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Precise Control of 3-dimensional Block Copolymer Assembly using 2-dimensional Chemical Templates SANGCHEOL KIM, Polymers Division, NIST/Dept. of Materials Science and Engineering, University of Maryland, HAE-JEONG LEE, RONALD L. JONES, ALAMGIR KARIM, Polymers Division, NIST, R.M. BRIBER, Dept. of Materials Science and Engineering, University of Maryland, HO-CHEOL KIM, Almaden Research Center, IBM — Chemically heterogeneous substrates, where the periodicities of the chemical pattern are close to those of lamellar microdomains of block copolymers, have been used as an effective route to align the microdomains with a low number density of defects. Macroscopic chemical heterogeneity is, however, still valuable for providing insights on ordering behavior of block copolymers. Using a series of chemical patterns with micrometers length scales, we studied the wetting and self-assembly behavior of poly(styrene-b-methyl methacrylate) (PS-b-PMMA). We found that the variation in morphology and orientation of microdomains are governed by the degree of chemical contrast and the size of the underlying chemical patterns. The two-dimensional chemical template is shown to precisely control the three dimensional assembly of the block copolymer film.

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