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[28–30] Very recently, large-range color tuning has been observed in CLCs prepared from so-called twist-bend nematic formulations.[33]

Our recent examinations have detailed reflection notch broadening[17–19] in PSCLCs formulated with negative dielectric anisotropy ($-\Delta\varepsilon$) nematic liquid crystals. As much as a seven-fold increase in bandwidth[17–19] has been observed when these materials are subject to moderate DC fields (0–6 V μm

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of applied DC bias. In Fig. 2(a), the reflection notch apparent at 630 nm is shifted to 900 nm at 70 V DC. When the PSCLC is probed with LH CPL, the sample is optically transparent at both 0 V and 70 V. Fig. 2(b) presents reflection spectra of the same sample when probed with RH CPL at 0, 40, and 60 V. Application of the DC bias shifts the reflection bandgap from 630 nm to as much as 830 nm (60 V). Importantly, the reflectivity of the sample is maintained over this range. Fig. 2(c) plots reflection spectra of the PSCLC sample at 0 V and $\pm$

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In order to elucidate the influence of the applied DC field on the pitch variation of the PSCLCs examined here we investigated cross-sectional images of the PSCLC samples using the multi-photon excitation fluorescence polarizing microscopy. Before applying DC voltage, uniform half pitches (spaced at approximately 0.8 μm) are observed at 0 V μm^{-1} shown in Fig. 4(a-i). Optical experiments completed on this sample confirm an initial reflection notch of 2450 nm (not shown here). By assuming an average refractive index of 1.55, this reflection wavelength gives an estimated full pitch length of approximately 1.6 μm. As the strength of the applied DC voltage is increased, the pitches close to the electrodes are influenced first, due to high electric potential near the electrodes. At low DC voltage (0.5 V μm^{-1}), pitches near the positive electrode are expanded as compared to the equilibrium value at no fields, whereas the pitches are contracted near the negative electrode. This is evident in Fig. 4(a-ii) as well as in Fig. 4(b) where around 1–2 pitches are expanded and contracted near the positive and the negative electrodes respectively and nearly 5 pitches in the middle of the cell are seemingly uninfluenced by the applied voltage. As the voltage is increased, the pitches in the middle of the cell gap are expanded somewhat uniformly. Based on the continuous nature of the change in reflection wavelength during the application of DC field, we see no evidence of so-called ''pitch hopping'' (e.g. an increase or decrease in the relative number of pitches that could emerge as a result of propagation of edge dislocations). Thus, we

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