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Nanostructured photovoltaic materials using conjugated block copolymer assemblies SARAH E. MASTROIANNI, THOMAS H. EPPS, III, University of Delaware, Chemical Engineering Department — Block copolymers containing a conjugated block offer attractive possibilities for creating nanostructured organic photovoltaic (OPV) devices. Current OPV materials suffer from efficiency losses primarily due to a size-scale discrepancy between exciton diffusion length and domain sizes; excitons that do not reach the interface between electron and hole-conducting materials recombine, preventing charge carrier separation. The inherent nature of block-copolymers to self-assemble into well-defined nanoscale structures with domain spacings on the order of exciton diffusion length offers a potential solution for reducing exciton recombination. In this work, allyl-terminated poly(3-hexyl thiophene) or poly(3-decyl thiophene) acting as electron donors are incorporated into the block copolymer chain via a coupling reaction with poly(styrene) or poly(isoprene-*b*-styrene) derivatives synthesized by anionic polymerization. The resulting block copolymer morphologies are characterized by small angle X-ray scattering and transmission electron microscopy.

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