

Viewing angle property in vertical alignment liquid crystal display using a novel negative C plate

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To achieve a wide viewing angle in liquid crystal display (LCD), a compensation film has been often used. Especially, the compensation film is one of the essential components in the vertically aligned (VA)-LCD mode due to the significant light leakage in the oblique viewing directions. By combining a positive A plate with a negative C plate, the compensation film can be fabricated for the VA-LCD mode [1]. Conventionally, the tri-acetylcellulose (TAC) film has been used for the negative C plate in VA-LCD [2]. In this paper, we newly introduced a novel discotic reactive mesogenic LC molecule (abbreviated as HABET) for the fabrication of negative C plate, which optical properties were further compared with those of TAC-based one.

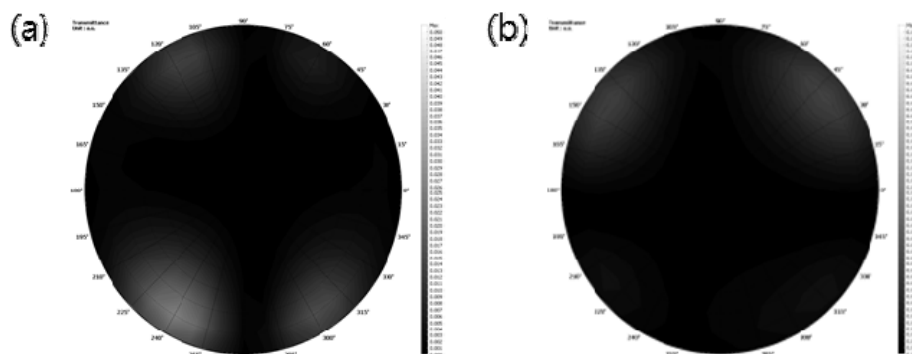


Fig. 1. Transmittance simulation at dark state to the input beam with 450 nm wavelength when (a) conventional negative C plate and (b) novel negative C plate were used.

Upon measuring the birefringence of LC test cell at different angles, it was realized that HABET molecules were self-assembled in the columnar phase [3]. The viewing angle properties of VA-LCD using the TAC film and the new negative C plate were shown in Figure 1a and 1b, respectively. From the experimental results, it was concluded that the viewing angle property of the VA-LCD using a new negative C plate showed a better dark state.

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