

## Author's Accepted Manuscript

Compatibility study of nanofiltration and reverse osmosis membranes with 1-cyclohexylpiperidinium bicarbonate solutions

Birendra Adhikari, Michael G. Jones, Christopher J. Orme, Daniel S. Wendt, Aaron D. Wilson



PII: S0376-7388(16)32230-X  
DOI: <http://dx.doi.org/10.1016/j.memsci.2016.12.017>  
Reference: MEMSCI14942

To appear in: *Journal of Membrane Science*

Received date: 10 November 2016  
Revised date: 9 December 2016  
Accepted date: 9 December 2016

Cite this article as: Birendra Adhikari, Michael G. Jones, Christopher J. Orme Daniel S. Wendt and Aaron D. Wilson, Compatibility study of nanofiltration and reverse osmosis membranes with 1-cyclohexylpiperidinium bicarbonate solutions, *Journal of Membrane Science* <http://dx.doi.org/10.1016/j.memsci.2016.12.017>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and 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 which could affect the content, and all legal disclaimers that apply to the journal pertain

# Compatibility study of nanofiltration and reverse osmosis membranes with 1-cyclohexylpiperidinium bicarbonate solutions

Birendra Adhikari, Michael G. Jones, Christopher J. Orme, Daniel S. Wendt, Aaron D. Wilson\*  
Idaho National Laboratory, P.O. Box 1625 MS 3732, Idaho Falls, ID 83415-3732, USA

\*Corresponding author: Aaron.Wilson@INL.gov

## ABSTRACT

Any forward osmosis (FO) based water treatment process using a thermolytic draw solute requires a method to remove/recycle low concentrations of residual draw solute contained in the product water. For switchable polarity solvent forward osmosis (SPS FO) this means the removal of residual tertiary amines from the product water. This study explores membrane filtration of 1-cyclohexylpiperidinium bicarbonate (CHP-H<sub>2</sub>CO<sub>3</sub>) draw solute under conditions relevant to the SPS FO process. Fourteen commercially available nanofiltration (NF) and reverse osmosis (RO) membranes were screened. Several NF membranes displayed good chemical compatibility at CHP-H<sub>2</sub>CO<sub>3</sub> concentrations of 2.5 weight percent or higher while maintaining fair selectivity, with flux normalized rejection of ~80 - 99% and flux normalized net driving pressure of 80 - 400 psi for the normalized flux of 20 LMH. Most sea water and brackish water RO membranes tested showed flux normalized rejection of above 98% and flux normalized net driving pressure of 300 - 900 psi. A two-pass NF/tap water (TW) RO system is proposed as an effective low-pressure method to remove residual CHP-H<sub>2</sub>CO<sub>3</sub> from water.

Download English Version:

<https://daneshyari.com/en/article/4989340>

Download Persian Version:

<https://daneshyari.com/article/4989340>

[Daneshyari.com](https://daneshyari.com)