

Structural studies on sequentially-deposited ternary organic solarcell

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Organic solar cells(OSCs) have been studied extensively in bulk heterojunction (BHJ) structures due to the advantages of low process cost and flexibility. However, recently a bi-layer OSCs have been attracting attention as a countermeasure for better stability and more ideal structure, because it induces mutual diffusion among layers by sequential solution processing and heat treatment. In this study, we investigated the diffusion of fullerene derivatives with different functional groups, i.e [6,6]-pentadeuterophenyl C61 butyric acid methyl ester (PC60BM) and indene-C60 bisadduct (ICBA), by solution deposition on poly(3-hexylthiophene) (P3HT) films. The mutual diffusion through heat treatment was affected by the functional groups of fullerene and it was confirmed by nanostructural studies as well as device performance. As a results, we could induce the ideal energy cascade through the morphology control of the P3HT / PCBM-ICBA sequentially-deposited ternary OSC.