Supplementary Information (SI) for Journal of Materials Chemistry C.

Supporting Information

Conjugated polymer dots stabilized blue phase liquid crystal for improved electro-optic and photoluminescence properties

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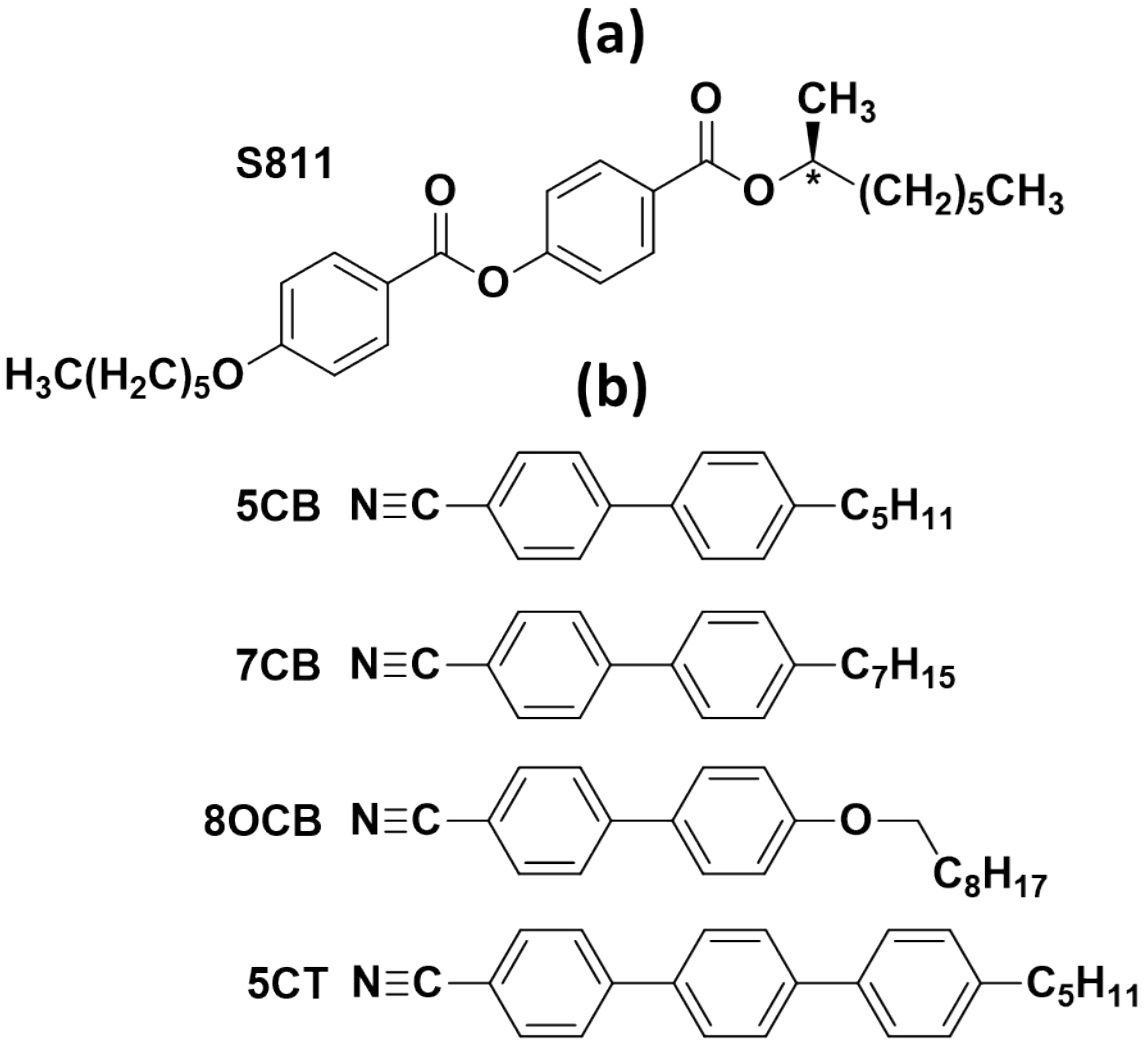


Fig. S1 Molecular structures of (a) chiral dopant S811 and (b) components of E7 liquid crystal. In (a), the asterisk (*) denotes the chiral center in the molecular structure of chiral dopant S811.

