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Controlling the Self-Assembly of Semiconducting Nanocrystals within Conjugated Rod-Coil Block Copolymers BRYAN L. MCCULLOCH, University of California, Berkeley, JEFF J. URBAN, Lawrence Berkeley National Laboratory, RACHEL A. SEGALMAN, University of California, Berkeley — Blends of conjugated polymers and inorganic nanoparticles have been investigated for numerous optoelectronic applications however optimization relies on precise control over the nanoscale morphologies. Here, we show that conjugated rod-coil block copolymers can be designed to self assemble into controllable morphologies with the coil block templating nanocrystal location. We have constructed a model system where nanocrystals are blended with poly(alkoxy-phenylene vinylene-b-2-vinylpyridine) (PPV-b-P2VP), which self assembles into tunable morphologies. Semiconducting nanocrystals reside within the P2VP domain, due to the favorable interactions between P2VP and the nanoparticle surface as well as the exclusionary effects of the liquid crystalline PPV. The placement of the nanoparticles can be tuned by altering domain size, nanocrystal diameter and nanocrystal surface chemistry. These findings are used to develop a comprehensive understanding of the self assembly processes in conjugated rod-coil block copolymer nanocomposites.

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