

Abstract Submitted  
for the MAR16 Meeting of  
The American Physical Society

**Self-assembly of Open-Shell-containing Block Polymer Thin Films** BRYAN BOUDOURIS, LIZBETH ROSTRO, ADITYA BARADWAJ, JENNIFER LASTER, Purdue University — Radical polymers, where a stable open-shell group is present on each repeat unit of a non-conjugated macromolecular backbone, are emerging as promising materials in organic electronic and magnetic applications. As such, designing molecular motifs that allow for the self-assembly of these open-shell species into nanostructured domains could be beneficial in a host of next-generation flexible electronic applications. In addition, the relatively flexible nature of their macromolecular backbone and ability to conduct charge in the amorphous state offer distinct advantages regarding their self-assembly relative to block polymers based on conjugated semiconducting polymers. Here, we demonstrate the controlled synthesis and self-assembly of diblock copolymers containing radical polymer moieties. In fact, we show that A-B diblock copolymers, where the A moiety contains nitroxide radical functionalities and the B moiety is a closed-shell, low glass transition temperature polymer, self-assemble into ordered structures with domain spacing values that are consistent with common coil-coil diblock copolymers ( $d = 30$  nm). In this way, we present a means by which to readily generate electronically-active macromolecules that self-assemble into nanostructured thin films with controlled morphologies over long ranges.

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Date submitted: 03 Nov 2015

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