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

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\textbf{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 \textit{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 \textmu m. The \textit{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.

\textbf{Keywords:} Pervaporation; \textit{n}-butanol; MMM; NaA zeolite

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