

Polymer semiconductor based transistors for flexible display

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Organic thin-film transistors (OTFTs) with printable semiconductors are promising candidate devices for flexible active-matrix (AM) display applications. Yet, stable operation of actual display panels driven by OTFTs has seldom been reported up to date. Here, we demonstrate a flexible reflective type polymer dispersed liquid crystal (PDLC) display, in which inkjet-printed OTFT arrays are used as driving elements with excellent areal uniformity in terms of device performance. As the active semiconductor, a novel, ambient processable conjugated copolymer was synthesized. The stability of the devices with respect to electrical bias stress was improved by applying a channel-passivation layer, which suppresses the environmental effects and hence reduces the density of trap states at the channel/dielectric interface. The combination of high performance and high stability OTFT devices enabled the successful realization of stable operating flexible color-displays by inkjet-printing.

Keywords: 유기 반도체, 트랜지스터, Flexible Display,

Bulk Heterojunction Organic Photovoltaics– Nano Morphology Control and Interfacial Layers

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Polymer solar cells utilize bulk heterojunction (BHJ) type photo-active layer in which the electron donating polymer and electron accepting C₆₀ derivatives are blended. We found there is significant charge recombination at the interface between the BHJ active layer and electrode. The charge recombination at the interface was effectively reduced by inserting wide band gap inorganic interfacial layer, which resulted in efficiency and stability enhancement of BHJ polymer solar cell.

Keywords: 태양전지, 유기 태양전지, 폴리머 태양전지