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Structure of Rod-Coil Block Copolymer Thin Films R.A. SEGALMAN, B.D. OLSEN, University of California Berkeley and Lawrence Berkeley National Lab — The self-assembly of rod-coil block copolymers confined to thin films demonstrates new and unusual surface effects. Since the rod block does not experience chain stretching and instead undergoes liquid crystalline interactions, the surface induced order of the block copolymer system is drastically modified. Thin films of a model rod-coil block copolymer, poly(alkoxyphenylene vinylene-b-isoprene), form islands or holes with lamellae oriented primarily parallel to the substrate. These parallel lamellae form grains bounded by defect regions consisting of lamellae oriented out of the plane of the film. These defects appear to have long-range interactions with the surrounding grains resulting in regular, angular grain boundaries. As film thickness is increased toward 10 lamellar spacings, the surface induced order dies off and the lamellae at the vacuum interface are entirely oriented perpendicular to the substrate. We will discuss the kinetics of grain growth and the penetration depth of surface induced ordering as a function of thermal history.

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