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Minimal Topographic Patterns for Guiding Hexagonal Arrays of Cylindrical Microdomains in Block Copolymer Thin Films JAEWON CHOI, YINYONG LI, University of Massachusetts Amherst, ILJA GUNKEL, Lawrence Berkeley National Laboratory, ZHIWEI SUN, University of Massachusetts Amherst, FENG LIU, Lawrence Berkeley National Laboratory, KENNETH CARTER, THOMAS RUSSELL, University of Massachusetts Amherst — Topographically patterned substrates have been widely studied to control the lateral order of block copolymer (BCP) microdomains in thin films. However, most studies have been focused on deep topographic patterns, where a confinement depth is comparable to or larger than domain spacing of BCP, limiting the grain size of BCP due to the confinement width. Also, the investigation of BCP microdomains using grazing incidence small angle X-ray scattering (GISAXS) is limited because the scattering peaks from BCP are generally hidden by the strong scattering peaks from the deep topographic pattern. Here, we present the use of minimal topographic patterns for guiding hexagonal arrays of cylindrical microdomains of poly(styrene-b-ethylene oxide) (PS-b-PEO) thin films. Since the confinement depth of the minimal pattern is much smaller than domain spacing of BCP, this enables cylindrical microdomains to overcome the confined width, generating macroscopic ordered hexagonal arrays. In the GISAXS experiment, we confirmed that the (10) plane of hexagonal arrays was parallel to the direction of the trench by rotating the sample stage and changing the incident angle of X-ray.

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