

Enhanced, Parallel Liquid Crystal Orientation Behavior on Phthalimidoyl Modified Polystyrene Film

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We synthesized a series of phthalimide substituted polystyrene (PPH#) by substitution reaction to investigate liquid crystal (LC) orientation behaviors of LC cells fabricated with PPH# films. PPH# films showed good optical transparency in visible light region than polyimide (PI) film, well-known in display industry. For instance, transmittances of PPH# films were in range of 91 to 93% and that of PI was 80.5% at a wavelength of 550 nm, respectively. LC cell made with pristine polystyrene film showed planar LC orientation in perpendicular direction with rubbing direction, whereas LC cells fabricated with phthalimide modified polystyrene films exhibited planar LC orientation in parallel direction with rubbing direction when substitution ratio was more than 20 mol%, respectively. In addition, long-term stability of LC cell made from pristine polystyrene was very low. However, long-term stability of LC cells made from PPH#s were remarkably enhanced as well as ultraviolet stability. Therefore, this study contributes to technology of producing planar and parallel LC orientation on polystyrene derivatives and can be applied to next-generation display industry including flexible display.