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Combinatorial Studies of Free Surface Effects on Block Copolymer Thin Films THOMAS EPPS, JULIE LAWSON, THOMAS SCHERR, University of Delaware, MICHAEL FASOLKA, NIST, Polymers Division — To employ block copolymers for many nanoscale templating applications, it is essential to understand how the interfacial interactions originating from the substrate and free surface in ultrathin (\sim nm) films affect block copolymer morphologies. In this work, we manipulated the free surface interactions of poly(styrene-*b*-isoprene-*b*-styrene) and poly(styrene-*b*-ethylene oxide) thin films using solvent vapor gradient libraries. These libraries were created using fluorinated acrylate microfluidic devices consisting of a two-input solvent vapor mixing tree and several discrete solvent vapor flow channels. Areas of the thin films exposed to vapor flowing through the channels were subsequently examined by AFM. Analysis along the discrete vapor gradients showed the expected results for the channels at the extremities (representing the approximately single component vapor streams); however, the channels at intermediate vapor compositions show time-dependent nanostructure behavior that was a function of both vapor composition and distance along the channel.

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