Synthesis of Poly(amide-imide)/Polydimethylsiloxane Graft Copolymer and the Effect of Mixing with Silicalite on the Pervaporation Property

by

Tsuyoshi SUGIYAMA[*1], Yu NAGASE[*2], Eiichi AKIYAMA[*3] and Hitoshi ITO[*3]

(Received on March 31, 2004 & accepted on May 26, 2004)

Abstract

The synthesis of a polydimethylsiloxane-grafted poly(amide-imide) (PAI-*g*-PDMS) copolymer was carried out by the polycondensation of a diamino-terminated PDMS macromonomer with trimellitic dianhydride chloride followed by chemical imidation. The copolymer membrane and the hybrid membrane with silicalite were prepared by a solvent casting method using NMP solutions, and the pervaporation properties of these membranes were evaluated. These membranes were found to exhibit the organic-permselectivity in the pervaporation of aqueous alcohols and acetone solutions, and the selectivity of PAI-*g*-PDMS membranes increased with an increase of PDMS content. In addition, the PAI-*g*-PDMS/silicalite hybrid membrane exhibited the higher organic-permselectivity than the PAI-*g*-PDMS membrane. Therefore, such a hybrid membrane is expected to be a highly selective and durable pervaporation membrane.

Keywords: *Poly(amide-imide), Polydimethylsiloxane, Graft copolymer, Silicalite, Hybrid membrane, Pervaporation*

---

*1 Graduate Student, Course of Applied Chemistry

*2 Professor, Department of Applied Chemistry

*3 Technology Research Center, Ebara Research Co., Ltd.