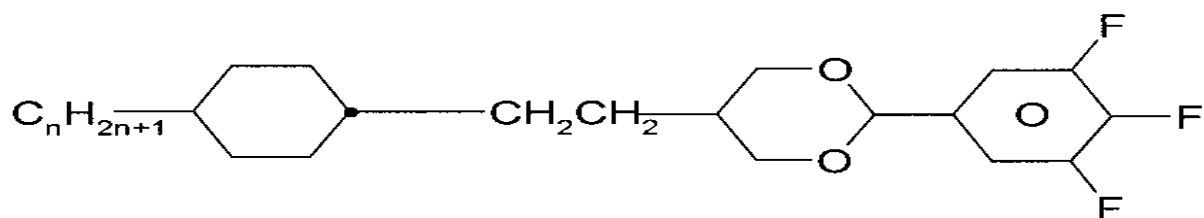


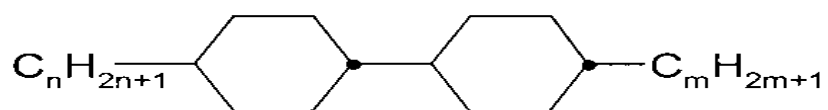
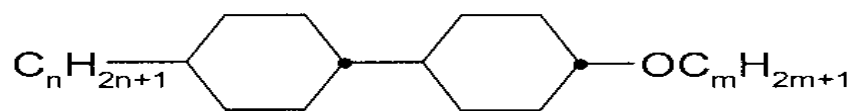
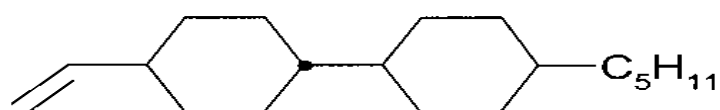
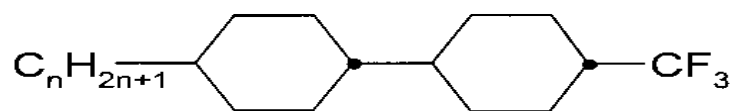
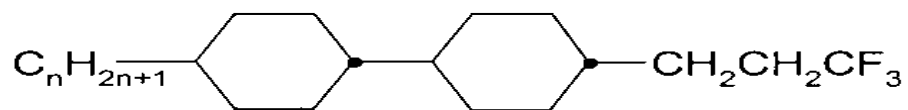
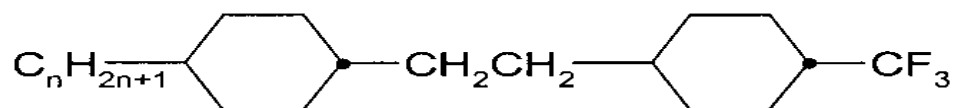
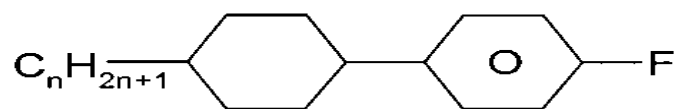
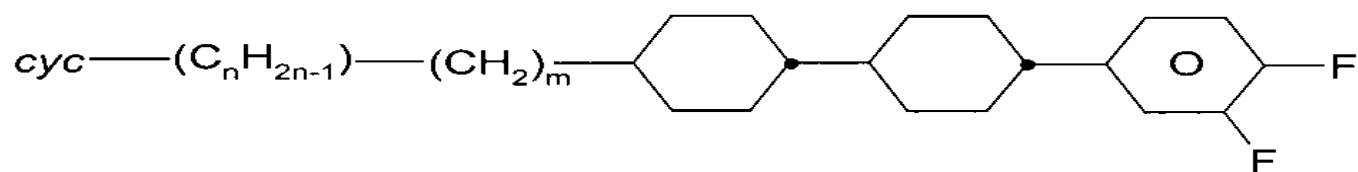
CC-V2-1V

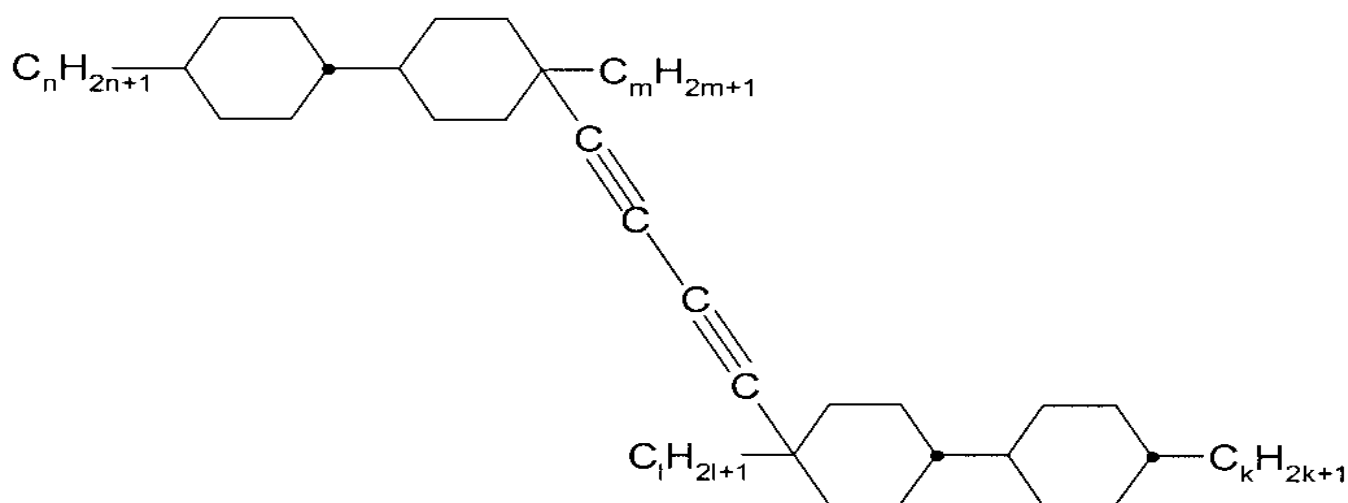
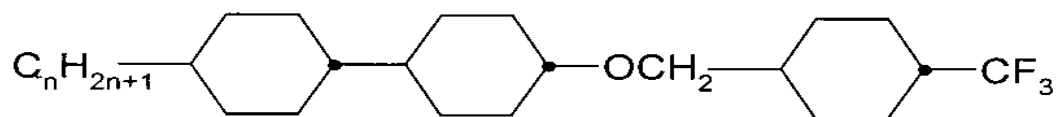
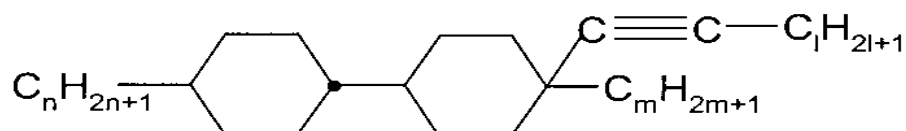
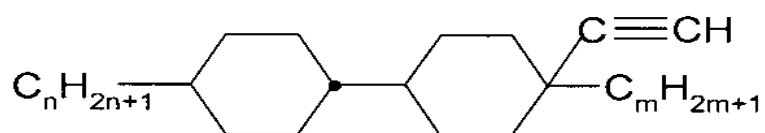
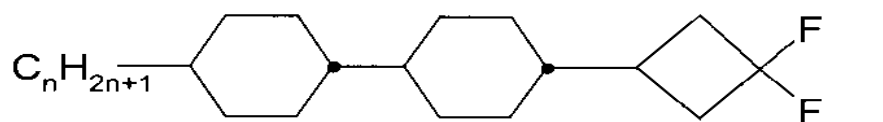
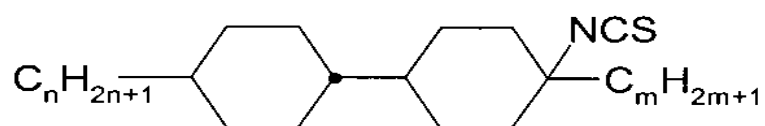


PCH-n(O)mFF

**CCP-n(O)mFF****CCPC-nm****CPCC-n-m,****CCOC-n-m****CH-nm****CCP-nF.F.F****CCP-nOCF₃**

**CCP-nOCF₂.F.F****CDU-n-F****CCP-nOCF₃.F****CCZU-n-F****DCZG-n-OT****CEDU-n-F**

**CCH-nm****CCH-nOm****CC-n-V****CCH-nCF3****CCH-n2T****ECCH-nCF3****PCH-nF**

CCG-(c n)m-F**CCTTCC-n-m-l-k****CCOIC-n-T or CHO-nCF3****CC-n-(T l)m****CC-n-(T)m****CCS-n****CC-n-(S)m**

- Aa Ac Ba Bj /
- Ba Bj /
- Aa Ac

1 가 .

1a 가

BL ,

P (),

z (normal) ,

n (), (n_0)

n (x - z -),
(n_e) .

1b . , 1a 가 .

2 (Φ Φ') (Θ) .

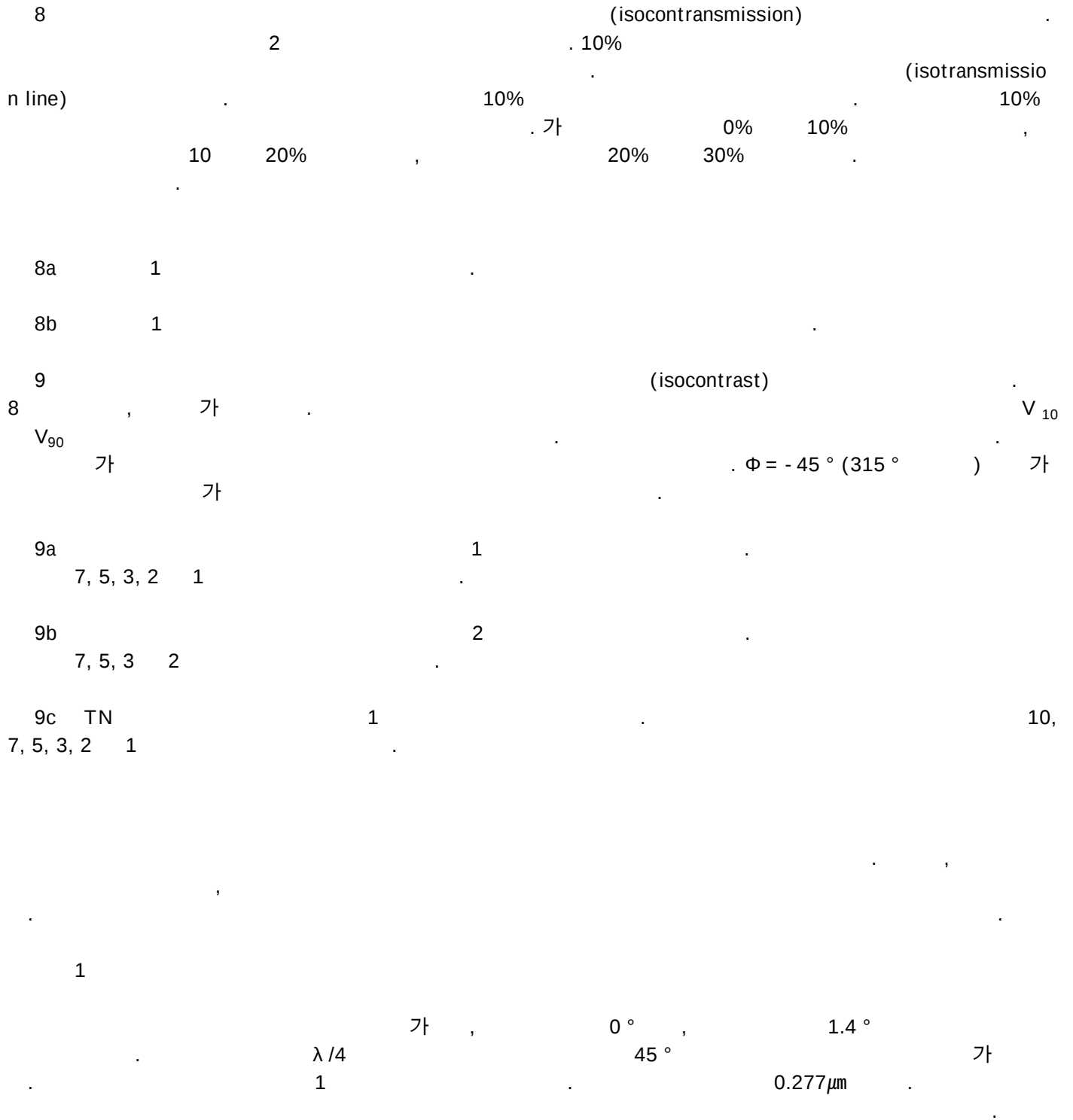
3 2 (Ψ_{PP}) , 1 .
($d \cdot n$)_{LC} 277nm .

