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Highly Oriented and Aligned Line Patterns of Block Copolymer over Macroscopic Areas SUNG WOO HONG, DONG HYUN LEE, Department of Polymer Science and Engineering University of Massachusetts Amherst, SOOJIN PARK, School of Nano Bio Chemical Engineering Ulsan National Institute of Science and Technology, TING XU, Department of Materials Science and Engineering / Chemistry University of California Berkeley, THOMAS P. RUSSELL, Department of Polymer Science and Engineering University of Massachusetts Amherst — We describe a novel process to prepare highly oriented and aligned line patterns over arbitrarily large surface areas without the use of photolithography, e-beam lithography, or other process used to chemically or topographically pattern a surface. Thin films of cylinder-forming PS-b-PEO were spin- coated onto the faceted surface of either hard (sapphire) or flexible (PBT) surfaces, and then exposed to THF and water. Scanning force microscopy demonstrated that highly aligned PEO cylindrical microdomains oriented parallel to the surface and normal to the surface facets were obtained over the entire surface. Grazing incidence small angle x-ray scattering (GI-SAXS) and 2D transmission SAXS were performed to characterize the ordering on the nanoscopic level over macroscopic length scales. X-ray results indicated that this film consisted of highly aligned and oriented cylindrical microdomains with no grains or misorientations over large areas owing to the ability of the faceted surfaces to direct the assembly of the block copolymer.

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