

Fast Response and High Transmittance Vertical Alignment Mode with Electrode Pattern on Single Substrate

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The vertically aligned liquid crystal displays (VALCDs) have been widely used for large display applications due to excellent dark state. To obtain a wide-viewing property of the VALCD, however, electrode patterns in both substrate should be required.^[1,2] In addition, an assembling issue of two electrode-patterned substrates is crucial for display performance. In general, the VALCDs with an electrode pattern on a single substrate, where no assembling issue occurs, exhibited slow response due to long stabilization time. Recently, the polymer-stabilized or surface-controlled VALCDs show the fast response characteristics introducing the polymerized reactive mesogen to the alignment layer.^[3,4]

In this work, we report on the high transmittance VALC mode with an x-shaped electrode pattern on a single substrate introducing the quarter wave plate (QWP) under crossed polarizers. The omni-directional alignments of the LC generated from the x-shaped electrode were optically compensated by the QWP and thus transmittance was enhanced. Also, a technique of the surface stabilization was applied to achieve the fast response characteristics.^[4]

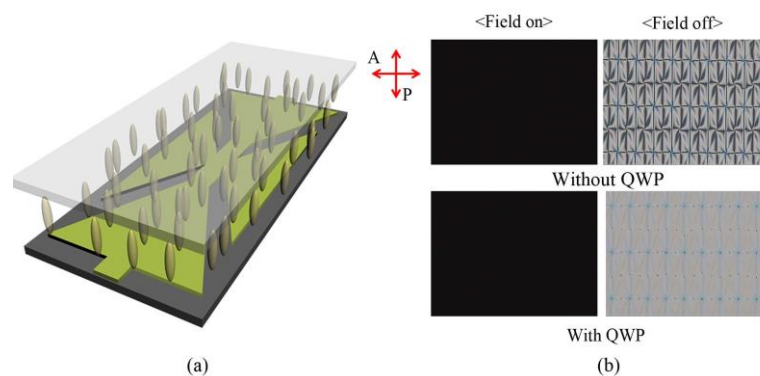


Figure 1. Electrode configurations and the corresponding microscopic textures.

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