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Influence of Homopolymers on the Microdomain Behavior of Block Copolymers in 2D Confinement YOUNGKEOL KIM, SUNGYOUL HWANG, GUIDUK YU, KOOKHEON CHAR, Seoul Natl Univ — Constraints imposed by nanometer scale confinement lead to changes in bulk equilibrium behavior of block copolymers (BCPs). Cylindrical pores with diameters corresponding to the length equivalent of several copolymer chains have been employed to investigate the influence of two-dimensional confinement on the behavior of BCPs. In this study, we expand the scope to homopolymer-BCP binary blends. Given fraction of homopolymers, the phase behavior of blends is dependent on molecular weight (Mw) of homopolymers. Lamella- and cylinder-forming poly(styrene-*b*-butadiene) (PS-*b*-PBD) and PS homopolymers (hPS) were drawn into the pores of anodized aluminum oxide (AAO) membranes in the melt by capillary forces. Based on the detailed observation of the morphologies within porous columns, we analyzed the structural transition of BCPs induced by the presence of hPS and confinement. The effect of hPS on the micro-domain of BCPs is greatly accentuated in nanoscale confinement compared to the bulk state due to the entropic loss of polymer chains. Pore diameters of AAO and Mw of the PS-*b*-PBD are also controlled so as to examine the effects of confinement on the phase transition of PS-*b*-PBD/hPS blends.

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