4 1 .
.
 $\Theta = 0^\circ$ $\Theta = 30^\circ$ $\Theta = -45^\circ$.

5 1 0.5 μ m(1 (Gooch and Tarry)) $d \cdot n$ 가 TN
, 4 . $\Theta = 0^\circ$

6 $\Theta = 10^\circ$, $\Phi = -45^\circ$, ,
0.50 μ m $d \cdot n$ 가 TN .

7 1 $d \cdot n = 0.50\mu$ m 가 TN () 1
() . 10, 50 90%



조성물	농도 /%	특성
CCH-301	5.0	전이 T (S,N) < -30.0°C
CH-33	3.0	클리어링 포인트 T (N,I) = +68.0°C
CH-35	3.0	Δn (589 nm, 20°C) = +0.0602
CCP-2F.F.F	6.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +10.3
CCZU-2-F	6.0	γ_1 (20°C) = 161 mPa s
CCZU-3-F	16.0	$d \cdot \Delta n = 0.277 \mu\text{m}$
CCZU-5-F	6.0	트위스트 = 0°
CDU-2-F	10.0	V_0 (20°C) = 0.99 V
CDU-3-F	12.0	V_{10} (20°C) = 1.29 V
CDU-5-F	8.0	V_{50} (20°C) = 1.76 V
CCH-3CF3	9.0	V_{90} (20°C) = 3.15 V
CCH-5CF3	12.0	
CGPC-34	4.0	
Σ	100.0	

277nm . 3 .

0% . 0 ° , 180 ° 360 ° Ψ_{PP} ,

90 ° 270 ° Ψ_{PP} 가 .

(Autronic - Melchers) -

가 ($\Phi = -45^\circ$) Θ ($\Theta = 0^\circ$ $\Theta - 30^\circ$) Θ Φ

2 .

2 (Φ Φ') (Θ) .

4 가

$\Theta = 30^\circ$ $\Theta = -45^\circ$ $\Theta = 0^\circ$ (Θ)

(flatter rise) .

45% . 6 7

V , .

N () . 3 1 $d \cdot n = 0.5 \mu\text{m}$ 가 T

10, 50 90%

가

. TN

(Autronic - Melchers) 8b
 a 1 TN 1 8

8 (2) . 10%

10% 0% 10%
 10% 20% 20% 30%
 30% 가

8b 8a , 8b 가

(Autronic - Melchers)
 (V₁₀) (V₉₀) 9

1.13V 2.64V 9a
 7, 5, 3, 2 1 9.6
 0.58 (CR)
 가 CR_{min} = 0.58 1

9c 1 TN
 10, 7, 5, 3, 2 1 가
 4 1 TN
 가
 0
 9.9 5.0
 V₁₀ V₉₀
 (4)

[6]

		V /V	V /V	τ /ms	τ /ms	τ /ms	τ /ms	τ /ms
123	11	00001.1	9.99.95.05.01.	2.601.433.	0.780.7834.	3.392.239.69.6	52.325.252.324.	55.727.456.528.11
456	1 11	11.26	733.07	390.65	4 8.98	37.8 9.64	883.632.8	21.4 42.4

1

가 TN , 1 가 0.50μm

TN

조성물	농도 /%	특성
BCH-2F.F	9.0	클리어링 포인트 T (N,I) = +69.5°C
BCH-3F.F	9.0	Δn (589 nm, 20°C) = +0.1039
BCH-3F.F.F	5.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +10.2
BCH-5F.F.F	7.0	γ_1 (20°C) = 156 m Pa s
CGU-2-F	10.0	$d \cdot \Delta n = 0.50 \mu\text{m}$
CGU-3-F	9.0	트위스트 = 90°
CCP-3F.F.F	10.0	V_0 (20°C) = 0.94 V
CCP-5F.F.F	6.0	V_{10} (20°C) = 1.08 V
CCZU-2-F	4.0	V_{50} (20°C) = 1.35 V
CCZU-3-F	13.0	V_{90} (20°C) = 1.72 V
CCG-V-F	15.0	
BCH-32	3.0	
Σ	100.0	

TN 4, 5, 1, 0.5 μm (1, 1) $\Theta = 0^\circ$ d · n 가 TN

가 , 1 () , () , (,)

1 7 , 1

8a 1 1

9c 1 1.07V 1.71V 15 , 0.43 10, 7, 5, 3, 2 1 V_{10} V_{90}

1 2 가

1 2 가

4 , 4

TN (4.8 μm) 가 1 1

3% , 가 .

2

가 1 가 . $\lambda/4$.

(Autronic - Melchers)

1 0°

- 가 1 .

가

1

1

1.13V

2.64V

9b

7, 5, 3 2 , 10.0 , 1.08 , 9a ,

가

1 2

(Θ)

2

, ,

가

2

1

. ,

1

(Φ)

가

가

1

3

1

$\lambda/4$

가

0.0969

5.1 μ m

ZLI - 4792(M

erck KGaA)

(가)

6

1

$\Phi = -45^\circ$ $\Theta = 10^\circ$

6 ,

가 , d • n 0.50 μ m TN

$\Theta = 10^\circ$, $\Phi = -45^\circ$

TN

가 ,

2

ZLI - 4792

TN

3

1

3

,

$\Phi = -45^\circ$

$\Theta = 10^\circ$

(0.50 μ m)

3

6

, ,

가

-

2.4

TN

(" ")

가

6

1 TN

가

 $\Theta = 10^\circ$ $\Phi = -45^\circ$

TN

가

(4 63)

1

 V_{10} , V_{50} V_{90}

4

조성물	농도 /%	특성
CC-5-V	14.0	전이 T (S,N) < -40.0°C
CCH-303	3.0	클리어링 포인트 T (N,I) = +76.0°C
CCH-501	5.0	Δn (589 nm, 20°C) = +0.0597
CCP-2F.F.F	10.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +5.5
CCP-3F.F.F	12.0	γ_1 (20°C) [m Pa s]
CCP-5F.F.F	4.0	V_{10} (20°C) = 1.80 V
CCZU-2-F	5.0	V_{50} (20°C) = 2.48 V
CCZU-3-F	16.0	V_{90} (20°C) = 4.44 V
CCZU-5-F	5.0	
CCH-301	18.0	
CH-33	2.0	
CH-35	3.0	
CH-45	3.0	
Σ	100.0	

5

조성물	농도 /%	특성
CC-5-V	6.0	전이 T (S,N) < -40.0°C
CCH-34	5.0	클리어링 포인트 T (N,I) = +75.0°C
CCH-501	6.0	Δn (589 nm, 20°C) = +0.0604
CCP-2F.F.F	12.0	$\Delta \varepsilon$ (1 kHz 20°C) = +6.4
CCP-3F.F.F	12.0	V_{10} (20°C) = 1.60 V
CCP-5F.F.F	5.0	V_{50} (20°C) = 2.23 V
CCZU-2-F	6.0	V_{90} (20°C) = 3.95 V
CCZU-3-F	20.0	
CCZU-5-F	5.0	
CCH-301	18.0	
CH-35	2.0	
CH-45	3.0	
Σ	100.0	

6

조성물	농도 /%	특성
CCH-3CF3	8.0	전이 T (S,N) < -40.0°C
CCH-5CF3	12.0	클리어링 포인트 T (N,I) = +72.0°C
CC-5-V	5.0	Δn (589 nm, 20°C) = +0.0578
CCH-303	5.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +6.5
CCH-501	12.0	γ_1 (20°C) = 129 m Pa s
CCP-2F.F.F	12.0	V_{10} (20°C) = 1.72
CCP-3F.F.F	6.0	V_{50} (20°C) = 2.34 V
CCZU-2-F	6.0	V_{90} (20°C) = 4.13 V
CCZU-3-F	19.0	
CCZU-5-F	6.0	
CH-33	3.0	
CH-35	3.0	
CCPC-34	3.0	
Σ	100.0	

7

조성물	농도 /%	특성
CC-5-(S)3	10.0	전이 T (S,N) < -40.0°C
CCH-301	6.0	클리어링 포인트 T (N,I) = +70.5°C
CCH-303	5.0	Δn (589 nm, 20°C) = +0.0568
CCH-501	14.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +5.8
CCP-2F.F.F	12.0	γ_1 (20°C) = 142 m Pa s
CCP-3F.F.F	12.0	V_{10} (20°C) = 1.64 V
CCZU-2-F	6.0	V_{50} (20°C) = 2.23 V
CCZU-3-F	22.0	V_{90} (20°C) = 3.98 V
CCZU-5-F	6.0	
CH-33	3.0	
CCPC-34	4.0	
Σ	100.0	

8

조성물	농도 /%	특성
CC-5-V	14.0	클리어링 포인트 T (N,I) = +76.0°C
CCH-301	18.0	Δn (589 nm, 20°C) = +0.0608
CCH-303	3.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +5.5
CCH-501	5.0	V_{10} (20°C) = 1.77 V
CCP-2F.F.F	10.0	V_{90} (20°C) = 4.28 V
CCP-3F.F.F	12.0	
CCP-5F.F.F	4.0	
CCZU-2-F	5.0	
CCZU-3-F	16.0	
CCZU-5-F	5.0	
CH-33	2.0	
CH-35	3.0	
CH-45	<u>3.0</u>	
Σ	<u>100.0</u>	

