

Interfacial Electronic Structures of Poly[N-9''-hepta-decanyl-2,7-carbazole-alt-5,5-(4',7'-di-2-thienyl-2',1',3'-benzothiadiazole)] and [6,6]-phenyl C60 Butyric Acid Methyl Ester

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PCDTBT (Poly[N-9''-hepta-decanyl-2,7-carbazole-alt-5,5-(4',7'-di-2-thienyl-2',1',3'-benzothiadiazole)]) is an attractive material as a semiconducting polymer for organic thin film transistor (OTFT) and organic solar cell (OSC). High power conversion efficiency (~6%) under simulated AM 1.5G solar illumination of bulk-heterojunction solar cell with PCDTBT and [6,6]-phenyl C60 butyric acid methyl ester (PC61BM) blend was reported. In OSC, it is known that the band alignment at the interface between donor and acceptor is critical. Therefore, we studied the interfacial electronic structures of PCDTBT and PC61BM. The polymers are deposited by electro-spray on gold and In-situ x-ray and ultraviolet photoelectron spectroscopy measurements revealed the interfacial electronic structures. We obtained the energy level alignment between two materials and the different interface formation was observed with different deposition order.

Keywords: PCDTBT, PCBM, OSC, PES, Electro spray