

Fabrication of Bulk Hetero-Junction Solar Cells by Using P3HT/PCBM Blend

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Fabrication of bulk hetero-junction solar cells was investigated by using blend of [6,6]-phenyl-C61-butyric acid methyl ester (PCBM) and poly (3-hexylthiophene) (P3HT). The ITO (7.9Ω/sq) coated glass substrate was cleaned in TCE, acetone, methanol for 30 min. Thin layer of poly (3,4-ethylene dioxy thiophene) doped with poly (styrene-sulfonate) acid (PEDOT:PSS) was spin-coated at 5000 rpm for 30s on a cleaned ITO-coated glass substrate and dried at 100 oC for 30 min. Photoactive layer (PCBM/P3HT) solution was spin-coated at 4000 rpm for 30s to form 150 (± 5)- nm-thick film. Finally, 100 nm-thick Al metal electrodes were evaporated on top of the active layer. It thickness was measured using surface profiler (alpha step) and the current-density-voltage (I-V) characteristics of the cells were measured both in the dark and under illumination at 80 mW/cm² by using an A.M 1.5 G solar simulator in the air. Power conversion efficiency was obtained reach to 1%. To improve power conversion efficiency, the studying of active layer morphology and thermal annealing effect was considered so far.