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Gradient Solvent Vapor Annealing of Thin Films JULIE ALBERT, TIMOTHY BOGART, RONALD LEWIS, THOMAS EPPS, University of Delaware — The development of block copolymer materials for emerging nanotechnologies requires an understanding of how surface energy/chemistry and annealing conditions affect thin film self-assembly. Specifically, in solvent vapor annealing (SVA), the use of solvent mixtures and the manipulation of solvent vapor concentration are promising approaches for obtaining a desired morphology or nanostructure orientation. We designed and fabricated solvent-resistant devices to produce discrete SVA gradients in composition and/or concentration to efficiently explore SVA parameter space. We annealed copolymer films containing poly(styrene), poly(isoprene), and/or poly(methyl methacrylate) blocks, monitored film thicknesses during annealing, and characterized film morphologies with atomic force microscopy. Morphological changes across the gradients such as the transformation from parallel cylinders to spheres with increasing solvent selectivity provided insight into thin film self-assembly, and the gradient device has enabled us to determine transition compositions and/or concentrations.

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