

Abstract Submitted
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Discussion on optical response of liquid-crystal BPIII driven by an inclined electric field.¹ HUI-YU CHEN, YEN-WEN WANG, National Chung Hsing University — Three blue phases exist between the chiral nematic and the liquid phase. Compared with the electro-optical properties of BPI and BPII, BPIII is a fast response photonic device with no residual birefringence, and less hysteresis effect when an in-plane electric field is applied. However, the in-the-plane field is not uniform and then the electro-optical properties is more complicate than that we can image. This is a key point for further application of BP. In this paper, a grating-like vertical electric field is used to induce the two different optical phenomena of BPIII. As the electric field is turned on, the light transmittance rapidly increases to a stable value (<0.5 ms, Kerr effect). If the applied voltage is a dc, the transmittance will remind in this stable value. However, when the applied voltage is ac, the transmittance will oscillate with the frequency. The change in transmittance will be obvious in a low frequency. From our observation, we have known that the oscillation of the transmittance is not caused by the ion effect. It is induced by reorientation of the induced optical axis (flexoelectric effect). Thus, we can control the applied frequency and the amplitude to modulate the contribution of Kerr effect and flexoelectric effect.

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