9

조성물	농도 /%	특성
CC-5-V	6.0	클리어링 포인트 T (N,I) = +75.5°C
CCH-301	18.0	Δn (589 nm, 20°C) = +0.0596
CCH-34	5.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +6.4
CCH-501	6.0	V_{10} (20°C) = 1.63 V
CCP-2F.F.F	12.0	V_{90} (20°C) = 3.91 V
CCP-3F.F.F	12.0	
CCP-5F.F.F	5.0	
CCZU-2-F	6.0	
CCZU-3-F	20.0	
CCZU-5-F	5.0	
CH-35	2.0	
CH-45	<u>3.0</u>	
Σ	<u>100.0</u>	

10

조성물	농도 /%	특성
CCH-501	12.0	전이 T (S,N) < -40.0°C
CH-33	4.0	클리어링 포인트 T (N,I)=+81.0°C
CH-35	4.0	Δn (589 nm, 20°C) = +0.0610
CH-43	4.0	$\Delta \epsilon$ (1 kHz, 20°C) = +8.9
CCP-2F.F.F	9.0	γ_1 (20°C) = 154 m Pa s
CCZU-2-F	6.0	V_{10} (20°C) = 1.49 V
CCZU-3-F	16.0	V_{90} (20°C) = 3.55 V
CCZU-5-F	6.0	
CDU-2-F	9.0	
CDU-3-F	11.0	
CGH-3CF3	7.0	
CCH-5CF3	8.0	
CCPC-34	4.0	
Σ	100.0	

11

조성물	농도 /%	특성
ECCH-5CF3	20.0	클리어링 포인트 T (N,I)=+74.0°C
CC-5-V	5.0	Δn (589 nm, 20°C) = +0.0585
CCH-303	5.0	$\Delta \epsilon$ (1 kHz, 20°C) = +6.5
CCH-501	12.0	γ_1 (20°C) = 141 m Pa s
CCP-2F.F.F	12.0	V_{10} (20°C) = 1.79 V
CCP-3F.F.F	6.0	V_{90} (20°C) = 4.27 V
CCZU-2-F	6.0	
CCZU-3-F	19.0	
CCZU-5-F	6.0	
CH-33	3.0	
CH-35	3.0	
CCPC-34	3.0	
Σ	100.0	

12

조성물	농도 /%	특성
CC-5-V	10.0	전이 T (S,N) < -40.0°C
CCP-20CF3	6.0	클리어링 포인트 T (N,I)=+77.0°C
CCP-40CF3	4.0	Δn (589 nm, 20°C) = +0.0608
CCP-2F.F.F	11.0	$\Delta \epsilon$ (1 kHz, 20°C) = +5.4
CCP-3F.F.F	11.0	V_{10} (20°C) = 1.91 V
CCP-5F.F.F	6.0	V_{90} (20°C) = 4.66 V
CCP-20CF3.F	9.0	
CCZU-2-F	5.0	
CZU-3-F	10.0	
CCPC-34	3.0	
CG-5-(T)5	15.0	
CC-5-(T1)5	<u>10.0</u>	
Σ	<u>100.0</u>	

13

조성물	농도 /%	특성
CCH-501	12.0	전이 T (S,N) < -40.0°C
CH-33	3.0	클리어링 포인트 T (N,I)=+81.5°C
CH-35	3.0	Δn (589 nm, 20°C) = +0.0604
CH-43	3.0	$\Delta \epsilon$ (1 kHz, 20°C) = +8.4
CH-45	3.0	γ_1 (20°C) = 160 m Pa s
CCP-2F.F.F	9.0	V_0 (20°C) = 1.22 V
CCZU-2-F	6.0	V_{10} (20°C) = 1.51 V
CZU-3-F	15.0	V_{50} (20°C) = 2.03 V
CZU-5-F	6.0	V_{90} (20°C) = 3.59 V
CDU-2-F	9.0	
CDU-3-F	9.0	
CDU-5-F	3.0	
CCH-3CF3	7.0	
CCH-5CF3	8.0	
CCPC-34	<u>4.0</u>	
Σ	<u>100.0</u>	

14

조성물	농도 /%	특성
CCH-301	17.0	전이 T (S,N) < -40.0°C
CCH-501	14.0	클리어링 포인트 T (N,I)=+81.0°C
CCH-34	4.0	Δn (589 nm, 20°C) = +0.0598
CH-33	3.0	$\Delta \epsilon$ (1 kHz, 20°C) = +7.1
CH-35	3.0	V_{10} (20°C) = 1.65 V
CH-43	3.0	V_{90} (20°C) = 3.96 V
CCPC-34	4.0	
CCZU-2-F	4.0	
CCZU-3-F	17.0	
CCZU-5-F	5.0	
CDU-2-F	9.0	
CDU-3-F	9.0	
CDU-5-F	8.0	
Σ	100.0	

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조성물	농도 /%	특성
CCH-301	14.0	전이 T (S,N) < -40.0°C
CCH-34	4.0	클리어링 포인트 T (N,I)=+78.0°C
CC-5-V	5.0	Δn (589 nm, 20°C) = +0.0601
CCP-2F.F.F	10.0	$\Delta \epsilon$ (1 kHz, 20°C) = +6.6
CCP-3F.F.F	12.0	V_{10} (20°C) = 1.72 V
CCP-5F.F.F	6.0	V_{90} (20°C) = 4.17 V
CCZU-2-F	5.0	
CCZU-3-F	16.0	
CCZU-5-F	5.0	
CCP-20CF3.F	2.0	
CCH-3CF3	10.0	
CH-33	3.0	
CH-35	3.0	
CH-43	3.0	
CH-45	2.0	
Σ	100.0	

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조성물	농도 /%	특성
CCH-301	16.0	전이 T (S,N) < -40.0°C
CCH-501	16.0	클리어링 포인트 T (N,I)=+95.5°C
CCH-35	3.0	Δn (589 nm, 20°C) = +0.0608
CCH-5CF3	5.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +4.5
CCP-2F.F.F	10.0	V_{10} (20°C) = 2.26 V
CCP-3F.F.F	8.0	V_{90} (20°C) = 5.41 V
CCZU-2-F	4.0	
CCZU-3-F	13.0	
CCZU-5-F	4.0	
CCPC-33	3.0	
CCPC-34	4.0	
CCPC-35	4.0	
CCOC-3-3	3.0	
CCOC-4-3	5.0	
CCOC-3-5	<u>2.0</u>	
Σ	<u>100.0</u>	

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조성물	농도 /%	특성
CCH-301	14.0	클리어링 포인트 T (N,I) = +71.0°C
CCH-303	18.0	Δn (589 nm, 20°C) = +0.0593
CCH-501	4.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +4.0
CCH-34	6.0	
CCH-35	6.0	
CCP-20CF3	5.0	
CCP-40CF3	5.0	
CCP-50CF3	7.0	
CCP-2F.F.F	12.0	
CCP-3F.F.F	15.0	
CCP-5F.F.F	<u>8.0</u>	
Σ	<u>100.0</u>	

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조성물	농도 /%	특성
CC-5-V	14.0	전이 T (S,N) < -40.0°C
CCH-303	3.0	클리어링 포인트 T (N,I) = +76.0°C
CCH-501	5.0	Δn (589 nm, 20°C) = +0.0597
CCP-2F.F.F	10.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +5.5
CCP-3F.F.F	12.0	V_{10} (20°C) = 1.80 V
CCP-5F.F.F	4.0	V_{90} (20°C) = 4.44 V
CCZU-2-F	5.0	
CCZU-3-F	16.0	
CCZU-5-F	5.0	
CCH-301	18.0	
CH-33	2.0	
CH-35	3.0	
CH-45	3.0	
Σ	100.0	

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조성물	농도 /%	특성
CC-5-V	6.0	전이 T (S,N) < -40.0°C
CCH-34	5.0	클리어링 포인트 T (N,I) = +75.0°C
CCH-501	6.0	Δn (589 nm, 20°C) = +0.0604
CCP-2F.F.F	12.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +6.4
CCP-3F.F.F	12.0	V_{10} (20°C) = 1.60 V
CCP-5F.F.F	5.0	V_{90} (20°C) = 3.94 V
CCZU-2-F	6.0	
CCZU-3-F	20.0	
CCZU-5-F	5.0	
CCH-301	18.0	
CH-35	2.0	
CH-45	3.0	
Σ	100.0	

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조성물	농도 /%	특성
CC-5-V	4.0	클리어링 포인트 T (N,I) = +70.0°C
CCH-34	5.0	Δn (589 nm, 20°C) = +0.0601
CCH-501	7.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +6.6
CCP-2F.F.F	11.0	V_{10} (20°C) = 1.57 V
CCP-3F.F.F	12.0	V_{90} (20°C) = 3.89 V
CCP-5F.F.F	5.0	
CCZU-2-F	6.0	
CCZU-3-F	20.0	
CCZU-5-F	6.0	
CCH-301	20.0	
CH-35	2.0	
CCP-20CF2.F.F	<u>2.0</u>	
Σ	<u>100.0</u>	

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조성물	농도 /%	특성
CCH-301	23.0	클리어링 포인트 T (N,I) = +70.0°C
CCH-303	3.0	Δn (589 nm, 20°C) = +0.0610
CCH-501	4.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +4.1
CCP-30CF3	3.0	V_{10} (20°C) = 2.10 V
CCP-40CF3	3.0	V_{90} (20°C) = 5.05 V
CCP-50CF3	3.0	
CCP-2F.F.F	5.0	
CCP-3F.F.F	10.0	
CCP-5F.F.F	8.0	
CC-5-V	16.0	
CCP-30CF3.F	6.0	
CCP-50CF3.F	8.0	
CCP-30CF2.F.F	4.0	
CCP-50CF2.F.F	<u>4.0</u>	
Σ	<u>100.0</u>	

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조성물	농도 /%	특성
CCH-301	23.0	클리어링 포인트 T (N,I) = +70.0°C
CCH-303	3.0	Δn (589 nm, 20°C) = +0.0610
CCH-501	4.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +4.1
CCP-30CF3	3.0	V_{10} (20°C) = 2.10 V
CCP-40CF3	3.0	V_{90} (20°C) = 5.05 V
CCP-50CF3	3.0	
CCP-2F.F.F	5.0	
CCP-3F.F.F	10.0	
CCP-5F.F.F	8.0	
CC-5-V	16.0	
CCP-30CF3.F	6.0	
CCP-50CF3.F	8.0	
CCP-30CF2.F.F	4.0	
CCP-50CF2.F.F	4.0	
Σ	100.0	

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조성물	농도 /%	특성
CC-5-V	16.0	전이 T (S,N) < -30.0°C
CCH-301	16.0	클리어링 포인트 T (N,I) = +86.0°C
CCH-303	3.0	Δn (589 nm, 20°C) = +0.0606
CCH-501	5.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +4.0
CCP-2F.F.F	7.0	γ_1 (20°C) = 123 m Pa s
CCP-3F.F.F	5.0	V_{10} (20°C) = 2.18 V
CCZU-2-F	4.0	V_{90} (20°C) = 5.30 V
CCZU-3-F	13.0	
CCZU-5-F	4.0	
CH-33	2.0	
CH-35	3.0	
CH-43	2.0	
CH-45	3.0	
CCPC-34	3.0	
CCPC-35	2.0	
CCP-50CF2.F.F	7.0	
PCH-7F	5.0	
Σ	100.0	

