



Mass and heat transport resistance in pervaporation process

Andrzej Noworyta*, Monika Kubasiewicz-Ponitka, Antoni Koziol

*Department of Chemistry, Wrocław University of Technology, 50-370 Wybrzeże Wyspińskiego 27, Wrocław, Poland
Tel. +48 71 3202653; email: andrzej.noworyta@pwr.wroc.pl*

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ABSTRACT

Using a solution-diffusion mechanism, the rate of mass transport in pervaporation process was determined. A method to determine the parameters of the applied model, i.e., mass transport coefficients in the liquid and gas phase and partition coefficients on both sides of membrane surface was presented. Experiments were conducted in phenol-water and p-cresol-water system using a PDMS composite membrane (Pervatech, the Netherlands). Results of vacuum pervaporation were used to calculate mass transfer resistance in the liquid phase and the partition coefficient on the membrane surface. Experimental values obtained in vacuum pervaporation have shown that resistance in the liquid phase is in the range from 10 to 40% of the total resistance and cannot be neglected. The experiments with a sweep gas pervaporation process allowed to determine mass transport resistance in the inert phase, which appeared to be a limiting parameter of the mass transport rate.

Keywords: Vacuum pervaporation; Sweep gas pervaporation; Mass transport; Organic compound

*Corresponding author.