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Consequences of Surface Neutralization in Thin Film Block Copolymers[1] SANGWON KIM, University of Minnesota, Twin Cities, PAUL NEALEY, University of Chicago, FRANK BATES[2], University of Minnesota, Twin Cities — Changes in boundary conditions have been found to induce novel physical phenomena in numerous systems. In this presentation, the consequences of surface neutralization to the structures of thin-film block copolymers were investigated using partially epoxidized poly(styrene-*b*-isoprene) (PS-PI) diblock copolymers. The thickness dependence of thin-film structures, prepared on non-preferential and preferential underlying brushes, were studied using scanning electron microscopy and atomic force microscopy. The PS-PI precursor, without epoxidation, exhibited parallel, layer-by-layer structures covered with one component, and the corresponding hole/island structures had step heights of one bulk lamellar periodicity (L_0), consistent with previous studies. On the other hand, the thin films of epoxidized PS-PI showed perpendicular ordering independent of the thickness above non-preferential brushes, indicative of surface neutralization at both interfaces. The parallel lamellae of epoxidized PS-PI above preferential brushes were characterized as hole/island structures of 0.5 L_0 step heights and the free surface wetting by both components of the diblock copolymers. The formation of the distinctive relief structures was attributed to the surface neutralization from the chemical modification.

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