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조성물	농도 /%	특성
CCH-301	20.0	전이 T (S,N) < -40.0°C
CCH-501	16.0	클리어링 포인트 T (N,I) = +95.0°C
CC-5-V	11.5	Δn (589 nm, 20°C) = +0.0604
CDU-2-F	6.0	$\Delta \epsilon$ (1 kHz, 20°C) = +4.0
CDU-3-F	6.0	γ_1 (20°C) = 127 m Pa s
CDU-5-F	3.0	V_{10} (20°C) = 2.31 V
CCZU-2-F	3.0	V_{90} (20°C) = 5.55 V
CCZU-3-F	11.0	
CCZU-5-F	3.0	
CH-33	3.0	
CH-35	2.0	
CH-43	2.5	
CCPC-33	5.0	
CCPC-34	4.0	
CCPC-35	4.0	
Σ	100.0	

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조성물	농도 /%	특성
CCH-301	18.0	클리어링 포인트 T (N,I) = +80.0°C
CCH-501	8.0	Δn (589 nm, 20°C) = +0.0602
CCH-34	5.0	$\Delta \epsilon$ (1 kHz, 20°C) = +7.9
CH-33	3.0	
CH-35	3.0	
CH-45	3.0	
CCPC-34	3.0	
CCZU-2-F	5.0	
CCZU-3-F	17.0	
CCZU-5-F	5.0	
CDU-2-F	11.0	
CDU-3-F	12.0	
CDU-5-F	7.0	
Σ	100.0	

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조성물	농도 /%	특성
CCH-301	12.0	전이 T (S,N) < -30.0°C
CCH-501	8.0	클리어링 포인트 T (N,I) = +80.0°C
CC-5-V	8.0	Δn (589 nm, 20°C) = +0.0606
CCP-2F.F.F	10.0	$\Delta \epsilon$ (1 kHz, 20°C) = +6.3
CCP-3F.F.F	12.0	
CCP-5F.F.F	5.0	
CCZU-2-F	5.0	
CCZU-3-F	17.0	
CCZU-5-F	5.0	
CH-33	3.0	
CH-35	3.0	
CH-43	3.0	
CCH-3CF3	7.0	
CCPC-33	<u>2.0</u>	
Σ	<u>100.0</u>	

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조성물	농도 /%	특성
CCH-301	14.0	전이 T (S,N) < -30.0°C
CCH-501	11.0	클리어링 포인트 T (N,I) = +80.0°C
CCP-2F.F.F	10.0	Δn (589 nm, 20°C) = +0.0607
CCP-3F.F.F	13.0	$\Delta \epsilon$ (1 kHz, 20°C) = +6.5
CCP-5F.F.F	5.0	
CCZU-2-F	5.0	
CCZU-3-F	17.0	
CCZU-5-F	5.0	
CH-33	3.0	
CH-35	3.0	
CH-43	3.0	
CCPC-33	3.0	
CCH-3CF3	<u>8.0</u>	
Σ	<u>100.0</u>	

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조성물	농도 /%	특성
CC-5-V	4.0	클리어링 포인트 T (N,I) = +70.0°C Δn (589 nm, 20°C) = +0.0601 $\Delta \epsilon$ (1 kHz, 20°C) = +6.6
CCH-34	5.0	
CCH-301	20.0	
CCH-501	7.0	
CH-35	2.0	
CCP-2F.F.F	11.0	
CCP-3F.F.F	12.0	
CCP-5F.F.F	5.0	
CCZU-2-F	6.0	
CCZU-3-F	20.0	
CCZU-5-F	6.0	
CCP-20CF2.F.F	2.0	
Σ	100.0	

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조성물	농도 /%	특성
CCH-301	17.0	전이 T (S,N) < -30.0°C 클리어링 포인트 T (N,I) = +80.0°C Δn (589 nm, 20°C) = +0.0605 $\Delta \epsilon$ (1 kHz, 20°C) = +5.7 γ_1 (20°C) = 104 m Pa s V_0 (20°C) = 1.50 V
CCH-501	6.0	
CC-5-V	14.0	
CCP-2F.F.F	10.0	
CCP-3F.F.F	10.0	
CCP-5F.F.F	5.0	
CCZU-2-F	5.0	
CCZU-3-F	18.0	
CCZU-5-F	6.0	
CH-33	3.0	
CH-35	3.0	
CH-43	3.0	
Σ	100.0	

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조성물	농도 /%	특성
CCH-301	18.0	클리어링 포인트 T (N,I) = +81.0°C
CCH-501	5.0	Δn (589 nm, 20°C) = +0.0604
CC-5-V	14.0	$\Delta \epsilon$ (1 kHz, 20°C) = +5.5
CCP-2F.F.F	9.0	
CCP-3F.F.F	13.0	
CCP-5F.F.F	6.0	
CCZU-2-F	4.0	
CCZU-3-F	16.0	
CCZU-5-F	5.0	
CH-33	2.0	
CH-35	3.0	
CH-43	2.0	
CH-45	3.0	
Σ	100.0	

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조성물	농도 /%	특성
CC-5-V	16.0	전이 T (S,N) < -30.0°C
CCH-301	16.0	클리어링 포인트 T (N,I) = +86.0°C
CCH-303	3.0	Δn (589 nm, 20°C) = +0.0606
CCH-501	5.0	$\Delta \epsilon$ (1 kHz, 20°C) = +4.0
CCP-2F.F.F	7.0	V_{10} (20°C) = 2.18 V
CCP-3F.F.F	5.0	V_{90} (20°C) = 5.30 V
CCZU-2-F	4.0	
CCZU-3-F	13.0	
CCZU-5-F	4.0	
CH-33	2.0	
CH-35	3.0	
CH-43	2.0	
CH-45	3.0	
CCPC-34	3.0	
CCPC-35	2.0	
CCP-50CF2.F.F	7.0	
PCH-7F	5.0	
Σ	100.0	

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조성물	농도 /%	특성
CCH-301	20.0	전이 T (S,N) < -40.0°C
CCH-501	16.0	클리어링 포인트 T (N,I) = +95.0°C
CC-5-V	11.5	Δn (589 nm, 20°C) = +0.0604
CDU-2-F	6.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +4.0
CDU-3-F	6.0	γ_1 (20°C) = 127 m Pa s
CDU-5-F	3.0	V_{10} (20°C) = 2.31 V
CCZU-2-F	3.0	V_{90} (20°C) = 5.53 V
CCZU-3-F	11.0	
CCZU-5-F	3.0	
CH-33	3.0	
CH-35	2.0	
CH-43	2.5	
CCPC-33	5.0	
CCPC-34	4.0	
CCPC-35	<u>4.0</u>	
Σ	<u>100.0</u>	

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조성물	농도 /%	특성
CCH-301	18.0	클리어링 포인트 T (N,I) = +80.0°C
CCH-501	8.0	Δn (589 nm, 20°C) = +0.0602
CCH-34	5.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +7.9
CH-33	3.0	
CH-34	3.0	
CH-35	3.0	
CCPC-34	3.0	
CCZU-2-F	5.0	
CCZU-3-F	17.0	
CCZU-5-F	5.0	
CDU-2-F	11.0	
CDU-3-F	12.0	
CDU-5-F	<u>7.0</u>	
Σ	<u>100.0</u>	

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조성물	농도 /%	특성
CCH-301	14.0	전이 T (S,N) < -30.0°C
CCH-501	11.0	클리어링 포인트 T (N,I) = +80.0°C
CCP-2F.F.F	10.0	Δn (589 nm, 20°C) = +0.0607
CCP-3F.F.F	13.0	$\Delta \epsilon$ (1 kHz, 20°C) = +6.5
CCP-5F.F.F	5.0	
CCZU-2-F	5.0	
CCZU-3-F	17.0	
CCZU-5-F	5.0	
CH-33	3.0	
CH-35	3.0	
CH-43	3.0	
CCPC-33	3.0	
CCH-3CF3	8.0	
Σ	100.0	

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조성물	농도 /%	특성
CC-5-V	14.0	전이 T (S,N) < -40.0°C
CCH-303	3.0	클리어링 포인트 T (N,I) = +76.0°C
CCH-501	5.0	Δn (589 nm, 20°C) = +0.0597
CCP-2F.F.F	10.0	$\Delta \epsilon$ (1 kHz, 20°C) = +5.5
CCP-3F.F.F	12.0	V_{10} (20°C) = 1.80 V
CCP-5F.F.F	4.0	V_{90} (20°C) = 4.44 V
CCZU-2-F	5.0	
CCZU-3-F	16.0	
CCZU-5-F	5.0	
CCH-301	18.0	
CH-33	2.0	
CH-35	3.0	
CH-43	3.0	
Σ	100.0	

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조성물	농도 /%	특성
CC-5-V	6.0	전이 T (S,N) = < -40.0°C
CCH-34	5.0	클리어링 포인트 T (N,I) = +75.0°C
CCH-301	18.0	Δn (589 nm, 20°C) = +0.0604
CCH-501	6.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +6.4
CCP-2F.F.F	12.0	V_{10} (20°C) = 1.61 V
CCP-3F.F.F	12.0	V_{90} (20°C) = 3.94 V
CCP-5F.F.F	5.0	
CCZU-2-F	6.0	
CCZU-3-F	20.0	
CCZU-5-F	5.0	
CH-35	2.0	
CH-45	3.0	
Σ	100.0	

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조성물	농도 /%	특성
CC-5-V	7.0	전이 T (S,N) < -30.0°C
CCH-301	5.0	클리어링 포인트 T (N,I) = +82.0°C
CCH-303	5.0	Δn (589 nm, 20°C) = +0.0630
CCH-501	14.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +8.0
CCP-2F.F.F	12.0	V_{10} (20°C) = 1.69 V
CCP-3F.F.F	12.0	V_{90} (20°C) = 4.08 V
CCP-5F.F.F	4.0	
CCZU-2-F	6.0	
CCZU-3-F	22.0	
CCZU-5-F	6.0	
CH-33	2.0	
CH-35	3.0	
CH-45	2.0	
Σ	100.0	

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조성물	농도 /%	특성
CCH-303	11.0	전이 T (S,N) < -30.0°C
CCH-501	17.0	클리어링 포인트 T (N,I) = +83.5°C
CH-33	3.0	Δn (589 nm, 20°C) = +0.0624
CH-35	3.0	$\Delta \epsilon$ (1 kHz, 20°C) = +8.7
CH-45	3.0	γ_1 (20°C) = 151 m Pa s
CCP-5F.F.F	3.0	V_{10} (20°C) = 1.51 V
CCZU-2-F	6.0	V_{90} (20°C) = 3.64 V
CCZU-3-F	16.0	
CCZU-5-F	6.0	
CCPC-34	2.0	
CDU-2-F	10.0	
CDU-3-F	12.0	
CDU-5-F	8.0	
Σ	100.0	

