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Synthesis and Phase Behavior of Well Defined Coil-Rod-Coil Block Copolymer Composed of Regioregular Poly(3-hexyl thiophene)
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JIN KON KIM, Department of Chemical Engineering, Pohang University of Science and Technology — We synthesized coil-rod-coil triblock copolymers composed of regioregular poly(3-hexyl thiophene) (P3HT) block via anionic coupling reaction. Two different coil blocks (poly(2-vinyl pyridine) (P2VP) and polyisoprene (PI)) were selected. P2VP-b- P3HT-b-P2VP copolymer was synthesized in a polar solvent of tetrahydrofuran, while PI-b-P3HT-b-PI copolymer was synthesized in a nonpolar solvent of benzene. For the synthesis of both block copolymers, the chain ends of the P3HT were capped by the aldehyde group. When the excess amount of the living P2VP (or PI) anions was used, all of aldehyde-capped P3HT were completely reacted with P2VP (or PI) anions, without leaving any P3HT homopolymer in the product. We also investigated the phase behavior of synthesized block copolymers with various molecular weights and volume fractions of each block component.

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