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Functional Thin Films from Aligned Block Copolymers and Blends BRYAN VOGT, ZHE QIANG, KEVIN CAVICCHI, Univ of Akron — Block copolymer (BCP) self-assembly provides a simple, cost effective route to fabricating nanoscale patterns. Here we describe how we can modulate the alignment/orientation of BCP films using a modified solvent vapor anealing (SVA) method where the BCP is covered with an elastomer during SVA and controlled deswelling of the elastomer macroscopically produces a shear force that aligns the BCP domains. By proper selection of the BCP or BCP + functional precursors, functional nanopatterns can be obtained. Thin films of cylindrical forming polystyrene-block-polydimethylsiloxane (PS-b-PDMS) are shear aligned. High temperature calcination converts the PDMS to silica and removes the PS to yield the silica nanolines. The spacing of these features is effectively halved by the use of bilayer films. Sequential shear-alignment of two distinct layers can generate arbitrary line based nanostructured features such as a rhombic array, but the size of the features is defined by the BCP. Oligomeric phenolic resin can effectively modulate the size and morphology of amphiphilic BCPs even at high loadings (¿70 wt

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