

Abstract Submitted
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Towards quantitative structure-function relationships for organic solar cells DEREK KOZUB, Department of Chemical Engineering, The Pennsylvania State University, KIARASH VAKHSHOURI, ENRIQUE GOMEZ — Organic solar cells belong to a class of devices where the morphology of the active layer has a large impact on device performance. However, characterization of the morphology of organic semiconductor mixtures remains a challenge. We have utilized Grazing Incidence Small Angle X-Ray Scattering (GISAXS), Resonant Soft X-ray Scattering (RSOXS), and Energy Filtered Transmission Electron Microscopy (EFTEM) to characterize the morphology of polythiophene/fullerene mixtures as a function of processing conditions. GISAXS and RSOXS have been used to determine the domain spacing within the active layer, whereas EFTEM has been used to generate images with high contrast between domains. Furthermore, these techniques have been useful in guiding our attempts to control the nucleation of crystals and perturb the structure of the active layer. By comparing our morphological data with device data, we are developing structure-function relationships relevant to organic solar cells.

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