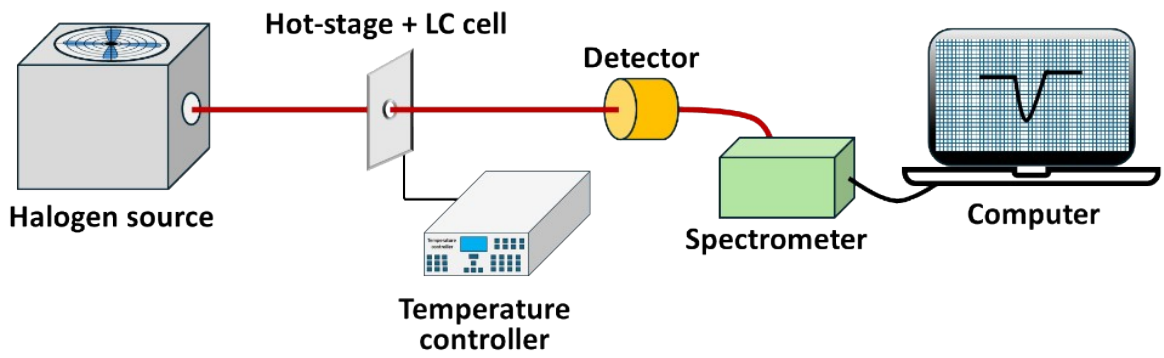


Fig. S2 Schematic of the setup used to study selective reflection properties in pure and doped BPLC samples.

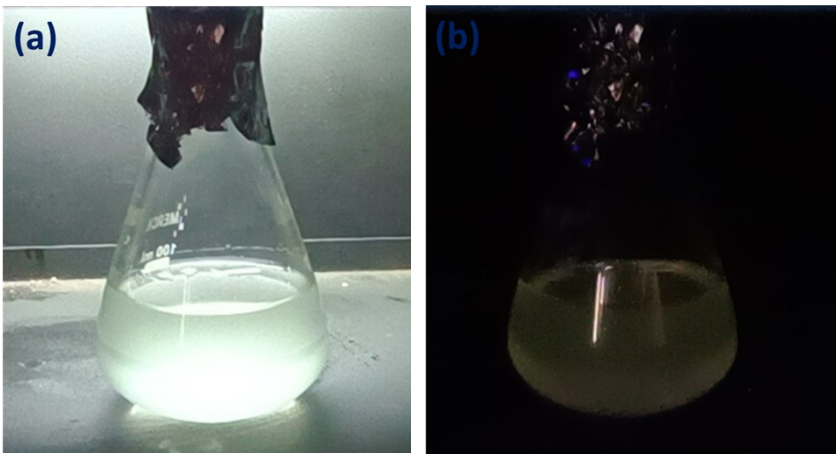


Fig. S3 The aqueous suspension of P3HT polymer Pdots under (a) white light and (b) ultraviolet light (365 nm).

