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Dislocation Density and Orientational Order of Spherical Microdomains in Shear-Aligned Block Copolymer Thin Films ANDREW MARENCIC, MINGSHAW WU, RICHARD REGISTER, Princeton University, PAUL CHAIKIN, New York University — Studies of annealed monolayers of cylindrical diblock copolymers (striped patterns) showed that the disclination density dictated the orientational correlation length. Here we test the role of dislocations in the orientational order of shear aligned hexagonal patterns. Shearing block copolymer thin films using a viscous fluid overlayer creates long-range orientational order of the microdomains, extending over a centimeter or more, by eliminating grain boundaries. However, some isolated dislocations remain that perturb the both translational and local orientational order of the hexagonal lattice formed by the spherical microdomains in these thin films. Atomic force microscopy was used to image the lattice, and image analysis software was written to determine dislocation density and alignment quality using an orientational order parameter. In such shear-aligned films, a linear relationship between the density of isolated dislocations and the orientational order parameter was found.

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