

Hydrophilic, Imidazole-based Copolymer for Polymeric Membrane with High CO₂ Selectivity and Permeability

이창수, 김종학[†]
연세대학교

(jonghak@yonsei.ac.kr[†])

Imidazole compounds have attracted enormous attentions due to its potential to generate clusters, ionic liquids, bio-macromolecules and etc. In particular, 1-vinylimidazole is polymerizable monomer via radical polymerization and can be polymerized into copolymer with other monomers. In this work, we synthesized poly(vinyl imidazole)-poly(oxyethylene methacrylate) (PVIm-POEM) *via* radical polymerization and coated on porous polysulfone (PSf) substrate to prepare composite membrane. The imidazole group in glassy PVIm ($T_g \sim 171$ °C) serves as the facilitated transport pathway with good diffusivity and repetitive ethylene glycol group in rubber POEM ($T_g \sim -50$ °C) plays an important role to enhance the solubility of CO₂. Moreover, more content of POEM in PVIm-POEM resulted in higher selectivity and permeability of composite membrane whereas polymerized POEM (polyPOEM) showed severe defects and Knudsen diffusion due to its too rubbery phase. The PVIm-POEM with 3 to 7 ratio exhibited the best CO₂ permeability of 148.6 Barrer and CO₂/N₂ and CO₂/CH₄ selectivity of 65.3 and 35.0, respectively.