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Morphological robustness in polythiophene/fullerene mixtures¹ SAMEER VAJJALA KESAVA, DEREK KOZUB², Pennsylvania State University, CHENG WANG, ALEXANDER HEXEMER, Advanced Light Source, Lawrence Berkeley National Laboratory, ENRIQUE GOMEZ, Pennsylvania State University, ENRIQUE GOMEZ TEAM, ALEXANDER HEXEMER TEAM — The morphology of the photoactive layer of organic solar cells evolves differently under different processing conditions such as annealing temperature, annealing time and casting solvent. Hence, characterizing it is crucial in understanding its effect on device performance. In our study, we used Grazing Incidence Small Angle Xray Scattering (GISAXS) and Energy-Filtered Transmission Electron Microscopy (EFTEM) to characterize the in-plane morphology of poly(3-hexylthiophene-2,5diyl) (P3HT)/[6,6]-phenyl-C₆₁-butyric acid methyl ester (PCBM) mixtures. We found that the characteristic length scale determined through GISAXS did not vary significantly for different processing conditions thus making P3HT/PCBM a robust system. For example, different spin-casting solvents did not significantly affect lateral phase separation, and consequently, device performance was similar once thickness effects are accounted for.

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