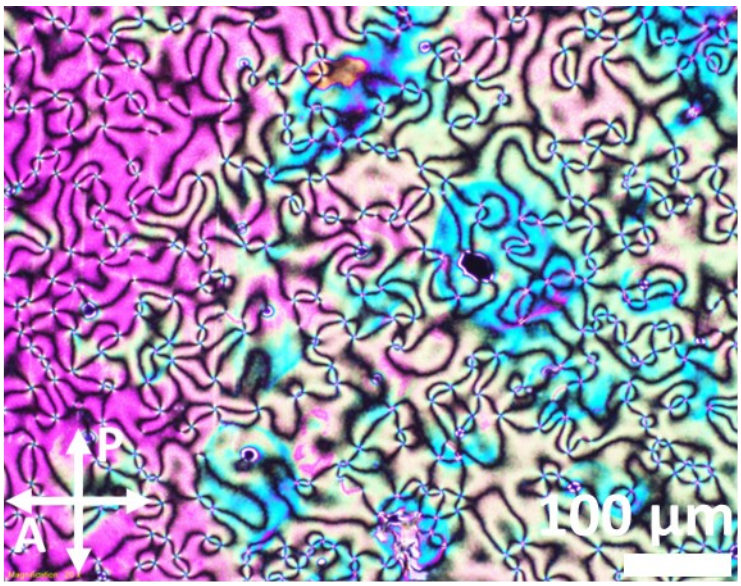


Fig. S4 Schlieren nematic texture obtained for E7 liquid crystal under a polarizing optical microscope.

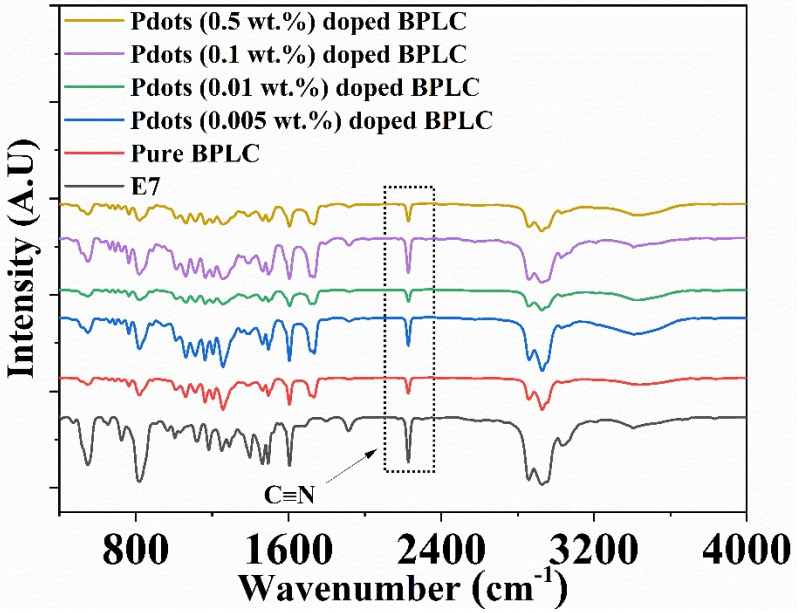


Fig. S5 FTIR spectra of E7, pure, and doped BPLCs samples.

