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**Minimal Topographic Surfaces for Directed Self-assembly of Cylinder-forming Block Copolymer Thin films with Lateral Order** JAEWON CHOI, KENNETH CARTER, THOMAS RUSSELL, Department of Polymer Science and Engineering, University of Massachusetts Amherst — Controlling the orientation of cylinder-forming block copolymer microdomains in thin films is important for block copolymer applications such as lithographic masks and bit patterned media. However, it is still challenging to produce perfectly ordered cylindrical microdomains with perpendicular orientation over very large areas by using topographical surfaces. Here, we investigate the generation of a single hexagonal array of cylindrical poly(styrene-b-ethylene oxide) (PS-b-PEO) microdomains with perpendicular orientation on minimally patterned surfaces over large areas by thermal annealing without a brush layer. Key factors, such as pattern dimension and film thickness, emerge as being critical for inducing a single grain of perpendicular orientation of PS-b-PEO microdomains over large areas. We systematically investigated the effect of pattern dimension on the generation of perpendicular cylindrical PS-b-PEO microdomains. Furthermore, by solvent vapor annealing, we produced a single grain of parallel cylindrical PS-b-PEO microdomains over large areas on the same minimally patterned surfaces. This simple approach can be an alternative route to achieve the desired orientation of cylinder-forming block copolymer microdomains over large areas.

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