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Dip-coating of poly(3,4-ethylenedioxythiophene):poly(styrenesulfonate) anodes for efficient polymer solar cells

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Abstract: The fabrication of anodes and active layers by dip-coating in *indium tin oxide (ITO)*-free polymer solar cells (PSCs) is investigated. A highly conductive poly(3, 4-ethylenedioxythiophene):poly(styrenesulfonate)(PEDOT:PSS) layer was used as an anode while a blend film of poly(3-hexylthiophene) (P3HT) and [6, 6]-phenyl-C61 butyric acid methyl ester (PCBM) employed as an active layer. The transmittance and sheet resistance of dip-coated PEDOT:PSS layers prepared with different thickness were studied. These layers were integrated into PSCs. The PSCs with the dip-coated PEDOT:PSS and P3HT:PCBM films exhibited power conversion efficiencies of 3.21% and 3.03% on glass and *polyethylene terephthalate* substrates, respectively, comparable to those of conventional ITO-based cells. Our research results suggest the feasibility of fabricating PSCs without a traditional spin-coating process and the possibility to substitute the ITO electrodes for conducting polymer films using the facile dip-coating method.

Keywords: Polymer solar cells; Dip coating; PEDOT:PSS film; Organic

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