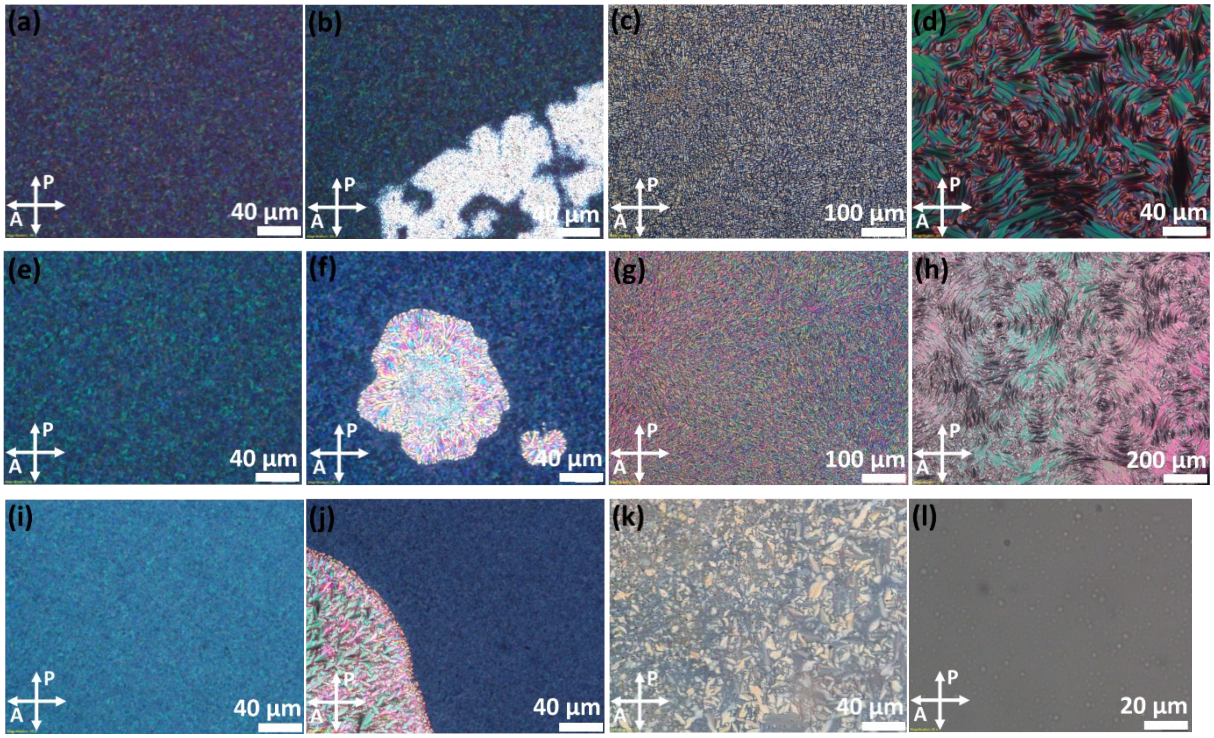


Fig. S6 (a) BPI/BPII, (b) BPI/II to N* transition, (c) N*, (d) SmA* phases in pure BPLC, (e) BPI/II, (f) BPI/II to N* transition, (g) N*, (h) SmA* phases in Pdots (0.005 wt.%) doped BPLC, (i) BPI/II, (j) BPI/II to N* transition in Pdots (0.01 wt.%) doped BPLC, (k) N* and (l) Iso phase in Pdots (0.5 wt.%) doped BPLC (Cell type-unaligned, having 6 microns thickness).

