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Discrete Nanopatterns from Block Copolymer Self-Assembly HO-CHEOL KIM, IBM Almaden Research Center, SANG-MIN PARK, CHARLES RETTNER, JED PITERA, IBM ALMADEN RESEARCH CENTER TEAM —
Self-assembled block copolymers in thin films have been studied extensively due to their potential applications to surface patterning alternative to conventional photolithography. In fact, the length scales of microdomains of block copolymers, which range typically 10 nm to 50 nm are very attractive for future technology generations of semiconductor devices. Tremendous progress has been made for controlling the orientation and the lateral placement of microdomains of block copolymers on surfaces as a result of numerous research groups' effort. While continuous periodic patterns with small number density of defects are desirable for most applications, discrete patterns with controlled lateral placement are necessary for fabricating devices as well. In this paper, we report a simple and effective method to create discrete surface patterns from lamellar microdomains of block copolymers. We used topographic surface patterns to control the orientation of lamellar microdomains. This approach provides line/space patterns with desirable length at precisely controlled positions on substrates. Detailed control parameters for this approach will be discussed based on the surface energy of substrates and the confinement of block copolymers.

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