Recent Advances in Blue Phase Liquid Crystal Displays

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Abstract:

Polymer-stabilized blue phase liquid crystals displays (PS-BP LCD) based on Kerr effect have become an increasingly important technology for information display applications. In comparison to conventional nematic LC devices, BPLCs exhibit several attractive features, such as submillisecond gray-to-gray response time, reasonably wide temperature range, no need for alignment layer, optically isotropic voltage-off state, and large cell gap tolerance. However, some technical challenges such as high operation voltage, hysteresis, residual birefringence, and relatively low transmittance remain to be overcome before their widespread applications can be realized. Recent progress on BPLC materials and devices has shown great promise. From material aspect, the electro-optical properties of blue phase liquid crystals material system are studied. To realize the electro-optic effect of PS-BPLC, novel device configurations that can dramatically improve the display performances are designed.