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조성물	농도 /%	특성
CCH-301	19.0	전이 T (S,N) < -40.0°C
CC-5-V	17.0	클리어링 포인트 T (N,I) = +76.5°C
CCP-20CF3	6.0	Δn (589 nm, 20°C) = +0.0639
CCP-40CF3	6.0	$\Delta \epsilon$ (1 kHz, 20°C) = +5.2
CCP-2F.F.F	11.0	γ_1 (20°C) = 92 m Pa s
CCP-3F.F.F	11.0	V_0 (20°C) = 1.50 V
CCP-5F.F.F	6.0	V_{10} (20°C) = 1.87 V
CCP-20CF3.F	9.0	V_{90} (20°C) = 4.59 V
CCZU-2-F	5.0	
CCZU-3-F	7.0	
CCPC-34	3.0	
Σ	100.0	

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조성물	농도 /%	특성
CCH-301	20.0	전이 T (S,N) < -30.0°C
CC-5-V	16.0	클리어링 포인트 T (N,I) = +70.5°C
CCP-20CF3	6.0	Δn (589 nm, 20°C) = +0.0620
CCP-40CF3	5.0	$\Delta \epsilon$ (1 kHz, 20°C) = +7.4
CCZU-2-F	5.0	V_0 (20°C) = 1.23 V
CCZU-3-F	8.0	V_{10} (20°C) = 1.52 V
CCPC-34	4.0	V_{90} (20°C) = 3.71 V
CDU-2-F	12.0	
CDU-3-F	14.0	
CDU-5-F	10.0	
Σ	100.0	

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조성물	농도 /%	특성
CCH-3CF3	9.0	전이 T (S,N) < -40.0°C
CCH-5CF3	12.0	클리어링 포인트 T (N,I) = +80.0°C
CCH-302	10.0	Δn (589 nm, 20°C) = +0.0633
CCP-2F.F.F	12.0	$\Delta \epsilon$ (1 kHz, 20°C) = +7.9
CCP-3F.F.F	11.0	V_{10} (20°C) = 1.72 V
CCP-5F.F.F	6.0	V_{90} (20°C) = 4.13 V
CCP-20CF3.F	3.0	
CCZU-2-F	6.0	
CCZU-3-F	14.0	
CCZU-5-F	6.0	
CCPC-34	5.0	
CH-35	6.0	
Σ	100.0	

42

조성물	농도 /%	특성
CH-33	4.0	전이 T (S,N) < -30.0°C
CH-35	3.0	클리어링 포인트 T (N,I) = +82.0°C
CCP-2F.F.F	10.0	Δn (589 nm, 20°C) = +0.0645
CCZU-2-F	6.0	$\Delta \epsilon$ (1 kHz, 20°C) = +11.2
CCZU-3-F	16.0	V_{10} (20°C) = 1.35 V
CCZU-5-F	6.0	V_{90} (20°C) = 3.26 V
CDU-2-F	9.0	
CDU-3-F	11.0	
CDU-5-F	8.0	
CCH-3CF3	11.0	
CCH-5CF3	9.0	
CCPC-33	4.0	
CCPC-34	3.0	
Σ	100.0	

43

조성물	농도 /%	특성
CCH-501	7.0	전이 T (S,N) < -30.0°C
CH-33	4.0	클리어링 포인트 T (N,I) = +81.0°C
CH-35	4.0	Δn (589 nm, 20°C) = +0.0624
CH-43	4.0	$\Delta \epsilon$ (1 kHz, 20°C) = +9.5
CCP-2F.F.F	12.0	γ_1 (20°C) = 180 m Pa s
CCZU-2-F	6.0	V_{10} (20°C) = 1.34 V
CCZU-3-F	16.0	V_{90} (20°C) = 3.23 V
CCZU-5-F	6.0	
CDU-2-F	9.0	
CDU-3-F	11.0	
CDU-5-F	6.0	
CCS-3	8.0	
CCS-5	7.0	
Σ	100.0	

44

조성물	농도 /%	특성
CCH-301	14.0	전이 T (S,N) < -30.0°C
CC-5-V	5.0	클리어링 포인트 T (N,I) = +79.5°C
CH-33	3.0	Δn (589 nm, 20°C) = +0.0640
CH-35	3.0	$\Delta \epsilon$ (1 kHz, 20°C) = +9.7
CH-45	3.0	V_0 (20°C) = 1.04 V
CCP-2F.F.F	8.0	V_{10} (20°C) = 1.33 V
CCZU-2-F	6.0	V_{90} (20°C) = 3.25 V
CCZU-3-F	19.0	
CCZU-5-F	6.0	
CCPC-34	1.0	
CDU-2-F	11.0	
CDU-3-F	12.0	
CDU-5-F	9.0	
Σ	100.0	

45

조성물	농도 /%	특성
ECCH-5CF3	21.0	클리어링 포인트 T (N,I) = +82.0°C
CC-5-V	5.0	Δn (589 nm, 20°C) = +0.0654
CH-33	3.0	$\Delta \epsilon$ (1 kHz, 20°C) = +8.5
CCP-2F.F.F	12.0	γ_1 (20°C) = 165 m Pa s
CCP-3F.F.F	12.0	V_{10} (20°C) = 1.58 V
CCP-5F.F.F	5.0	V_{90} (20°C) = 3.88 V
CCP-20CF3.F	6.0	
CCZU-2-F	6.0	
CCZU-3-F	20.0	
CCZU-5-F	6.0	
CCPC-34	4.0	
Σ	100.0	

46

조성물	농도 /%	특성
CCH-303	11.0	전이 T (S,N) < -40.0°C
CCH-501	17.0	클리어링 포인트 T (N,I) = +84.5°C
CH-33	3.0	Δn (589 nm, 20°C) = +0.0628
CH-35	3.0	$\Delta \epsilon$ (1 kHz, 20°C) = +9.2
CH-45	3.0	V_{10} (20°C) = 1.58 V
CCP-5F.F.F	3.0	V_{90} (20°C) = 3.83 V
CCZU-2-F	6.0	
CCZU-3-F	16.0	
CCZU-5-F	6.0	
CCPC-34	2.0	
CEDU-3-F	15.0	
CEDU-5-F	15.0	
Σ	100.0	

47

조성물	농도 /%	특성
CCH-501	7.0	전이 T (S,N) < -40.0°C
CH-33	3.0	클리어링 포인트 T (N,I) = +86.0°C
CH-35	3.0	Δn (589 nm, 20°C) = +0.0645
CH-43	3.0	$\Delta \epsilon$ (1 kHz, 20°C) = +10.2
CCP-2F.F.F	7.0	V_{10} (20°C) = 1.44 V
CCP-3F.F.F	5.0	V_{90} (20°C) = 3.44 V
CCZU-2-F	6.0	
CCZU-3-F	15.0	
CCZU-5-F	6.0	
CDU-2-F	9.0	
CDU-3-F	9.0	
CDU-5-F	6.0	
CCH-3CF3	7.0	
CCH-5CF3	8.0	
CCPC-34	3.0	
CCPC-33	3.0	
Σ	100.0	

48

조성물	농도 /%	특성
CCH-301	5.0	전이 T (S,N) < -40.0°C
CCH-501	16.0	클리어링 포인트 T (N,I) = +86.0°C
CCP-2F.F.F	12.0	Δn (589 nm, 20°C) = +0.0622
CCP-3F.F.F	12.0	$\Delta \epsilon$ (1 kHz, 20°C) = +4.8
CCP-5F.F.F	6.0	V_{10} (20°C) = 2.10 V
CCP-20CF3	5.0	V_{90} (20°C) = 4.98 V
CCP-40CF3	6.0	
CCP-20CF3.F	9.0	
CH-33	4.0	
CH-35	3.0	
CH-43	3.0	
CH-45	3.0	
CCPC-34	4.0	
CCH-3CF3	6.0	
CCH-5CF3	6.0	
Σ	100.0	

49

조성물	농도 /%	특성
CCH-5CF3	10.0	전이 T (S,N) < -30.0°C
CCH-34	5.0	클리어링 포인트 T (N,I) = +79.5°C
CC-5-V	16.0	Δn (589 nm, 20°C) = +0.0650
CCP-2F.F.F	12.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +7.4
CCP-3F.F.F	10.0	γ_1 (20°C) = 113 mPa s
CCP-5F.F.F	7.0	V_{10} (20°C) = 1.67 V
CCP-20CF3.F	12.0	V_{90} (20°C) = 4.08 V
CCZU-2-F	5.0	
CCZU-3-F	16.0	
CCZU-5-F	5.0	
CCPC-34	2.0	
Σ	100.0	

50

조성물	농도 /%	특성
CCH-34	6.0	전이 T (S,N) < -40.0°C
CCH-3CF3	3.0	클리어링 포인트 T (N,I) = +75.0°C
CCH-5CF3	8.0	Δn (589 nm, 20°C) = +0.0644
CCP-2F.F.F	11.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +10.1
CCP-3F.F.F	10.0	V_{10} (20°C) = 1.42 V
CCP-5F.F.F	6.0	V_{90} (20°C) = 3.47 V
CCP-20CF3.F	4.0	
CCP-40CF3	8.0	
CDU-2-F	10.0	
CDU-3-F	12.0	
CDU-5-F	10.0	
CCOC-3-3	4.0	
CCOC-3-3	8.0	
Σ	100.0	

51

조성물	농도 /%	특성
CCH-34	6.0	클리어링 포인트 T (N,I) = +81.0°C
CC-5-V	11.0	Δn (589 nm, 20°C) = +0.0653
CC-3-2T	9.0	$\Delta \epsilon$ (1 kHz, 20°C) = +7.7
CC-5-2T	9.0	V_{10} (20°C) = 1.70 V
CCP-2F.F.F	11.0	V_{90} (20°C) = 4.20 V
CCP-3F.F.F	11.0	
CCP-5F.F.F	6.0	
CCP-40CF3	6.0	
CCP-20CF3.F	5.0	
CCZU-2-F	6.0	
CCZU-3-F	14.0	
CCZU-5-F	6.0	
Σ	100.0	

52

조성물	농도 /%	특성
CCH-34	5.0	클리어링 포인트 T (N,I) = +80.0°C
CC-5-V	8.0	Δn (589 nm, 20°C) = +0.0642
CCH-3CF3	6.0	$\Delta \epsilon$ (1 kHz, 20°C) = +7.8
CCH-5CF3	8.0	V_{10} (20°C) = 1.68 V
CCP-2F.F.F	11.0	V_{90} (20°C) = 4.08 V
CCP-3F.F.F	11.0	
CCP-5F.F.F	6.0	
CCZU-2-F	6.0	
CCZU-3-F	14.0	
CCZU-5-F	6.0	
CCP-20CF3.F	8.0	
CCP-40CF3	4.0	
CCOC-4-3	5.0	
CCOC-3-3	2.0	
Σ	100.0	

