

Abstract Submitted
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Molecular-Scale and Nanoscale Morphology of P3HT:PCBM Bulk Heterojunctions: Energy-Filtered TEM and Low-Dose HREM
LAWRENCE DRUMMY, Air Force Research Laboratory, ROBERT DAVIS, DIANA MOORE, Sandia National Laboratory, MICHAEL DURSTOCK, RICHARD VAIA, Air Force Research Laboratory, JULIA HSU, Sandia National Laboratory — The performance of bulk heterojunction organic photovoltaic devices is critically dependent on the morphology of the active layer. Here we describe the combination of two electron microscopy techniques to quantitatively examine the molecular level structure and mesoscopic domain morphology of the active layer of P3HT:PCBM bulk heterojunction solar cells. Energy-filtered transmission electron microscopy (EFTEM) revealed the nanoscopic, interpenetrating fibrillar structure of the phase separated blend, providing unique assignments of the P3HT-rich and PCBM-rich regions. Low-dose high-resolution electron microscopy (LD-HREM) provided direct images of the P3HT crystals and their orientation within the P3HT-rich domains.

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