

Sarawut Pongpattanapanich 2007: Dehydration of Ethanol/Water Mixtures by Polymeric Membrane Pervaporation. Master of Science (Chemistry), Major Field: Chemistry, Department of Chemistry. Thesis Advisor: Associate Professor Cholticha Noomhorm, Ph.D. 70 pages.

Polymeric membranes were prepared having thickness of 28  $\mu\text{m}$  to 30.5  $\mu\text{m}$  from poly(vinyl alcohol), PVA; poly(vinyl alcohol-*co*-ethylene), PVAE; polysulfone, PSF; poly(vinyl alcohol-*co*-ethylene) and poly(sulfone) blend (PVAE:PSF) with weight percent = 7.5, 10.0, 12.5%; 7.5, 10.0, 12.5%; 5.0, 7.5, 10.0%; and 7.5:2.5, 10.0:2.5, 12.5:2.5% respectively. Polymeric membranes from PVAE, PVAE:PSF blend and PSF were obtained by phase inversion process, while polymeric membranes from PVA were obtained by evaporation at ambient temperature. The effects of polymeric materials, hydrophilicity of polymeric materials, polymer concentration of casting solution and water content in ethanol/water (E:W = 90.0:10.0, 95.0:5.0 and 97.0:3.0) feed composition for dehydration of ethanol/water azeotropic mixtures by the prepared polymeric membranes pervaporation in term of water permeate flux and selectivity were investigated. Results showed that water content in the retentate decreases more in hydrophilic PVA than in hydrophobic PSF polymeric membranes but water content in the retentate decreases even more when copolymer combined of hydrophilic and hydrophobic. For water content in feed composition of water: ethanol, it was found that the permeate flux increases with increasing water content in the feed, but selectivity decreases with increasing of water content in feed. Thus, it can be concluded that the order of the polymeric materials effect on cast membranes, polymeric concentration of casting solution, and water/ethanol feed compositions, in pervaporation of water/ethanol azeotropic mixture in term of water permeation flux and selectivity in this study are as followed: PSF-ME > PSF > X-PVA > PVA ~ PVAE-PSF > PVAE and PVAE > PVA ~ PVAE-PSF > X-PVA > PSF > PSF-ME respectively which are in agreement with the water content in the retentate (PVAE > PVA ~ PVAE-PSF > X-PVA > PSF > PSF-M).



Student's signature



Thesis Advisor's signature

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