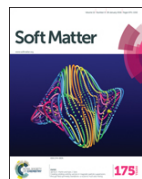


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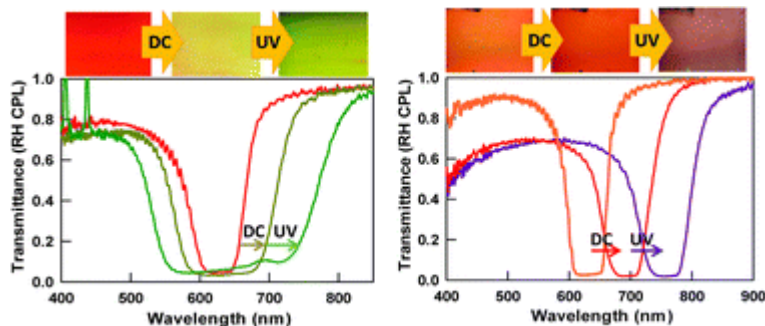
Photosensitivity of reflection notch tuning and broadening in polymer stabilized cholesteric liquid crystals

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Abstract

The position or bandwidth of the selective reflection of polymer stabilized cholesteric liquid crystals (PSCLCs) prepared from negative dielectric anisotropy ($-\Delta\epsilon$) liquid crystalline hosts can be shifted by applying a DC voltage. The underlying mechanism of the tuning or broadening of the reflection of PSCLCs detailed in these recent efforts is ion-facilitated, electromechanical deformation of the structurally chiral, polymer stabilizing network in the presence of a DC bias. Here, we show that these electro-optic responses can also be photosensitive. The photosensitivity is most directly related to the presence of photoinitiator, which is a known ionic contaminant to liquid crystal devices. Measurement of the ion density of a series of control compositions before, during, and after irradiation with UV light confirms that the ion density in compositions that exhibit photosensitivity is increased by irradiation and correlates to not only the concentration of the photoinitiator but also the type. Thus, the magnitude of the electrically tuned or broadened reflection of PSCLC of certain compositions when subjected to DC field is further increased in the presence of UV light. While interesting and potentially useful in applications such as architectural

windows, the effect may be deleterious to some device implementations. Accordingly, compositions in which photosensitivity is not observed are identified.



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