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Theoretical modeling of direct contact membrane distillation (DCMD): effects of operation parameters on flux

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ABSTRACT

In this research, a mathematical model for calculating and predicting flux through direct contact membrane distillation in flat-sheet membrane modules was presented. The membrane properties' and permeate and feed streams' main specifications were considered as model input parameters. The effects of simultaneous heat and mass transfer were investigated. The developed mathematical model was written in Visual Basic language based on heat and mass balances. The influences of process parameters such as temperature, flow rate, feed concentration, and membrane properties (pore size) on flux and temperature polarization coefficient were evaluated by the model. The modeling results were compared with some experimental data and good agreement was observed.

Keywords: Direct contact membrane distillation; Mathematical model; Flux prediction; Temperature polarization

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