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Thin Film Morphologies of Bulk-Gyroid Polystyrene-block-Polydimethylsiloxane under Solvent Vapor Annealing WUBIN BAI, ADAM HANNON, KEVIN GOTRIK, HONG KYOON CHOI, KARIM AISSOU, Massachusetts Institute of Technology, GEORGE LIONTOS, KONSTANTINOS NTETSIKAS, University of Ioannina, ALFREDO ALEXANDER-KATZ, Massachusetts Institute of Technology, APOSTOLOS AVGEROPOULOS, University of Ioannina, CAROLINE ROSS, Massachusetts Institute of Technology, PROFESSOR CAROLINE ROSS GROUP COLLABORATION, PROFESSOR APOSTOLOS AVGEROPOULOS GROUP COLLABORATION — Thin film morphologies of a 75.5 kg/mol polystyrene-block-polydimethylsiloxane (PS-PDMS) diblock copolymer (SD75) subject to solvent vapor annealing are described. Thin films were spin-cast from 1% solution of SD75 in cyclohexane and annealed in cosolvent vapors consisting of mixed toluene and heptane vapors. The PS-PDMS has a double-gyroid morphology in bulk, but as a thin film the morphology consists of spheres, cylinders, perforated lamellae or gyroids, depending on the film thickness, its commensurability with the microdomain period, and the ratio of toluene:heptane vapors used for the solvent annealing process. The morphologies are described by self-consistent field theory simulations. Thin film structures with excellent long-range order were produced, which are promising for nano patterning applications.

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