

Gas Separation Membranes Using Stability Improved Ion Gels

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Abstract : Since ionic liquids have a special interaction with gas specially CO₂ and/or olefin, supported ionic liquids membrane (SILM) are fabricated for practical gas separation. However, SILM has a problem in practical application due to the low mechanical stability under high pressure for gas separation. In order to improve the mechanical strength of the selective ionic liquid layer, we prepared supported ion gel membrane by the formation of gel on the surface of Nylon support. The ion gel was prepared by the addition of poly(styrene-block-ethyleneoxide-block-styrene) triblock copolymer in four tricyanomethanide ionic liquids have different cation; 1-ethyl-3-methylimidazolium tricyanomethanide, 1-butyl-3-methylimidazolium tricyanomethanide, 1-butyl-1-methylpyrrolidinium tricyanomethanide, 1-butyl-4-methylpyridinium tricyanomethanide using methylenechloride as a solvent. The characters of ion gel with different cation were studied. Four different gases (CO₂, N₂, O₂, and CH₄) permeance were measured at room temperature by bubble flow meter and cation effect of tricyanomethanide ionic liquids investigated.

Keywords : membrane, ionic liquid, ion gel, nanostructure

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