

Abstract Submitted
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Assembly of conjugated-polymer-based nanostructures driven by solution-state crystallization RYAN HAYWARD, FELICIA BOKEL, EUNJI LEE, BRENT HAMMER, P.K. SUDEEP, EMILY PENTZER, TODD EMRICK, University of Massachusetts Amherst — Conjugated polymers such as regioregular poly(3-alkyl thiophenes), are well known to crystallize into extended one-dimensional nanowires or fibrils. This behavior is not only important for the efficiency of charge transport in device layers, but can also provide a driving force to assemble different optoelectronic components into well- defined nanostructures. We have investigated the assembly of two systems that rely on solution-state crystallization of poly(3-hexyl thiophene) (P3HT). In the first case, co- crystallization of freely dissolved and particle-bound P3HT provides hybrid fibrils of polymers flanked with n-type inorganic nanoparticles. In the second case, crystallization of P3HT-poly(3-triethylene glycol thiophene) diblock copolymers yields fibrils that can form supramolecular helical assemblies in the presence of salt. We seek to elucidate the mechanisms of self-assembly and the optoelectronic properties of the resulting nanostructures.

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