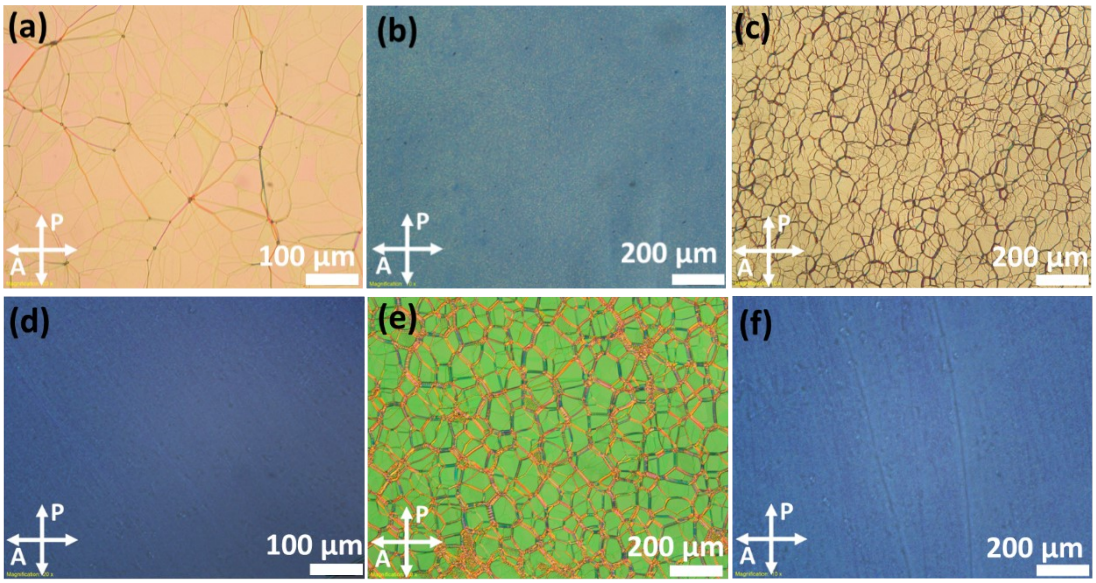


Fig. S7 POM texture obtained in N* and BP phase of (a,b) Pdots (0.05 wt.%) doped BPLC, (c,d) Pdots (0.01 wt.%) doped BPLC, and (e, f) Pdots (0.005 wt.%) doped BPLC (Cell type- planar aligned, having 12 microns thickness).

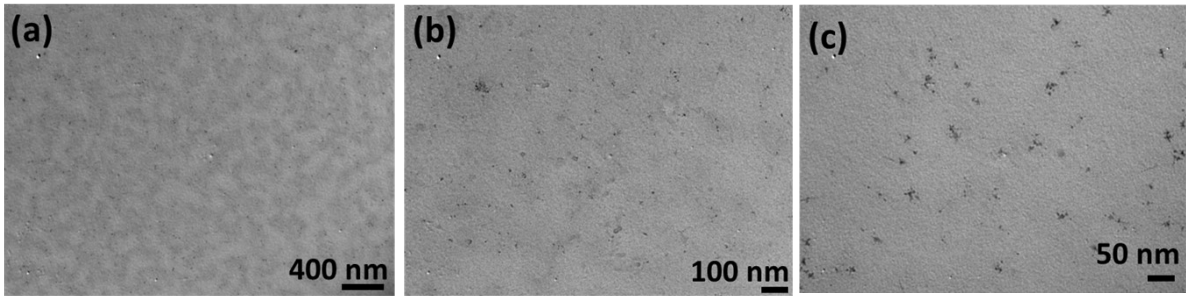
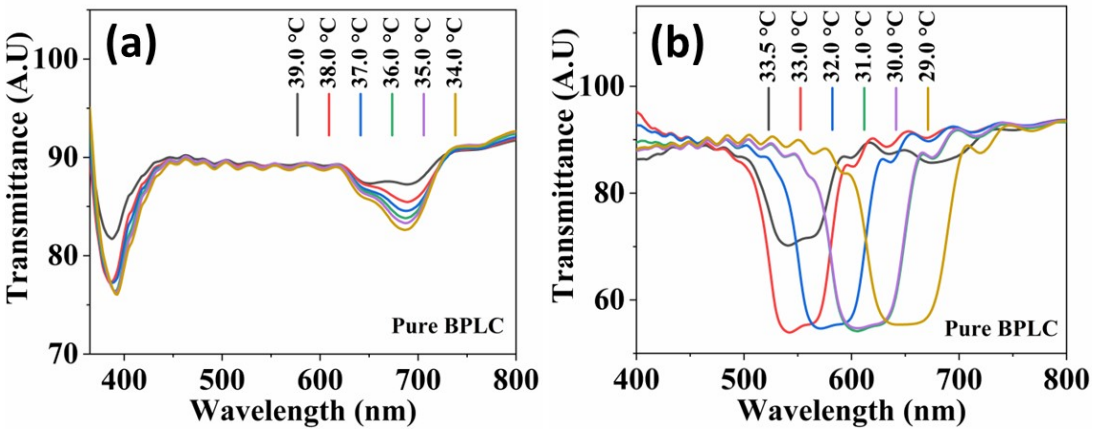


Fig. S8 Transmission electron microscopy images of Pdots (0.005 wt.%) doped BPLC obtained at different magnification scales.



