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Supporting Information

Polymer Stabilized Bistable Dual Frequency Cholesteric Liquid Crystal Devices Assisted by a Predesigned Chiral Dopant

Chun-Yen Liu^{1*}, Chi-Feng Yen², Yi-Hua Hung², Chia-Min Tu¹, Guan-Yi Wu¹ and

Hung-Yi Chen1

¹ Department of Materials Science and Engineering, National Cheng Kung University, No.1, University Road, East Dist., Tainan City 70101 Taiwan.

² Department of Chemical Engineering, National Cheng Kung University, No.1, University Road, East Dist., Tainan City 70101 Taiwan.

cyliu@gs.ncku.edu.tw



Scheme S1. Synthesis of compound 1A.



Scheme S2. Synthesis of compound 2C.



Scheme S3. Synthesis of compound BAHB.



Scheme S4. The chemical structure of (a) chiral dopant S811, (b) chiral dopant ferroelectric liquid crystal 3C, (c) photoinitiator IRG-651.



Figure S1. The instrument for measurement of electro-optical properties of the fabricated cells.



Figure S2. ¹H-NMR spectrum of 1A in CDCl₃.











Figure S5. Schematic illustration of fabrication process of dual frequency CLC cells and polymer stabilized CLC cells without alignment.



Figure S6. Thermal properties of the S1 sample mixture: (a) TGA and (b) DSC thermograms of the S1 mixture under a nitrogen atmosphere with a heating/cooling rate of 5 $^{\circ}$ C/min.



Figure S7. Thermal properties of the M1 sample mixture: (a) TGA and (b) DSC thermograms of the M1 mixture under a nitrogen atmosphere with a heating/cooling rate of 5 °C/min.



Figure S8. The transmittance spectra of DFCLC S1 and M1 cells at (a) focal conic and(b) planar states driven by applied voltage.



Figure S9. Voltage-dependent transmittance of dual-frequency CLC (a) S1 and (b) M1 cells measured under an applied electric field.



Figure S10. Frequency-dependent transmittance of dual-frequency CLC of (a) S1 and (b) M1 cells measured at the indicated driving voltage.



Figure S11. Stability of focal-conic DFCLC cells kept at ambient temperature without alignment (M1, red line) and with parallel alignment (M1A, blue line).



Figure S12. Response time for transitions of the DFCLC S1 cell from (a) focal conic to planar and (b) planar to focal conic states.



Figure S13. Response time for transitions of the DFCLC M1 cell from (a) focal conic to planar and (b) planar to focal conic states.



Figure S14. POM textures of PSDFCLC PS1 cell under various voltages at low frequency of 60 Hz.



Figure S15. Response time of PSDFCLC 1BC cell (a) switching "ON" from focal conic to planar and (b) switching "OFF" from planar to focal conic states.

Code ^b	HEF951	3C	S811	Alignment (16µm)
S1	92	0	8	Xc
M1	92	8	0	Х
M1A	92	8	0	parallel

Table S1. Physical properties of DFNLC HEF951800-100^a.

^a In weight %.

^b Dual frequency ferroelectric cholesteric liquid crystal mixture. ^c "X" means without alignment layer.

Table S2. Composition of dual frequency CLC mixtures.^a

Physical properties	Value
T _{N-i} (°C)	104
n _e (589 nm, 20 °C)	1.718
n _o (589 nm, 20 °C)	1.496
Δn (589 nm, 20 °C)	0.222
Viscosity (mm ² s ⁻¹ , 20 °C)	41
Δε (0.1 kHz, 21 °C)	2.5
Δε (50 kHz, 21 °C)	-3.2

^a Purchased from was from Fusol Material Co., LTD, Tokyo.