53

조성물	농도 /%	특성
CCH-34	6.0	클리어링 포인트 T (N,I) = +79.5°C
CC-5-V	14.0	Δn (589 nm, 20°C) = +0.0649
CCP-2F.F.F	11.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +9.5
CCP-3F.F.F	11.0	V_{10} (20°C) = 1.46 V
CCP-5F.F.F	6.0	V_{90} (20°C) = 3.60 V
CCP-20CF3.F	6.0	
CDU-2-F	10.0	
CDU-3-F	14.0	
CDU-5-F	10.0	
CCOC-3-3	4.0	
CCOC-4-3	8.0	
Σ	100.0	

54

조성물	농도 /%	특성
CCH-34	6.0	클리어링 포인트 T (N,I) = +78.5°C
CC-5-V	15.0	Δn (589 nm, 20°C) = +0.0652
CCH-5CF3	9.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +9.4
CCP-2F.F.F	11.0	V_{10} (20°C) = 1.48 V
CCP-3F.F.F	11.0	V_{90} (20°C) = 3.66 V
CCP-5F.F.F	6.0	
CCP-40CF3	4.0	
CCZU-2-F	6.0	
CCZU-3-F	14.0	
CCZU-5-F	6.0	
DCZG-2-OT	4.0	
DCZG-3-OT	4.0	
DCZG-5-OT	4.0	
Σ	100.0	

55

조성물	농도 /%	특성
CCH-34	5.0	전이 T (S,N) < -40.0°C
CC-5-V	8.0	클리어링 포인트 T (N,I) = +80.5°C
CCH-3CF3	6.0	Δn (589 nm, 20°C) = +0.0643
CCH-5CF3	8.0	$\Delta \epsilon$ (1 kHz, 20°C) = +7.8
CCP-2F.F.F	11.0	V_{10} (20°C) = 1.69 V
CCP-3F.F.F	11.0	V_{90} (20°C) = 4.11 V
CCP-5F.F.F	6.0	
CCZU-2-F	5.0	
CCZU-3-F	15.0	
CCZU-5-F	5.0	
CCP-20CF3.F	8.0	
CCP-40CF3	5.0	
CCOC-4-3	5.0	
CCOC-3-3	2.0	
Σ	100.0	

56

조성물	농도 /%	특성
CCH-34	5.0	클리어링 포인트 T (N,I) = +82.0°C
CC-3-2T	8.0	Δn (589 nm, 20°C) = +0.0650
CC-5-2T	8.0	$\Delta \epsilon$ (1 kHz, 20°C) = +6.5
CCH-5CF3	8.0	V_{10} (20°C) = 1.94 V
CCP-2F.F.F	12.0	V_{90} (20°C) = 4.71 V
CCP-3F.F.F	11.0	
CCP-5F.F.F	6.0	
CCP-20CF3.F	12.0	
CCP-50CF3.F	6.0	
CCP-40CF3	6.0	
CCOC-4-3	8.0	
CCG-(c3)m-F	10.0	
Σ	100.0	

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조성물	농도 /%	특성
CCH-34	5.0	전이 T (S,N) < -40.0°C
CC-5-V	6.0	클리어링 포인트 T (N,I) = +80.5°C
CCH-3CF3	6.0	Δn (589 nm, 20°C) = +0.0644
CCH-5CF3	8.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +7.9
CCP-2F.F.F	11.0	γ_1 (20°C) = 124 m Pa s
CCP-3F.F.F	12.0	V_{10} (20°C) = 1.65 V
CCP-5F.F.F	5.0	V_{90} (20°C) = 4.06 V
CCZU-2-F	5.0	
CCZU-3-F	15.0	
CCZU-5-F	4.0	
CCP-20CF3.F	10.5	
CCP-40CF3	6.5	
CCOC-4-3	4.0	
CCOC-3-3	2.0	
Σ	100.0	

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조성물	농도 /%	특성
CCH-3CF3	8.0	클리어링 포인트 T (N,I) = +81.0°C
CCH-5CF3	5.0	Δn (589 nm, 20°C) = +0.0655
CCH-301	9.0	$\Delta \varepsilon$ (1 kHz, 20°C) = +8.7
CCP-2F.F.F	8.0	V_{10} (20°C) = 1.56 V
CCP-3F.F.F	13.0	V_{90} (20°C) = 3.77 V
CCP-5F.F.F	5.0	
CCZU-2-F	5.0	
CCZU-3-F	8.0	
CCZU-5-F	5.0	
CCP-30CF3.F	8.0	
CCP-50CF2.F.F	8.0	
CDU-3-F	9.0	
CCOC-3-3	5.0	
CPCC-2-3	4.0	
Σ	100.0	

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조성물	농도 /%	특성
CCH-3CF3	9.0	전이 T (S,N) = < -30.0°C
CCH-5CF3	7.0	클리어링 포인트 T (N,I) = +80.0°C
CCH-34	5.0	Δn (589 nm, 20°C) = +0.0652
CCP-2F.F.F	11.0	$\Delta \epsilon$ (1 kHz, 20°C) = +8.6
CCP-3F.F.F	12.0	γ_1 (20°C) = 144 m Pa s
CCP-5F.F.F	5.0	V_{10} (20°C) = 1.58 V
CCP-20CF3	4.0	V_{90} (20°C) = 3.88 V
CCP-30CF3	2.0	
CCP-40CF3	7.0	
CCP-20CF3.F	10.0	
CCZU-2-F	5.0	
CCZU-3-F	15.0	
CCZU-5-F	4.0	
CCTTCC-5-5-5-5	<u>4.0</u>	
Σ	<u>100.0</u>	

60

조성물	농도 /%	특성
CCH-34	6.0	전이 T (S,N) = < -40.0°C
CCH-501	8.0	클리어링 포인트 T (N,I) = +80.0°C
CCH-5CF3	8.0	Δn (589 nm, 20°C) = +0.0656
CCP-2F.F.F	11.0	$\Delta \epsilon$ (1 kHz, 20°C) = +8.4
CCP-3F.F.F	11.0	V_{10} (20°C) = 1.57 V
CCP-5F.F.F	6.0	V_{90} (20°C) = 3.89 V
CCP-40CF3	8.0	
CCP-20CF3.F	10.0	
CCZU-2-F	6.0	
CCZU-3-F	14.0	
CCZU-5-F	6.0	
CHO-3CF3	<u>6.0</u>	
Σ	<u>100.0</u>	

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조성물	농도 /%	특성
CCH-34	6.0	전이 T (S,N) = < -40.0°C
CCH-501	10.0	클리어링 포인트 T (N,I) = +80.0°C
CCH-5CF3	6.0	Δn (589 nm, 20°C) = 0.0653
CCP-2F.F.F	11.0	V_{10} (20°C) = 1.41 V
CCP-3F.F.F	11.0	V_{90} (20°C) = 3.45 V
CCP-5F.F.F	6.0	
CCP-20CF3.F	8.0	
CCZU-2-F	6.0	
CCZU-3-F	14.0	
CCZU-5-F	6.0	
DCZG-2-OT	4.0	
DCZG-3-OT	4.0	
DCZG-5-OT	4.0	
CCOC-3-3	<u>4.0</u>	
Σ	<u>100.0</u>	

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조성물	농도 /%	특성
CC-5-V	18.5	클리어링 포인트 T (N,I) = +70.0°C
CCH-303	6.0	Δn (589 nm, 20°C) = 0.0650
CCH-501	6.0	V_{10} (20°C) = 1.56V
CCP-2F.F.F	12.0	V_{90} (20°C) = 3.93 V
CCP-3F.F.F	13.0	
CCP-5F.F.F	5.0	
CCP-20CF2.F.F	10.0	
CCP-30CF2.F.F	10.0	
CCZU-2-F	5.0	
CCZU-3-F	10.0	
PCH-7	<u>4.5</u>	
Σ	<u>100.0</u>	

63

조성물	농도 /%	특성
CCH-301	11.5	전이 T (S,N) = < -30.0°C
CCP-2F.F.F	10.0	클리어링 포인트 T (N,I) = +80.0°C
CCP-3F.F.F	13.0	Δn (589 nm, 20°C) = 0.0653
CCP-5F.F.F	5.0	γ_1 (20°C) = 161 m Pa s
CCZU-2-F	5.0	V_{10} (20°C) = 1.54 V
CCZU-3-F	16.0	V_{90} (20°C) = 3.76 V
CCZU-5-F	4.0	
CCP-20CF2.F.F	5.0	
CCP-30CF2.F.F	6.0	
CCP-50CF2.F.F	6.0	
CH-33	3.0	
CH-35	2.0	
CH-43	2.5	
CCH-3CF3	7.0	
CCH-5CF3	4.0	
Σ	100.0	

(57)

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가

0.05 μ m0.46 μ m[(d • n)_{LC}]

2.

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3.

1

2

(φ) - 25 ° + 25 °

4.

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3

0nm

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6.

1 5 ,

0.20 μm 0.37 μm .

7.

1 6 ,

0.07 μm 0.17 μm .

8.

1 7 ,

9.

8 ,

 $\lambda/4$, $\lambda/2$ $\lambda/4$.

10.

8 9 ,

 $[(d \cdot n)_{\text{BL}}]$ $[(d \cdot n)_{\text{LC}}]$.

11.

10 ,

0.20 μm 0.37 μm , $\lambda/4$.

12.

10 ,

0.07 μm 0.17 μm , $\lambda/2$ $\lambda/4$.

13.

1 7 ,

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14.

