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Photo-Activated Replication of Thin Film Block Copolymer Patterns CHRISTOPHER ELLISON, DUSTIN W. JANES, Department of Chemical Engineering, The University of Texas at Austin, CHRISTOPHER J. THODE, Department of Chemical Engineering, The University of Wisconsin-Madison, C. GRANT WILLSON, Department of Chemistry, The University of Texas at Austin, JEONG IN LEE, PAUL F. NEALEY, Institute for Molecular Engineering, University of Chicago — Strategies to replicate nanopatterns formed by the self-assembly of block co-polymer (BCP) thin films could help enable high-throughput nanopatterning technologies. Our approach involves placing liquid compositions between the top surface of a block copolymer thin film and a transparent substrate. Upon irradiation the liquid composition solidifies and covalently binds to the BCP, thus creating a mirror-image copy of the original pattern on the transparent substrate. This replicated pattern serves to direct the assembly of a new BCP thin film, while the wetting characteristics of the original substrate are recovered for use in further replication cycles. The process is scalable to large areas, photo-activated, takes less than 1 h, and occurs below the glass transition of the BCP.

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