

Abstract Submitted
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Influence of copolymer additives on the morphology and performance of bulk heterojunction organic photovoltaics¹ ANTON LI, JOJO AMONOO, BINGYUAN HUANG, PETER GOLDBERG, ANNE MCNEIL, PETER GREEN, Univ of Michigan - Ann Arbor — Device performance of polymer:fullerene photovoltaics is intimately connected to their complex bulk heterojunction morphologies. We incorporated varying amounts a fully-conjugated random copolymer, poly((3-hexylthiophene)-*r*-(3-(hexyl(oxy)methyl)thiophene))), into a blend of poly(3-hexylthiophene) and indene-C₆₀ bisadduct, achieving up to a 20% increase in power conversion efficiency. We attribute part of the improved device performance to a decrease in bimolecular recombination, as measured by photo-induced charge extraction by linearly increasing voltage. Superior carrier transport and collection are in turn correlated to the altered structure of the active layer, both internally and near the electrode interface, as revealed by energy-filtered transmission electron microscopy and atomic force microscopy. These findings illustrate the potential for conjugated copolymers to be versatile tools for tailoring the morphology and energetics of organic semiconductor blends for photovoltaic applications.

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