

일반강연 I -1

Preparation of water-swollen-hydrogel membrane for gas separation. I .

You-In Park and Kew-Ho Lee

*Membranes and Separation Laboratory, Korea Research Institute of
Chemical Technology, P.O.Box 107, Daedeog Danji, Taejeon, 305-606
Korea*

기체 분리용 수팽윤성 분리막 제조. I .

박유인, 이규호

한국화학연구소 고분자소재부 분리소재연구실, 305-606

Water-swollen-hydrogel membranes for gas separation were prepared by dipcoating and thermal crosslinking of poly(vinylalcohol) (PVA) - poly(acrylacid) (PAA) blends on asymmetric porous polyetherimide(PEI) supporters.

The polyetherimide supporters, prepared by phase inversion of polyetherimide solutions in N-methylpyrrolidone(NMP) (composition of PEI/NMP=25/75), had good heat and chemical resistane.

The coating materials with different blending ratios of PVA/PAA(=90/10, 80/20, 70/30) were characterized with differential scanning calorimetry (DSC), infrared spectroscopy(IR) and the water swelling ratios.

The permeabilities and the separation factors of carbon dioxide through these membranes were measured by a mass flow meter and gas chromatograph at different temperatures, respectively, under a vacuum mode of downstream.

The separation factors of carbon dioxide and nitrogen mixture(20/80) were obtained about 100 and the permeabilities of CO₂ ranged from 10⁻⁵ to 10⁻⁶cm³/cm².sec.cmHg.

These membranes showed good stability for a long time operation.

References

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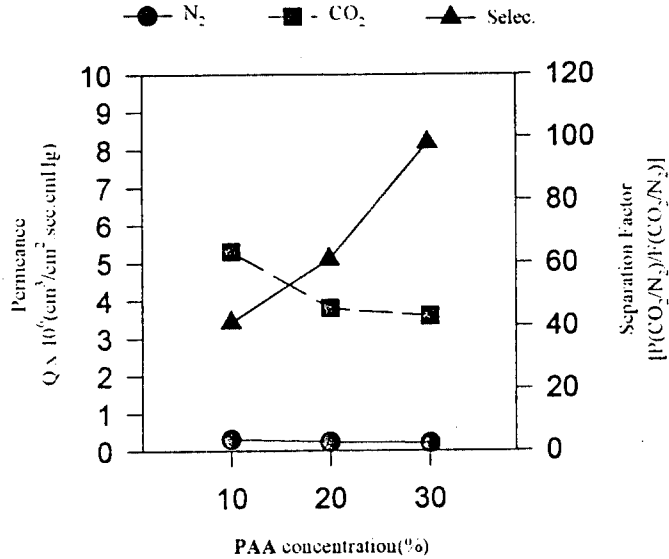


Fig. 1 Gas permeance and selectivities of water-swollen-hydrogel membranes prepared with different concentration of Crosslinking agent

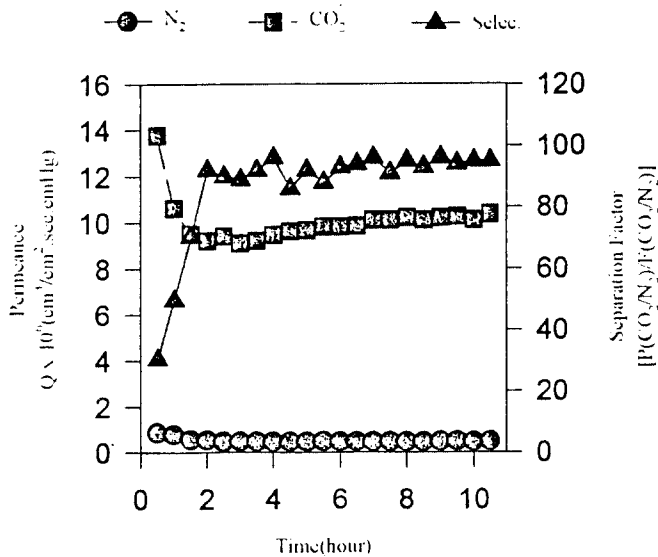


Fig. 2 Long term stability of a water-swollen-hydrogel membrane ; PVA/PAA = 70/30