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Graphene-Based Polymer Bulk Heterojunction Solar Cells FEI YU, VIKRAM KUPPA, University of Cincinnati — The requirement of exciton dissociation in organic photovoltaics necessitates the presence of a large-area interface accessible to the interior of the active layer. Traditionally, such bulk heterojunctions (BHJ) have been spin-coated from a blend of conjugated polymer and functionalized fullerene molecules. We propose and demonstrate BHJs that utilize chemically modified graphene nanoparticles in order to facilitate charge transfer in polymeric solar cells. Devices based on P3HT:PCBM:graphene were fabricated on patterned ITO glass, and the effect of graphene on performance was investigated. Various device parameters including short-circuit current density, open-circuit voltage, fill factor, power conversion efficiency, and external quantum efficiency are compared with traditional BHJs. Results are discussed in the context of the morphology of the active layer, and the distribution and orientation of graphene platelets, as characterized by SEM, AFM and TEM.

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