267e Optimization of Membrane Mixtures and Mass Transfer of Supported Liquid Membranes

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Liquid membranes have been considered a promising technology in the last decades. Though intensively discussed models suffer from a lack of accuracy, and limited stability of membranes has still anticipated a breakthrough of this powerful unit operation. Empirical models tend to summarize mass transfer and interfacial interaction with apparent diffusion coefficients. This project has focused on two targets, optimization of membrane composition and mass transfer.

Besides variation of the chemical potential the influence of the composition and transport properties of the mobile membrane phase on mass transfer has been considered. To account for the effect of membrane composition modeling of mass transfer has been based on finite differences. .

Optimization of membrane composition targeted in improved membrane stability as well as mass transfer rate by systematic investigation of different combinations of diluents and modifiers. Besides mass transfer water transport due to osmotic effects has been considered. Investigation has been carried out with the test system Zn^{2+}_{aqu} / bis(2-ethylhexyl) phosphoric acid/ sulphuric acid. Ternary mixtures of bis(2-ethylhexyl) phosphoric acid and alcohols with alcane diluents performed best in mass transfer although viscosity is higher compared with binary mixtures of bis(2-ethylhexyl) phosphoric acid and alcane diluents.