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Rod-Coil Block Copolymer Self-Assembly in Thin Films B.D. OLSEN, University of California Berkeley, X. LI, J. WANG, Argonne National Lab, R.A. SEGALMAN, University of California Berkeley — Rod-coil block copolymers demonstrate self-assembly behavior distinct from traditional block copolymers due to liquid crystalline interactions between rod blocks and the geometric mismatch between the rigid rod and flexible coil. In thin films, surface segregation and confinement of the block copolymer in one dimension create novel self-assembly effects. Films of a model rod-coil block copolymer less than a few lamellar layers thick demonstrate lamellae oriented primarily parallel to the surface of the film due to a preference for one block to segregate to the interface. Increasing thickness results in a reorientation of lamellae at the free interface to a perpendicular orientation, although parallel orientation persists near the supported interface. While parallel lamellae show a domain spacing similar to the bulk value, the domain spacing of perpendicular lamellae varies with changing film thickness, approaching the bulk value for thicker films. We suggest that this distortion of domain spacing in thin films results from the dilation of block copolymer domains to accommodate defects.

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