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Optoelectronic Properties of Conjugated Block Copolymer with Flexible Linking Group ZHIQI HU, Rice Univ, RAFAEL VERDUZCO, Rice University — State-of-the-art organic photovoltaics (OPVs) are prepared by depositing a disordered, co-continuous donor and acceptor blend. While optimization of material processing has produced significant improvements in performance, a fundamental understanding of charge separation and recombination at the donor/acceptor interface is lacking. Block copolymers with donor and acceptor polymer blocks provide an opportunity for controlling the donor-accepter interfacial structure and understanding its relationship to charge separation and photovoltaic performance. Here, we report the synthesis and characterization of donor-*linker*-acceptor block copolymers for use in OPVs. A series of poly(3-hexylthiophene)-block- poly((9,9-dioctylfluorene)-2,7-diyl-alt-[4,7-bis(thiophen-5-yl)-2,1,3-benzothiadiazole]-2',2"-diyl) (P3HT-*linker*PFTBT) are synthesized with flexible oligo-ethylene glycol (PEG) linkers. Photoluminescence measurements demonstrate that the insertion of a non-conjugated linker has a significant impact on energy transfer between the two blocks, and the block copolymers are used as additives for bulk heterojunction OPVs. This work provides insight into the charge separation process and demonstrates a technique for tailoring the donor-accepter interface in OPVs.

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