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Polymer blend photovoltaics with conjugated block copolymers as surfactants CHANGHE GUO, MATTHEW WITMAN, KIARASH VAKHSHOURI, Pennsylvania State University, RAFAEL VERDUZCO, Rice University, ENRIQUE GOMEZ, Pennsylvania State University — Conjugated polymer blend photovoltaics are a class of devices where the active layer is composed of a polymer acceptor and a polymer donor. These devices suffer from macrophase separation in the active layer, where it is challenging to kinetically trap domains with characteristic sizes below micron length scales. Thus, for mixtures of poly(3-hexylthiophene) (P3HT) and poly((9,9-dioctylfluorene)-2,7-diyl-alt-[4,7-bis(thiophen-5-yl)-2,1,3-benzothiadiazole]-2',2''-diyl) (PFOTBT), we have synthesized a conjugated block copolymer to act as an A/B surfactant and stabilize a microstructure. The performance of devices where the active layer is composed of P3HT, PFOTBT, and P3HT-PFOTBT block copolymer blends is found to depend on the composition of the mixture and processing conditions. In addition, we have utilized energy-filtered transmission electron microscopy to characterize the morphology of the blends and correlated the microstructure with device performance.

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