

Abstract Submitted
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Long-range Order in Self-assembled Poly(3-alkylthiophene)-Diblock Copolymers VICTOR HO, BRYAN BOUDOURIS, RACHEL SEGALMAN, University of California, Berkeley — Poly(3-alkylthiophenes) (P3ATs) are used commonly as active layer components in plastic electronic devices due to their relatively high hole mobilities, low optical band gaps, and their ability to be processed from solution. To date, however, block copolymers containing these molecules as a functional component predominantly have shown nanofibrillar morphologies identical to that of the P3AT homopolymers due to the large thermodynamic driving force for crystallization. We show that by decreasing rod-rod interactions through rational side chain substitution, well-ordered (*e.g.*, lamellar and hexagonally-packed) geometries can be obtained with P3AT-containing diblock copolymers as evidenced by x-ray scattering and electron microscopy. Additionally, we demonstrate that the structural and optoelectronic properties of the P3EHT domains remain in place. The ability to pattern these functional macromolecules on the nanoscale opens many doors for advanced design of organic electronic active layers.

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