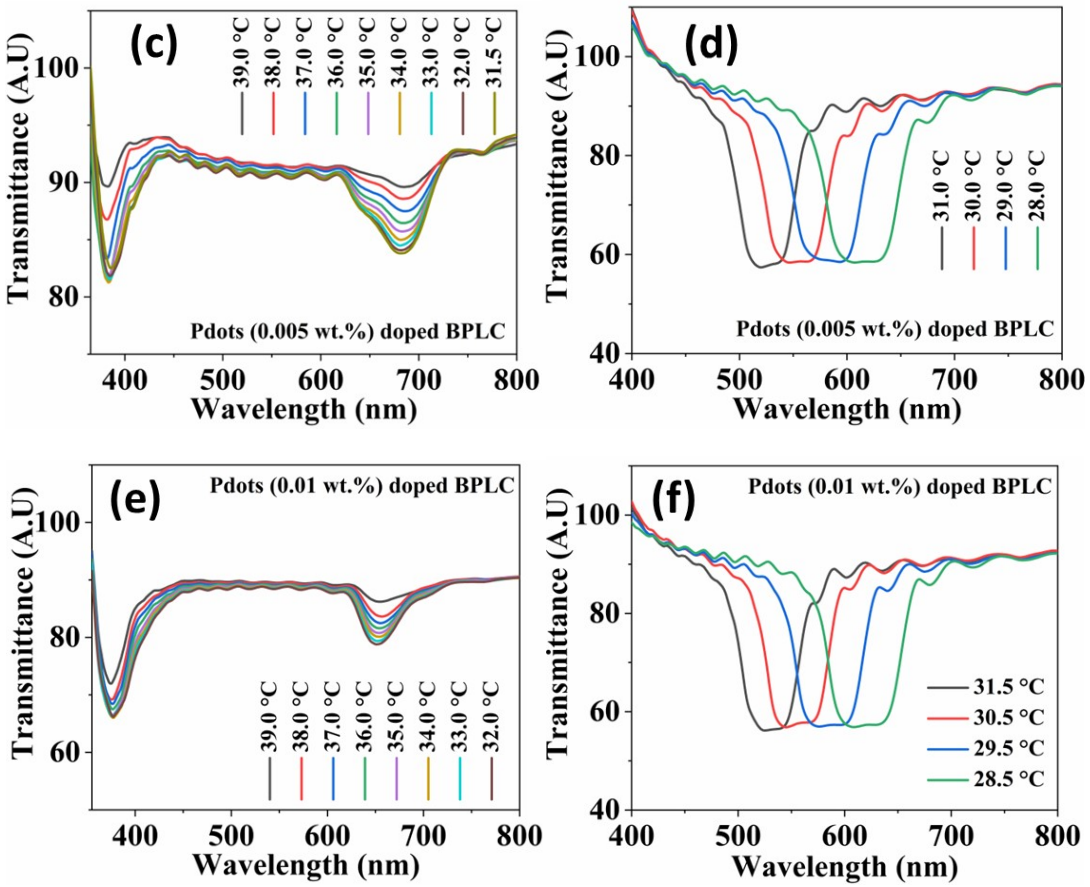


Fig. S9 Selective reflection spectra obtained at different temperatures in the cooling cycle in (a) BPI/II of pure BPLC, (b) N* phase of pure BPLC, (c) BPI/II of Pdots (0.005 wt.%) doped BPLC, (d) N* phase of Pdots (0.005 wt.%) doped BPLC, (e) BPI/II of Pdots (0.01 wt.%) doped BPLC, and (f) N* phase of Pdots (0.01 wt.%) doped BPLC.

