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Unusual Domain Morphology in PS-b-PFS Block Copolymer Films[1] SETH DARLING, MURUGANATHAN RAMANATHAN, Argonne National Laboratory, ELIZABETH NETTLETON, University of South Dakota — Gaining control over the structure and order of self-assembled domains is critical to the success of bottom-up fabrication methodologies. We focus on the self-assembly of polystyrene-block-poly(ferrocenyldimethylsilane) block copolymers (PS-b-PFS). Thin films microphase separate to form nanoscale PFS cylinders within a PS matrix. Traditionally, order in such films is improved using thermal annealing, which has drawbacks including time requirements and possible thermal degradation. In this work, solvent annealing has been used, sometimes in concert with thermal annealing, to gain control over the microphase domain orientation. In addition to orientational control, novel domain morphologies have been observed. Thermochemical techniques and AFM and TEM imaging have been utilized to characterize these materials. Because of the comparatively high etch resistivity of the PFS block, this block copolymer holds potential in lithographic patterning of nanowires, nanopillar arrays, and nanofluidic channels. Some initial patterning results will also be presented.

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