

## Study on Mechanism and Electro-Optical Characteristics of Liquid Crystal Alignment Employing ZnO:Al Electrode

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**Abstract :** In this paper, we investigated the feasibility of applying ZnO:Al films to display devices as transparent electrodes, and reported the electro-optical (EO) characteristics of VA cells using ZnO:Al electrodes and compared them with those of VA cells using ITO electrodes. The experiment results show that a uniform vertical LC alignment and a large pretilt angle were achieved. Also, the good voltage-transmittance curve, response time, and capacitance-voltage characteristics were observed for the rubbing aligned VA-LCD using ZnO:Al electrodes in comparison with ITO electrodes. In other words, the vertical alignment mode based on the ZnO:Al electrodes showed appropriate electro-optical characteristics and high transparency in comparison with that based on the ITO electrodes. These results indicated that the transparent ZnO:Al electrodes of the liquid crystal displays could substitute the ITO electrodes.

**Key Words :** ZnO:Al, vertical alignment, ITO, polyimide, EO character, response time, C-V character