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Self-Assembly of Conjugated Block Copolymers for Optoelectronic Applications RACHEL SEGALMAN, BRADLEY OLSEN, YUEFEI TAO, UC Berkeley — Recent breakthroughs in the device physics of organic optoelectronics have demonstrated that the interfaces between two conducting organics of different work function play an integral role in the separation of electrons and holes to generate energy in a photovoltaic cell or conversely in the recombination necessary to generate light. Organic optoelectronics can benefit from interfacial design on the 10nm length-scale of an exciton diffusion length, prompting an extension of controlled block copolymer self-assembly techniques to more complex, conjugated backbone polymers. We synthesize a model poly(phenylene vinylene) (PPV) derivative joined to a polyisoprene or poly(ethylene oxide) coil to prepare a series of rod-coil block copolymers. We demonstrate that by careful tuning of sidechain chemistry and block interactions, we can gain insight into the complex self-assembly of these materials. The interplay between the liquid crystallinity of the rod-like PPV block with the microphase separation of the block copolymer and morphological effects on light emitting diodes and luminescent electrochemical cells will be discussed.

Rachel Segalman
UC Berkeley

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