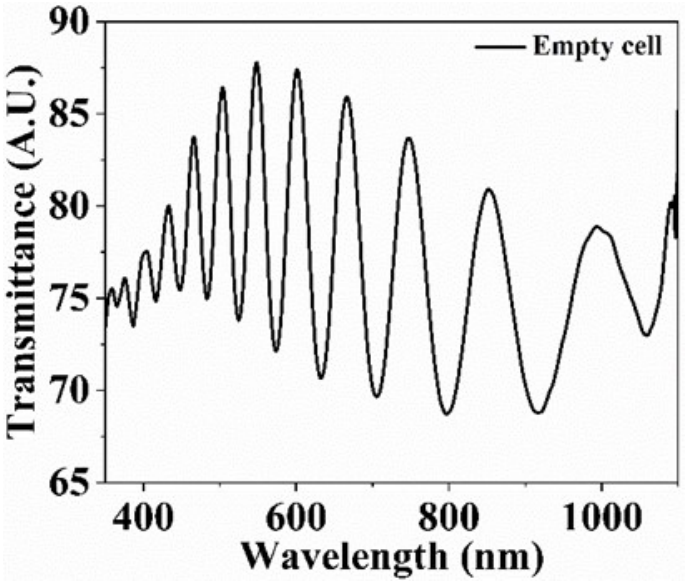


Fig. S10 Transmittance spectra of the empty cell obtained using a halogen light source. The value of the cell gap is calculated using the formula $t = (m.\lambda_m.\lambda_{m+1})/[2.n_{air}.(\lambda_{m+1} - \lambda_m)]$.

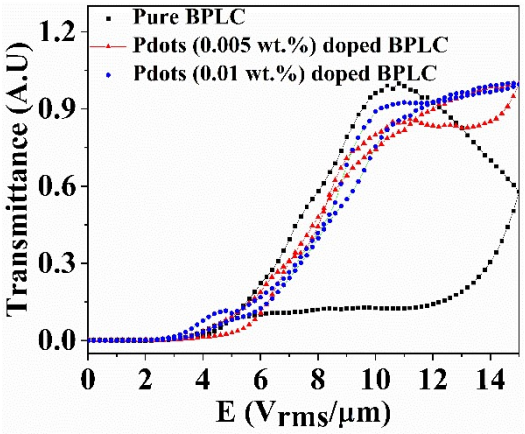


Fig. S11 Comparison of hysteresis curve for pure and doped BPLCs at a temperature difference of 2.0 °C from their isotropic point.

