

Abstract Submitted
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Phase Behavior of Polymer Blends for Organic Photovoltaic Applications JILLIAN EMERSON, ERIC FURST, THOMAS EPPS, III, Univ of Delaware — Polymer blends offer a promising and economically-viable route to creating organic photovoltaic (OPV) devices, as blends can form bicontinuous domains via spinodal decomposition. Understanding the phase behavior of conjugated polymer blends commonly used in OPVs is vital to producing more efficient devices. In this work, we determined the Flory-Huggins solvent-polymer and polymer-polymer interaction parameters for a model system of poly(3-hexylthiophene) (P3HT) and polystyrene (PS) through solvent vapor swelling of thin polymer films. From these interaction parameters, we constructed a polymer/polymer/solvent phase diagram. The phase diagram was validated experimentally with solution-based transmission measurements of PS/P3HT. This work highlights a method to determine the phase behavior in polymer/polymer/solvent blends that can be extended to other combinations of macromolecules relevant to organic photovoltaics, composites, and other materials systems.

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