

Two different nanoporous morphology of membrane based on poly(vinyl chloride-g-methylmethacrylate) graft copolymer

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An amphiphilic graft copolymer, PVC-g-PMMA, was synthesized via atom transfer radical polymerization(ATRP) and we confirmed the copolymer with nuclear magnetic resonance spectroscopy (^1H NMR), Fourier transform-infrared (FT-IR) spectroscopy, and gel permeation chromatography (GPC) analysis. And also, by wide angle X-ray scattering (WAXS) and transmission electron microscopy (TEM), it was confirmed that the copolymer self-assembled into nanophase domain of PVC main chains and PMMA side chains. We prepared two types of membrane with the copolymer by using THF and DMSO as a solvent. Depending on solvent, the copolymer showed different morphologies like random microphase-separated morphology or micelle morphology. It was attributed to solubility parameter of each monomer. And Nanoporous films with different pore sizes and shapes were prepared through the selective etching of PMMA chains using a combined process of UV irradiation and acetic acid treatment.