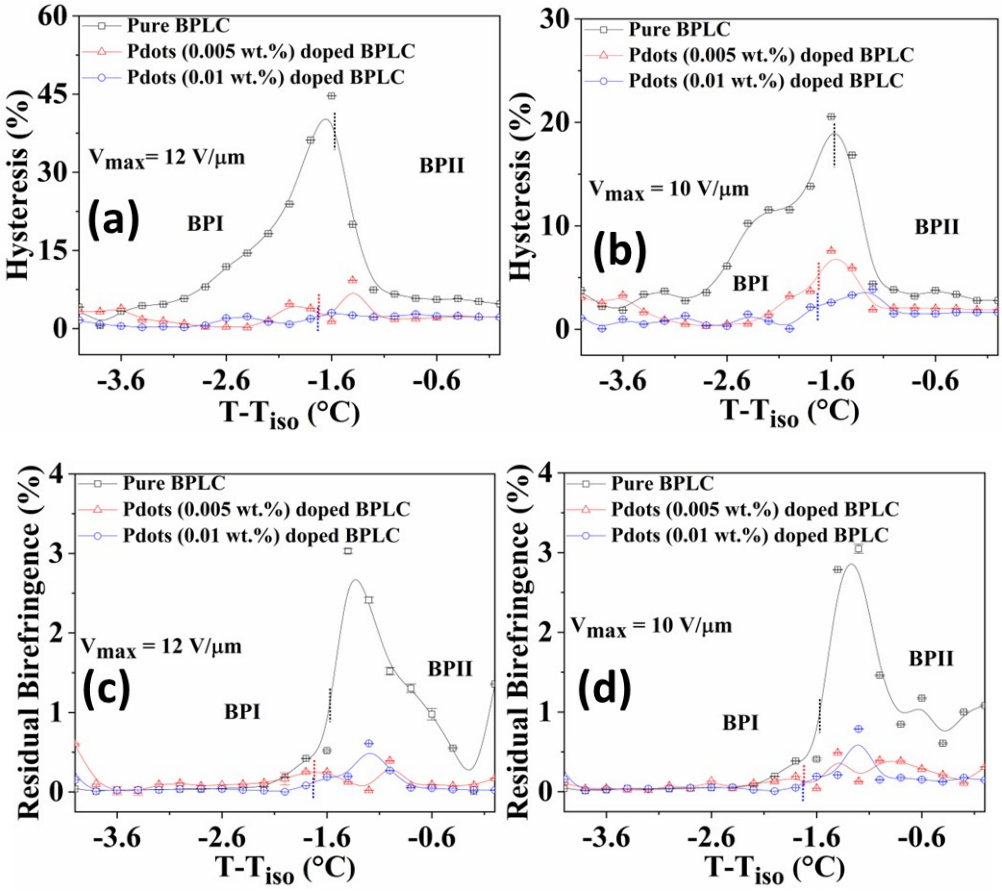


Fig. S12 (a) **%** Hysteresis at $V_{max} = 12\,V/\mu m$, (b) % Hysteresis at $V_{max} = 10\,V/\mu m$, (c) % Residual birefringence at $V_{max} = 12\,V/\mu m$ and (d) % Residual birefringence at $V_{max} = 10\,V/\mu m$ as a function of reduced temperature in pure and doped BPLC samples. The dotted vertical lines represent the phase transition values observed through textural analysis.

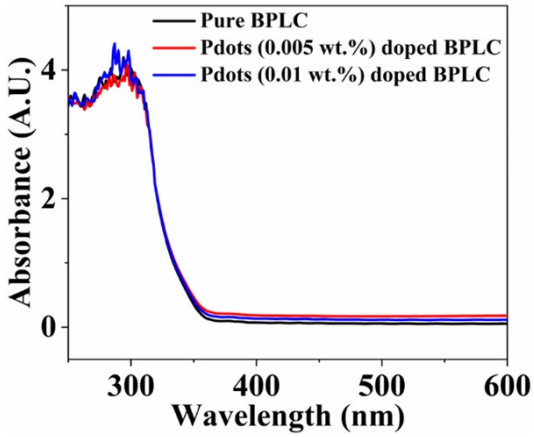


Fig. S13 Absorbance spectra of pure and doped BPLC samples obtained at ambient temperature. During the measurements, all samples remain in their SmA* phase.

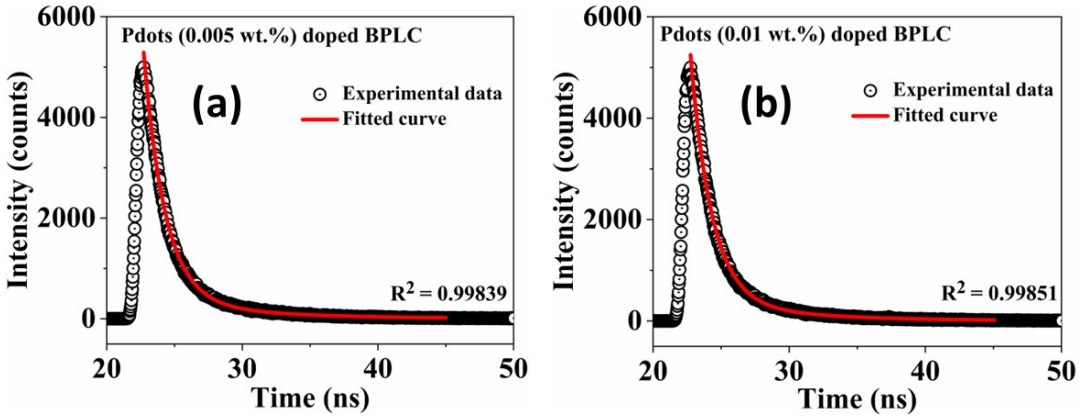


Fig. S14 Time resolved fitted curve for (a) Pdots (0.005 wt.%) doped BPLC and (b) Pdots (0.01 wt.%) doped BPLC $(\lambda_{ex.} = 320\ nm\ and\ \lambda_{em.} = 390\ nm)$.