Thesis Title	Separation of Acetone and Ethyl Acetate from Dilute Solutions by Pervaporation Process
Thesis Credits	12
Candidate	Mr. Oat Kokkamhaeng
Supervisor	Assoc. Prof. Dr. Ratana Jirarattananon
Degree of Study	Master of Engineering
Department	Chemical Engineering
Academic Year	2000

Abstract

The objective of this work was to study the effects of variables on the performance of pervaporation process (PV) for separation of dilute acetone and ethyl acetate aqueous solutions. The PV system was a crossflow flatsheet module. Two kinds of hydrophobic membranes, polyether block amide (PEBA) and polydimethylsiloxane (PDMS) were used in the experiments. The variables studied were the permeate pressure (2 to 15 mmHg), the feed flowrate (91 to 239 ml/min), the feed temperature (30 to 50 ^{O}C), the concentration of acetone in feed (0.1 to 0.5 vol%) and the concentration of ethyl acetate in feed (0.01 to 0.05 vol%). The experiments were also designed to compare the separation of acetone and ethyl acetate solutions and the mixtures of acetone-ethyl acetate-water when the concentrations of each organic were varied from 0.01 to 0.05 vol% under the same conditions.

The results showed that organic flux, water flux and separation factor increased with decreasing permeate pressure but increased with increasing feed flowrate. The organic and water fluxes increased, but the separation factor decreased

with the increasing feed temperature. In case of increasing feed concentration, the organic flux was increased but water flux and separation factor decreased.

For the separation of acetone and ethyl acetate under the same conditions, it was found that the separation of ethyl acetate solution gave higher organic flux, water flux and separation factor than those of acetone solution. In the separation of acetone-ethyl acetate-water mixture, an increase of concentration of one organic component did not affect the other organic flux, separation factor and the water flux. Separation performance of PEBA and PDMS membranes was evaluated as the permeability (Q). It was observed that the permeabilities of organics and water obtained by using PEBA membrane were less than those obtained by using PDMS membrane.

Keywords : Pervaporation / Separation / Flux / Polyether Block Amide / Polydimethylsiloxane / Acetone / Ethyl Acetate / Permeability / Mass Transfer Model