

Synthesis of Amphiphilic Copolymer via Free Radical Polymerization and Application to CO<sub>2</sub>/N<sub>2</sub> separation

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A sequential series of comb copolymers consisted of poly(ethylene glycol) behenyl ether methacrylate (PEGBEM) and poly(oxyethylene methacrylate) (POEM) were synthesized via facile and economical free radical polymerization with 2,2'-Azobi(2-methylpropionitrile) (AIBN) as initiator of chemical reaction. The characteristics of synthesized copolymers were analyzed by gel permeation chromatography (GPC), thermogravimetric analysis (TGA), nuclear magnetic resonance (<sup>1</sup>H-NMR) and Fourier transform infrared spectroscopy (FT-IR). The micro-separated phase morphology and crystalline structure were controllable varying the composition, as determined using wide-angle x-ray scattering (WAXS), differential scanning calorimetry (DSC), small-angle x-ray scattering (SAXS) and atomic force microscope (AFM). Because of good solubility with ethanol, the copolymers was able to directly be coated onto a microporous polysulfone support to fabricate composite membranes.