MASS FLUX ENHANCEMENT USING SPACER FILLED CHANNELS IN DIRECT CONTACT MEMBRANE DISTILLATION

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This paper describes the effect of spacers on mass flux enhancement for direct contact membrane distillation (DCMD). A novel model is proposed which can predict how mass flux increases when spacers are used. The model was derived for the case where heat transfer coefficients on both sides are equal, bulk temperature differences are less than 10°C, and distilled water is used as feed and permeate solutions. Heat transfer correlations for spacer filled channels, obtained from an analogy between heat transfer and mass transfer, were used in this work. The predictions showed good agreement with the experimental results. The effect of spacers on the temperature polarization is demonstrated. A novel analysis is used to calculate the temperature polarization coefficients, which approach unity in spacer filled channels.