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Thin film effects on the morphology of diblock and triblock copolymers KAREN SOHN, UCSB, KEN KOJIO, Nagasaki, ROBERT COFFIN, UCSB, BRIAN BERRY, NIST, GUILLERMO BAZAN, EDWARD KRAMER, UCSB, MICHAEL SPRUNG, JIN WANG, ANL — Surface effects in block copolymer thin films cause variations in the morphology from what is expressed in the bulk. The SEBS and SEB systems being studied have a composition such that both spherical and cylindrical morphologies are present in the bulk, depending on the annealing temperature. The bulk order-order transition from cylinders to spheres occurs at 140°C, but in thin films the morphology is more dependent on film thickness and substrate characteristics than the annealing temperature. The morphology of thin films was studied on silicon oxide and polystyrene brushes using SFM and GISAXS. The polystyrene blocks of the SEBS and SEB were deuterated and then studied with d-SIMS in order to determine which block wets the interface with the substrate. For samples annealed at 180°C, SFM shows a cylindrical morphology on SiO₂ substrates in the SEB, but a spherical morphology on the PS brush. GISAXS is used to determine whether the morphology is spheres or perpendicular cylinders. The SEBS shows a spherical morphology by SFM on both substrates.

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