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Effect of Asymmetric Confinement on the Microdomain Morphology of Block Copolymers YOUNGKEOL KIM, Seoul Natl Univ, GUIDUK YU, Samsung Electro-Mechanics, KOOKHEON CHAR, Seoul Natl Univ — Nanometer scale confinement could impose constraints to change the bulk equilibrium behavior of block copolymers (BCPs). The self-assembly of BCPs confined by two parallel surfaces (one-dimensional confinement) has been both theoretically and experimentally studied. More recently, cylindrical pores where the diameter of the pores are only several repeat periods of the copolymers have been employed to investigate the influence of two-dimensional confinement on the behavior of BCPs. However, the analysis on confinement by asymmetric geometry has not been thoroughly studied yet. Given the size of confining channels, singularity arising from the asymmetric geometry such as triangles and squares, could have a significant effect on the structure and symmetry of BCP morphologies self-assembled within such confinement. We prepared AAOs with triangular pores based on aluminum substrates with inverse-hexagonal packing pattern. Based on the detailed observation of BCP self-assembly within porous triangular columns, we analyzed the structural transition of BCPs induced by asymmetric confinement. Furthermore, we found that the packing frustration imposed by such confinement could be released by adding homopolymers into the BCP system.

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