Author's Accepted Manuscript

www.elsevier.com/locate/memsci

Vacuum Film Etching Effect of Carbon Alumina Mixed Matrix Membranes

Yingjun Song, David K. Wang, Greg Birkett, Simon Smart, João C. Diniz da Costa

PII: S0376-7388(17)31222-X
DOI: http://dx.doi.org/10.1016/j.memsci.2017.06.082
Reference: MEMSCI15394

To appear in: *Journal of Membrane Science*

Received date: 27 April 2017
Revised date: 16 June 2017
Accepted date: 27 June 2017

Cite this article as: Yingjun Song, David K. Wang, Greg Birkett, Simon Smar and João C. Diniz da Costa, Vacuum Film Etching Effect of Carbon Alumina Mixed Matrix Membranes, *Journal of Membrane Science* http://dx.doi.org/10.1016/j.memsci.2017.06.082

This is a PDF file of an unedited manuscript that has been accepted fo publication. As a service to our customers we are providing this early version o the manuscript. The manuscript will undergo copyediting, typesetting, an review of the resulting galley proof before it is published in its final citable form Please note that during the production process errors may be discovered whic could affect the content, and all legal disclaimers that apply to the journal pertain

ACCEPTED MANUSCRIPT

Vacuum Film Etching Effect of Carbon Alumina Mixed Matrix Membranes

Yingjun Song[a], David K. Wang[a,b], Greg Birkett[c], Simon Smart[a], João C. Diniz da Costa[a*]

[a]The University of Queensland, FIM^{2}Lab – Functional Interfacial Materials and Membranes Laboratory, School of Chemical Engineering, The University of Queensland, Brisbane Qld 4072, Australia.

[b]The University of Sydney, School of Chemical and Biomolecular Engineering, Darlington NSW 2006, Australia

[c]The University of Queensland, School of Chemical Engineering, The University of Queensland, Brisbane Qld 4072, Australia.

[*]corresponding author: j.dacosta@uq.edu.au Tel.:+61 7 3365 6960 Fax: +61 7 3365 4199

Accepted manuscript

Abstract

This work investigates the preparation and performance of carbon alumina mixed matrix membranes (CA-MMM) by a novel vacuum-assist method by impregnating phenolic resin into a porous alumina substrate followed by pyrolysis. Increasing the precursor concentration from 1 to 20 wt% led to greater carbon pore filling and a reduction in water flux. Systematic recording of vacuum pressure showed a sharp decrease in pressure for vacuum time (t_v) <30 s, followed by an over spike and then a steady state pressure for $t_v \geq 120$ s. A more interesting finding was the key role played by the vacuum time as water fluxes increased by almost three-fold when t_v increased from 90 to 120 s. For instance, water fluxes reached 25 L m^{-2} h^{-1} at 3.5% NaCl feed solution (75 °C) and NaCl rejection or 90%, though as high as 99.7% at 25 °C. A remarkable finding in this work is that the depth of impregnation increased to over 10 μm for $t_v \geq 120$, producing much thicker impregnated films, though delivering much higher water fluxes in desalting water. To explain this

Download English Version:

https://daneshyari.com/en/article/4988459

Download Persian Version:

https://daneshyari.com/article/4988459

Daneshyari.com