



Mixed-matrix membrane prepared from crosslinked PVA with NaA zeolite for pervaporative separation of water–butanol mixtures

Duckkyu Oh^a, Soobok Lee^b, Yongtaek Lee^{a,*}

^aDepartment of Chemical Engineering, Chungnam National University, 220 Gung-dong, Yuseong-gu, Daejeon 305-764, Korea

Tel. +82 42 8215686; Fax: +82 42 8228995; email: ytleee@cnu.ac.kr

^bInterface Materials and Engineering Group, Korea Research Institute of Chemical Technology, 305-600 P.O. Box 107 Yusong, Daejeon, South Korea

Received 15 June 2012; Accepted 11 September 2012

ABSTRACT

The NaA zeolite particles are dispersed in a poly(vinyl alcohol)(PVA) matrix to prepare a mixed-matrix membrane (MMM). Pervaporation characteristics such as a permeation flux and a separation factor are investigated in terms of the feed concentration of *n*-butanol together with a variety of the wt.% of NaA zeolite particles in the membrane. The nano sized zeolite particle of NaA was found to be 63.5 nm. Also, micro sized particle was less than 5 μm. The *n*-butanol concentration was changed from 0.01 to 0.05 mol fraction with an interval of 0.01 mol fraction, while the pressure of permeation side was about 3 mmHg. The wt.% of the NaA zeolite particles varied between 0 wt.% and 5 wt.%. The effect of the NaA zeolite particles was observed that the flux of water through the MMM was a factor of 2.5 increased compared to the pure PVA membrane at the typical operation condition. When the nano-sized of particles was dispersed in the MMM instead of the microsized particles, the flux of water was approximately 20% increased, compared to that through the MMM containing the microsized NaA particles. In addition, the separation factor of water was 5% increased.

Keywords: Pervaporation; *n*-butanol; MMM; NaA zeolite

*Corresponding author.

7th Aseanian Membrane Society Conference (AMS7), 4–7 July 2012, Busan, Korea

1944-3994/1944-3986 © 2013 Balaban Desalination Publications. All rights reserved.