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Enhanced Alignment of Block Copolymer Domains by Controlled Film Thickness and Interfacial Interactions on Chemically Patterned Surfaces HYO SEON SUH, KOOKHEON CHAR, Seoul National University — In this presentation, we focus on the self-aligning behavior of symmetric diblock copolymers on flat but chemically heterogeneous substrates defined by conventional photolithography. Laterally heterogeneous substrates with relatively large feature size ($> 5L_0$) were prepared by the first neutralization of organosilicate (OS) substrates followed by the selective oxidation of the OS substrate using O_2 RIE on a PR pattern placed on the energetically neutral OS substrate. The thermal annealing of block copolymer (BCP) films placed on these substrates resulted in featureless BCP films on the oxidized regions as well as well-defined line patterns aligned perpendicularly to the boundary lines between the two energetically different regions on the OS substrate. We found that these BCP nanostructures were influenced by BCP film thickness as well as the surface energy of the neutral OS region. By varying a set of these parameters, we could successfully obtain energetically favorable and self-aligned BCP films. In addition, we will discuss a strategy for improving the alignment of BCP microdomains while maintaining such parameter sets. Our approach taken here could give an insight on the process windows for the enhanced alignment of microdomains in the directed assembly of BCP thin films.

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