

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Studies on Morphology of Three-component Polymer Solar Cells YU GU, THOMAS RUSSELL, University of Massachusetts-Amherst — We prepared solar cells with an active layer that contains three components, including poly(3-hexylthiophene) (P3HT), a low bandgap 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) and [6,6]-phenyl C61-butyric acid methyl ester (PCBM). P3HT and PCPDTBT have complementary light absorption spectra such that, in parallel, the two cover a very broad range of the solar spectrum. It has been demonstrated that the power conversion efficiency of the P3HT/PCPDTBT/PCBM system is enhanced over that of either P3HT/PCBM or PCPDTBT/PCBM. Understanding the morphology developed for this system, therefore, can provide valuable insight into enhancing the performance of these technologically relevant and providing a fundamental challenge in controlling the phase behavior of such mixtures that undergo ordering. Morphological studies showed that the crystallization dynamics of P3HT was influenced by the presence of PCPDTBT. There are two domains existing in the thin films, one is pure P3HT domains and another is PCBM-rich domains mixed with amorphous PCPDTBT and P3HT.

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Date submitted: 09 Nov 2011

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