13 ,

(φ) - 6 ° + 6 °

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0nm 80nm, 0nm 40nm

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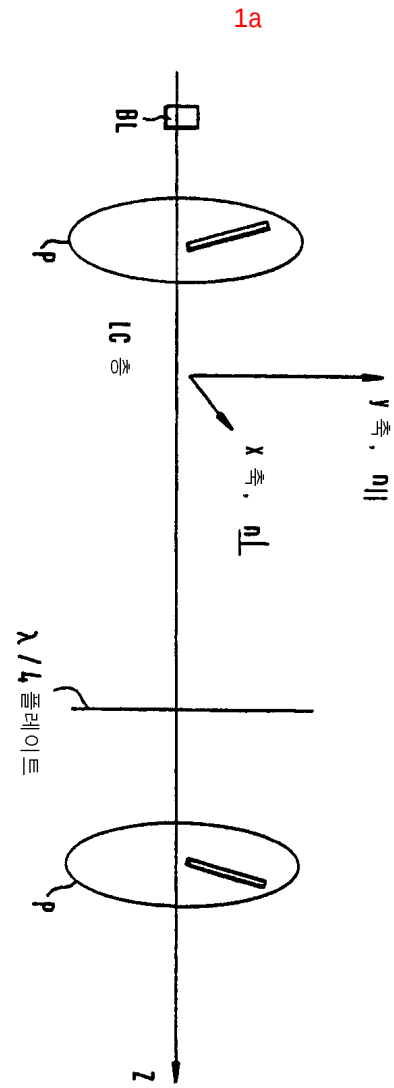
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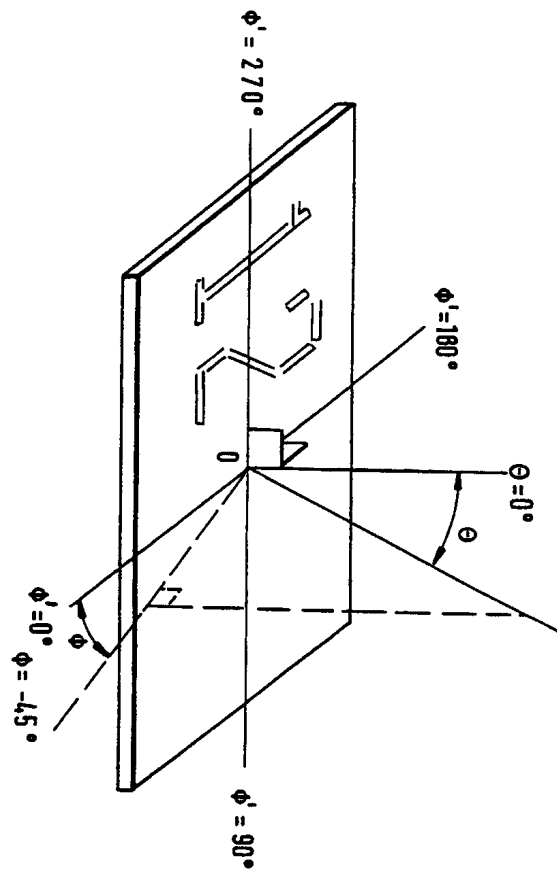
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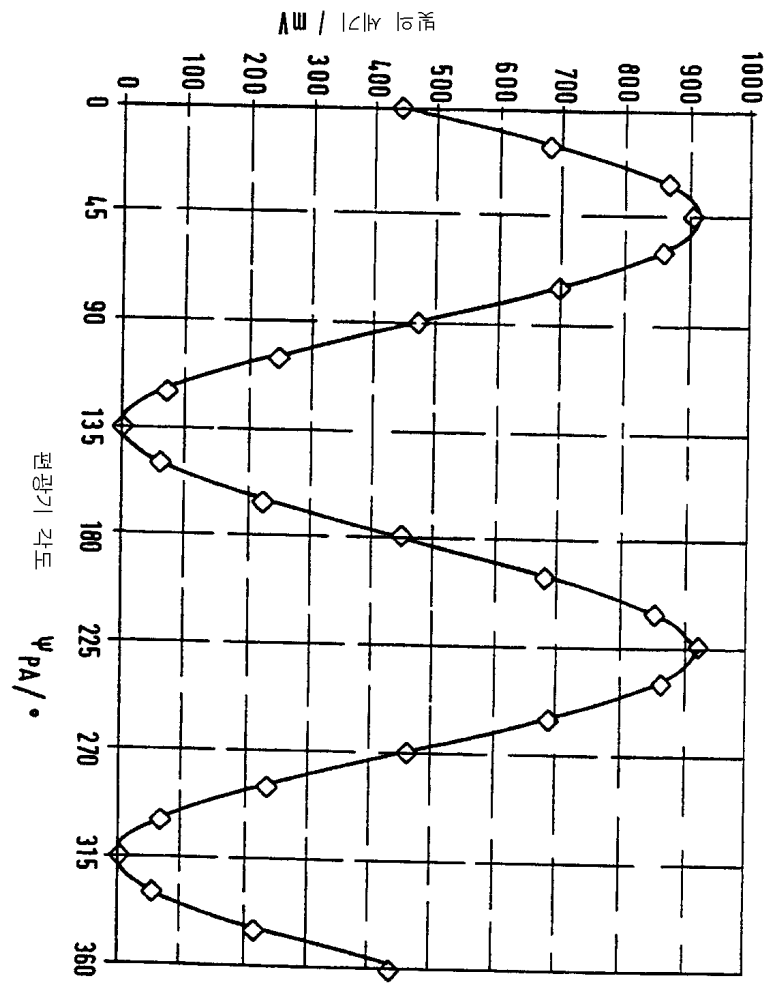
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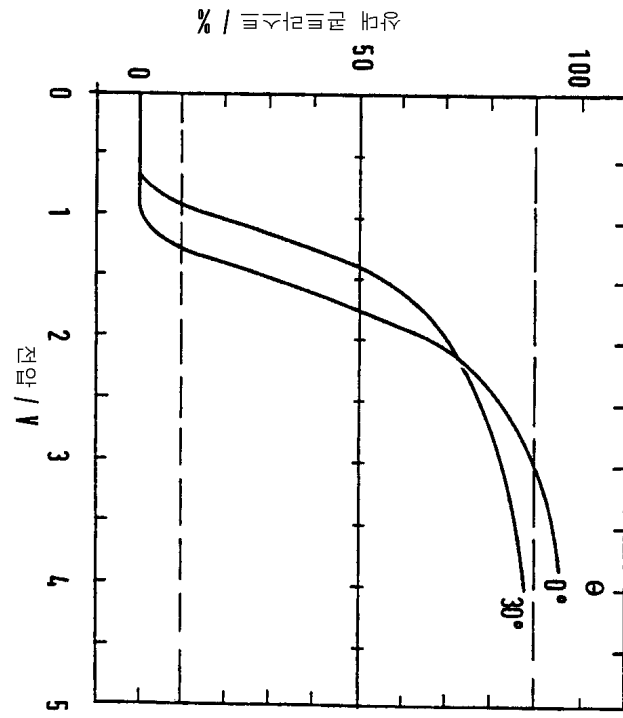
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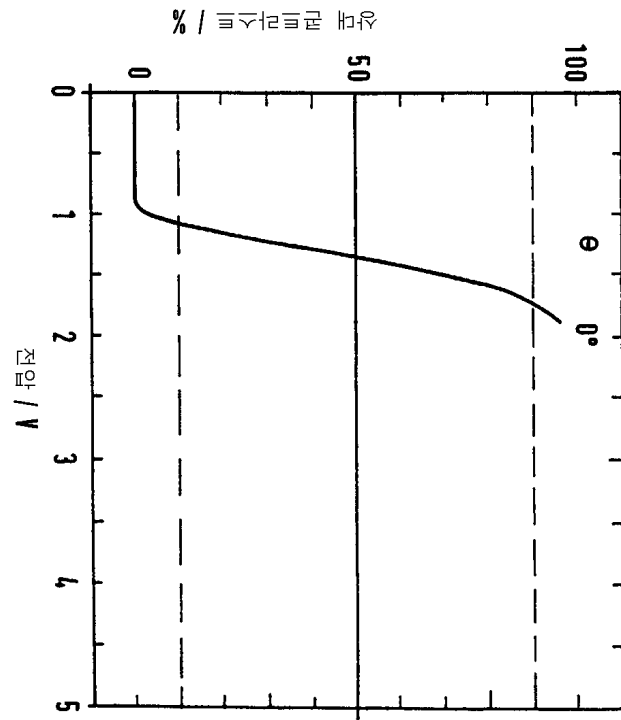
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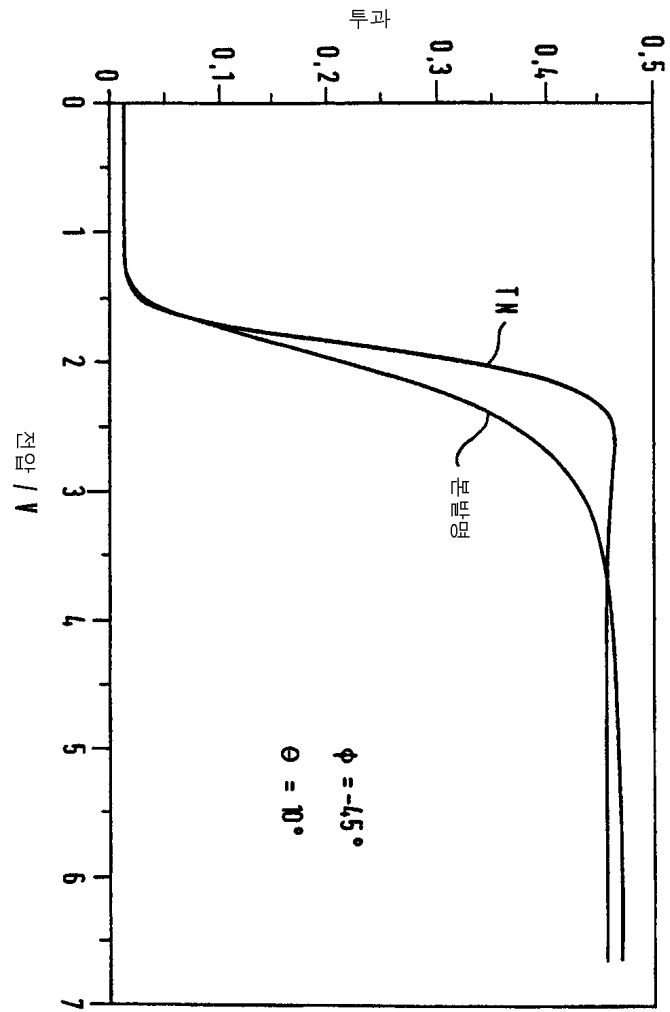
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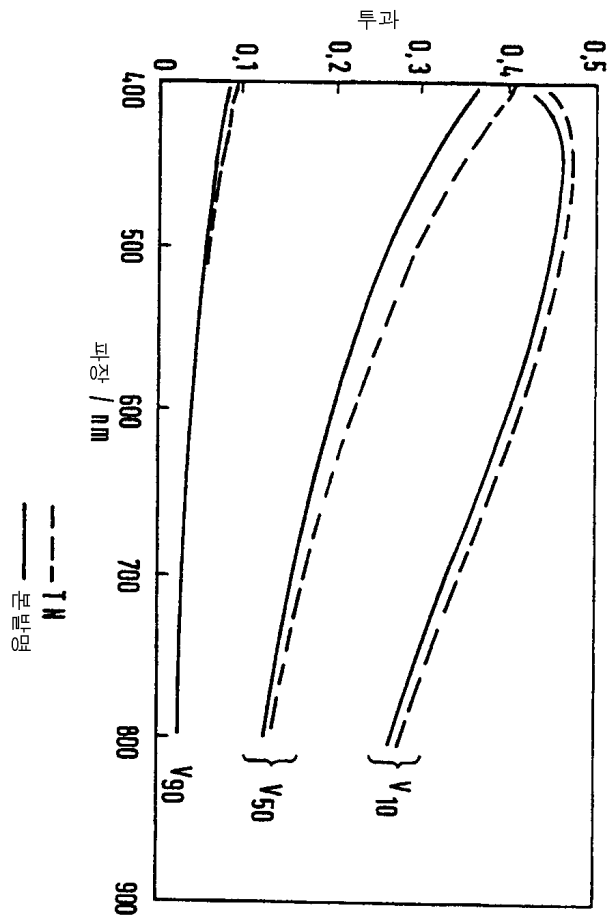
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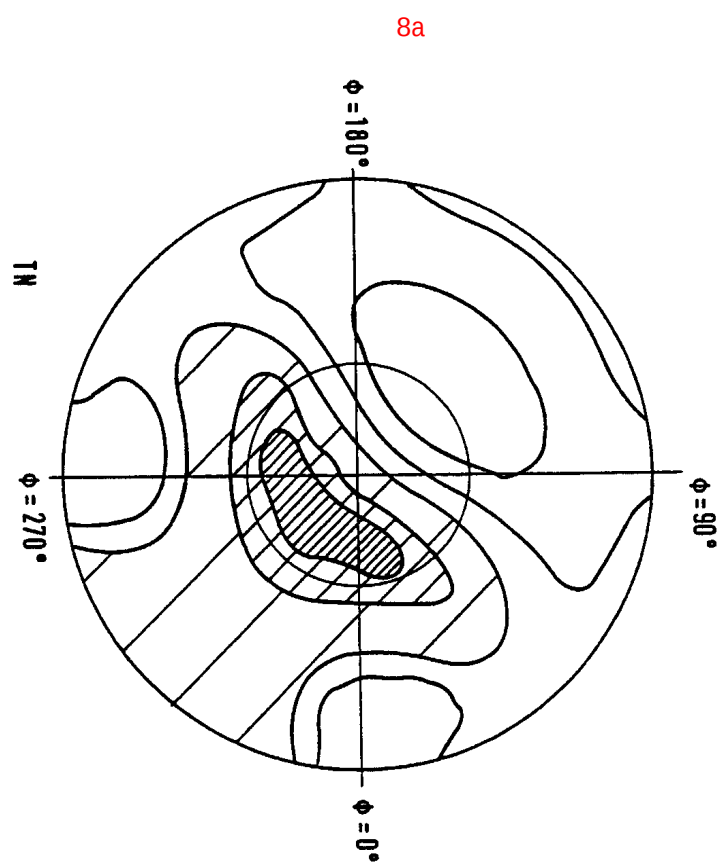


