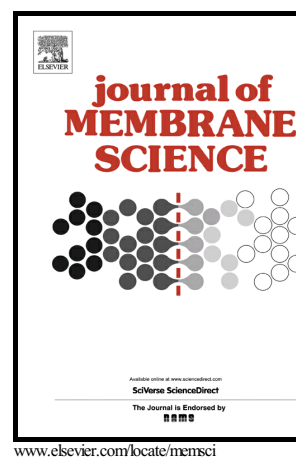


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Sweep gas membrane distillation in a membrane contactor with metallic hollow-fibers

S. Shukla¹, N. E. Benes², I. Vankelecom³, J.P. Méricq¹, M.P. Belleville¹, N. Hengl⁴,

J. Sanchez Marcano^{1*}

¹*Institut Européen des Membranes, Université de Montpellier, CC 047, Montpellier 34095 Cedex 5, France*

²*Universiteit Twente, 7500 AE Enschede, The Netherlands*

³*Centre for Surface Chemistry and Catalysis, Katholieke Universiteit Leuven, Belgium*

⁴*Laboratoire Rhéologie et Procédés, UJF, G-INP, CNRS, BP 53, 38041 Grenoble Cedex 9, France*

ABSTRACT

This work revolves around the use of porous metal hollow fibers in membrane distillation. Various stages are covered, starting from membrane synthesis up to the testing of a pilot scale membrane module. Mechanically stable metal hollow fibers have been synthesized by phase inversion of a stainless steel particle loaded polymer solution, followed by thermal treatment to remove the polymer and sinter the particles together. The pore surface of the metal fibers has been made hydrophobic by functionalization with polydimethylsiloxane or stearic acid. A water evaporation flux of $0.2 \text{ kg h}^{-1} \text{ m}^{-2}$ was obtained at a feed water temperature of 333 K and a sweep gas flow rate of 135 L h^{-1} ($Re_{air}=2458$) with pure water as feed. Under similar operating conditions, an evaporation flux of $0.14 \text{ kg h}^{-1} \text{ m}^{-2}$ was achieved when a 600 g L^{-1} sucrose solution was used as feed.

Key words: *Metallic membranes, hollow fibers, surface modification by PDMS, sweep gas membrane distillation, sucrose solutions.*

*corresponding author: Jose.Sanchez-Marcano@univ-montp2.fr

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