

Optimization of polymer capsules for dye-doped PDLC smart glass

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Many researchers have been studied about smart glass which can control light or heat transmission by external stimulus. One of the smart glass, a dye-doped polymer dispersed liquid crystal (DDPDLC) exhibit transparency change in electric field. DDPDLC which consists of dispersed dye-doped liquid crystal in polymer matrix has many advantages such as free polarizing film, high light efficiency, small gap of display and simple fabrication. However, dye can cause contamination problem in the device which influence poor polymerization and high driving voltage. To prevent the problem, DDPDLC require perfect separation of dye in polymer matrix. In this work, we separated the dye from the polymer matrix by encapsulating liquid crystal with dye and adapted the capsules in DDPDLC. Morphology of capsules, electro-optical property of DDPDLC and synthesized shell were analyzed by microscope, UV-Vis and FT-IR, respectively. We demonstrate the encapsulated dye and liquid crystal in polymer matrix as DDPDLC which has potential in flexible display and large area display.