6

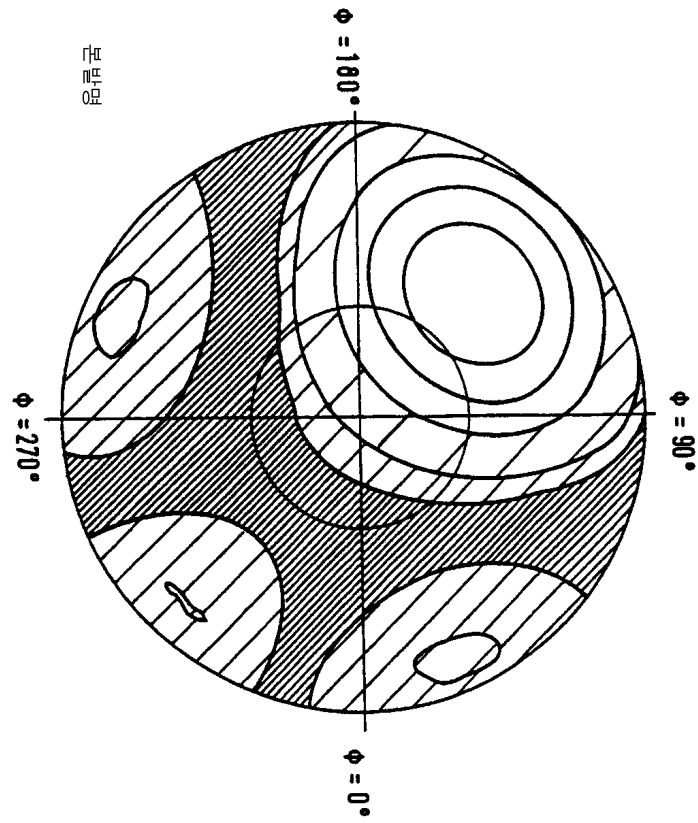


7

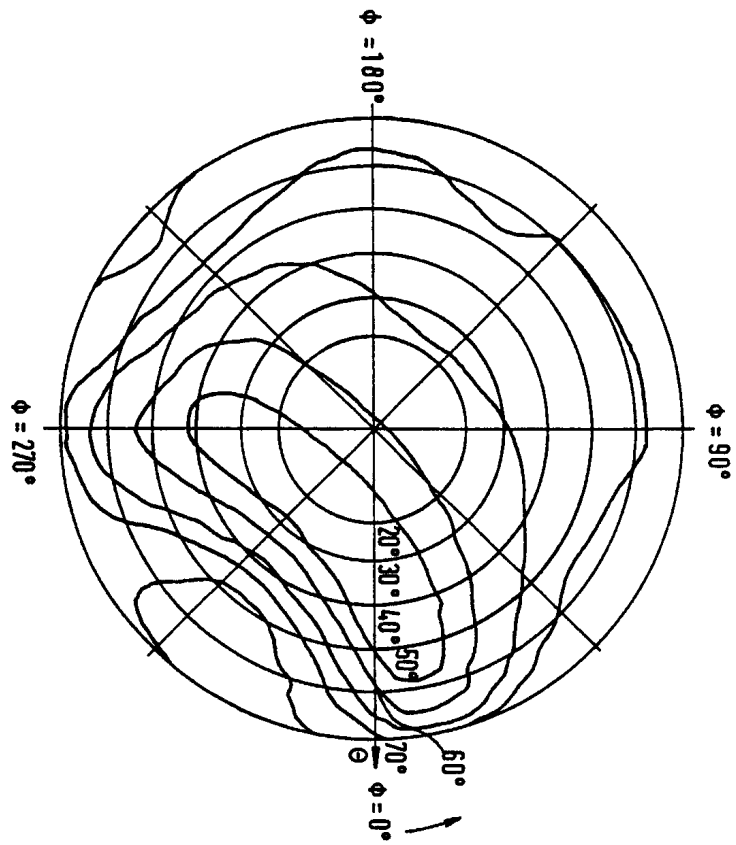




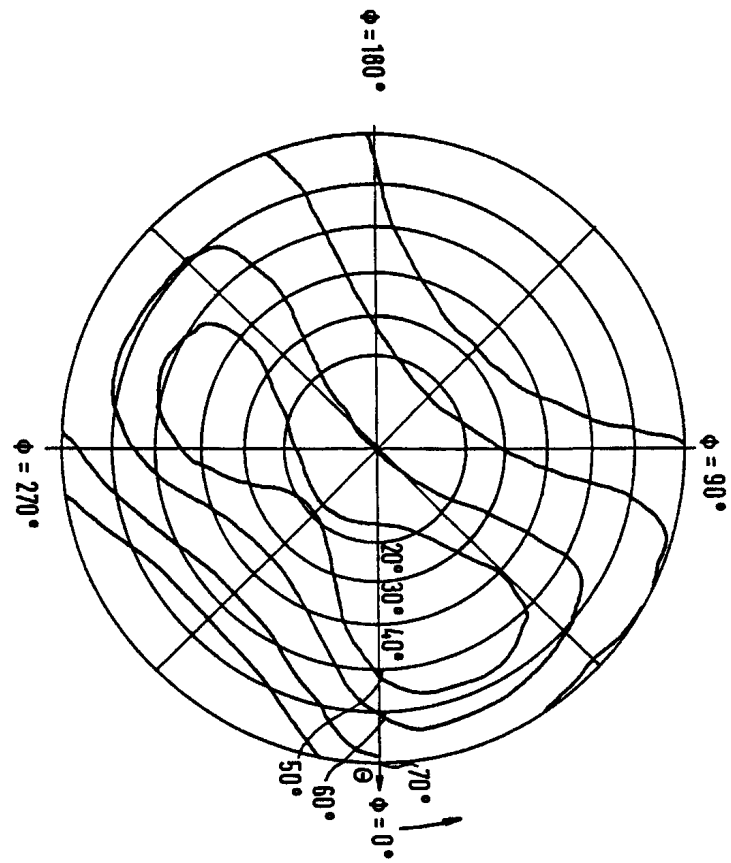
8b

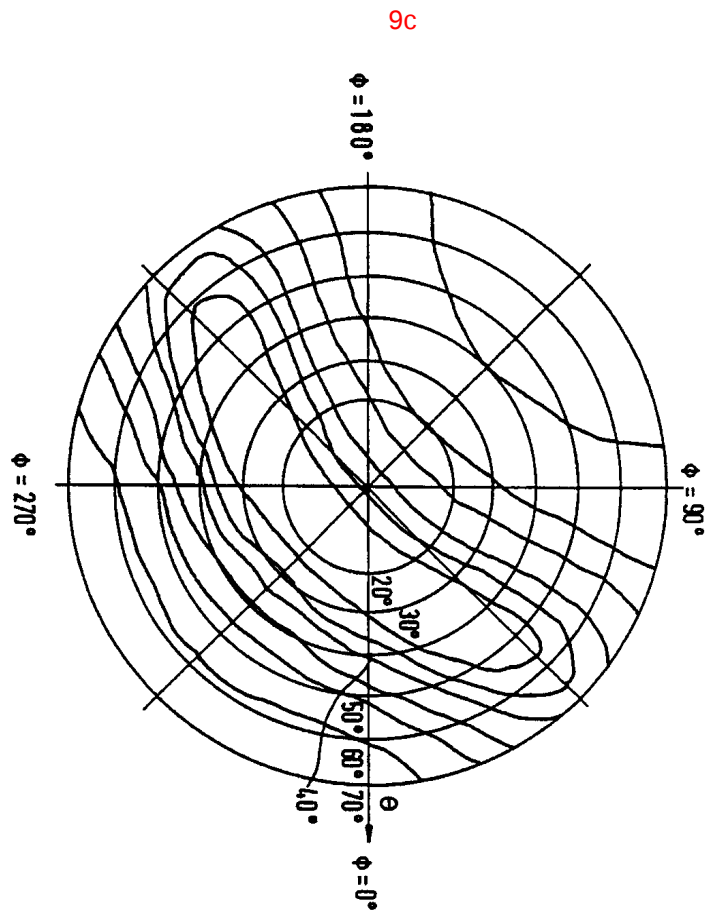


9a



9b





专利名称(译)	液晶开关元件和液晶显示装置		
公开(公告)号	KR1020020026355A	公开(公告)日	2002-04-09
申请号	KR1020027000687	申请日	2000-07-19
申请(专利权)人(译)	默克比肩10吨geem BEHA		
当前申请(专利权)人(译)	默克比肩10吨geem BEHA		
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代理人(译)	KIM的哦		
优先权	19933571 1999-07-22 DE		
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摘要(译)

本发明涉及包括这种形式的液晶开关元件的液晶显示系统和包括具有液晶层的液晶层的电光液晶开关元件的光学延迟非常低[$(d \cdot \Delta n)$] LC>0.06 μm 至0.43 μm 范围内液晶分子垂直排列在基板上液晶材料为正介电各向异性基板排列在基本平行于基板的液晶材料为负介电各向异性液晶基本上与其预对准平行于基板的对应电场重新排列，具有预对准，基本上平行排列至少一个偏振器，液晶分子基本上平行排列与基材。

