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Controlled Alignment of Lamellar Phase in Thin Films of a Block Copolymer and a Silica Precursor Mixture H.-C. KIM, C. RETTNER, J. CHENG, O.-H. PARK, L. SUNDSTROM, IBM Almaden Research Center — Thin films of block copolymers containing self-assembled microdomains have emerged as a promising method for generating patterns of sub-optical lithographic length scales. Of great interest in semiconductor industry is the line pattern from lamellar phase of block copolymers due to their potential application to fabricate devices with length scales much smaller than those that traditional optical lithography can offer. One of the great challenges in evolving the line patterns from block copolymers into a practically viable device fabrication is the control over alignment of the lamellar microdomains on substrates. In this presentation, we report a simple method to create and control the alignment of robust inorganic line patterns of 20nm half-pitch on surfaces. We used a mixture of an organic diblock copolymer (poly(styrene-b-ethylene oxide), PS-b-PEO) and an organosilicate precursor which is selectively miscible with PEO of the block copolymer. Lamellar phase of the mixture was obtained by controlling the mixing composition. We could control the orientation of lamellar microdomains by applying energetically *neutral* interface between thin films and substrate surface. In-plane alignment of the lamellae was achieved by using a topographic prepatterns generated using an E-beam lithography. We report the energetic calculation to cause the alignment of lamellae on surface along with a simple computational simulation

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