



Effects of channel spacers on direct contact membrane distillation

Yanbin Yun^{a,*}, Jianxin Wang^a, Runyu Ma^b, Anthony Gordon Fane^c

^aCollege of Environmental Science & Engineering, Beijing Forestry University, Beijing 100083, P.R. China
Tel. +86-13241730890; email: y.yanbin@unsw.edu.au

^bCollege of Chemical Engineering, Beijing University of Chemical Technology, Beijing 100029, P.R. China

^cSchool of Chemical Engineering, University of New South Wales, Sydney NSW, 2052, Australia

Received 3 September 2010; Accepted 3 January 2011

ABSTRACT

The effects of spacers on flux enhancement of direct contact membrane distillation (DCMD) had been studied for high concentration NaCl aqueous solution. For DCMD experiments, spacers were filled in different channels of the module. The effects of spacers on temperature polarization and concentration polarization were demonstrated. By contrasting different modes of spacers filling channels, it was found that: (1) the coarse spacer enhanced fluxes up to 30% and heat transfer coefficients by approximately two times over the empty channels; (2) the effect of spacer filled in the hot-side channel on the flux was much bigger than that in the cool-side; (3) The sequence of the spacers effects on flux was: coarse spacer > fine spacer > without spacer.

Keywords: Direct contact membrane distillation; Spacer; Heat transfer; High concentration; NaCl solution; Mass transfer

*Corresponding author.