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Fabrication of Network Structure in Block Copolymer Thin Films by Solvent Annealing and Ultrafiltration Ability SUNGMIN PARK, HYUNGJU AHN, Yonsei Univ, YOUNG HUN KIM, PIL J. YOO, Sungkyunkwan Univ, BYEONGDU LEE, Advanced Photon Source, Argonne National Laboratory, DU YEOL RYU[1], Yonsei Univ, YONSEI UNIV TEAM, SUNGKYUNKWAN UNIV TEAM, SKKU ADVANCED INSTITUTE OF NANOTECHNOLOGY TEAM, ADVANCED PHOTON SOURCE, ARGONNE NATIONAL LABORATORY TEAM
— Block copolymer (BCP) structure in nanoscale has attracted much interest due to the needs for various well-defined structures such as photonic crystals, separations, and solar cells. In this study, the thin films of asymmetric polystyrene-block-polymethyl methacrylate (PS-*b*-PMMA) with high molecular weight were prepared and exposed to a neutral solvent vapor. The time-dependent morphologies were investigated using Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM) and Grazing Incidence small-angle X-ray scattering (GISAXS). We observed the structural development from a frozen state to hexagonal cylindrical and gyroid structures in the BCP films during solvent vapor annealing process, where the membrane performance was compared between the two morphologies.

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