

Vertical Alignment of Liquid Crystals Using In Situ Self-Assembly of Amphiphilic Block Copolymers

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A uniform alignment of the liquid crystals (LCs) is needed in high-quality liquid crystal display devices. In general, polyimide has been used for initial vertical alignment of LCs because it provides better uniformity and stability than other materials. However, this alignment process needs additional multi-step process for thin film formation before injecting liquid crystals, resulting in long processing time and high manufacturing cost. For this reason, we were interested in self-alignment of LCs using novel functional organic materials instead of polyimide layer. In this study, we proposed a new alignment methodology for LCD device using in situ self-assembly of amphiphilic block copolymers. This method offers a facile manufacturing process involving simple doping of low-concentration copolymers in LC medium and provides high electro-optical performance to advanced LCD.