

Abstract Submitted
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Studies on Morphology of PCPDTBT/Fullerene Bulk Heterojunction Organic Photovoltaics YU GU, THOMAS RUSSELL, University of Massachusetts-Amherst — Low-bandgap conjugated polymer, poly[2,6-(4,4-bis(2-ethylhexyl)-4H-cyclopenta[2,1-b;3,4-b']-dithiophene)-alt-4,7-(2,1,3-benzothiadiazole)] (PCPDTBT), has been used in the active layer of the bulk heterojunction (BHJ) solar cells. Though PCPDTBT has a desirable bandgap, the power conversion efficiency (PCE) of the corresponding solar cells is still lower than the expectation. Grazing incidence wide angle X-ray scattering (GI-WAXS) showed that PCPDTBT is amorphous. Dynamic secondary ion mass spectrometry (DSIMS) and small angle neutron scattering (SANS) confirmed that PCPDTBT and [6,6]-phenyl C61-butyric acid methyl ester (PCBM) were uniformly distributed in the active layers. It is likely that the intimate mixing of the two components leads to a recombination of the free charges and the relatively low PCE. With additives, like 1,8-diiodooctane, the crystallinity of PCPDTBT increases and the PCBM segregates, which leads to improved device performances.

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