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Topographically Uniform but Chemically Heterogeneous Nanostructures by Nanoimprinting Demixed Polymer blends ZHEN WANG, DAE-UP AHN, YIFU DING, University of Colorado at Boulder — This study examined the coarsening process of phase-separated polymer blends under physical confinement. The physical confinement was realized by nanoimprinting phase-separated PS (polystyrene)/PMMA (polymethylmethacrylate) blend thin films. The influences of the imprint temperature, blend composition and film thickness on the morphological evolutions were systematically investigated. All the patterned PS/PMMA films showed topographically uniform structure after nano-imprinting, regardless of the surface roughness caused by the initial stage of the phase separation. The morphologies, or the phase structures, of the PS/PMMA patterns were found to be dictated by the preferential wetting of PMMA onto silicon oxide surface. The interplay of this preferential wetting and the domain coalescence resulted in a range of complex and unique encapsulated structures. Furthermore, by inhibiting such preferential wetting of a blend component using a neutralized surface, non-capsulated morphology can be achieved.

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