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www.elsevier.com/locate/memsci

PII: S0376-7388(18)31204-3
DOI: https://doi.org/10.1016/j.memsci.2018.08.052
Reference: MEMSCI16426

To appear in: *Journal of Membrane Science*

Received date: 18 May 2018
Revised date: 23 July 2018
Accepted date: 25 August 2018

Cite this article as: Yvonne Thiermeyer, Stefanie Blumenschein and Mirko Skiborowski, Solvent dependent membrane-solute sensitivity of OSN membranes, *Journal of Membrane Science,* https://doi.org/10.1016/j.memsci.2018.08.052

Solvent dependent membrane-solute sensitivity of OSN membranes

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Abstract

Organic solvent nanofiltration (OSN) offers great potential as a versatile tool for process intensification in the chemical industry. Nevertheless, the mass transfer mechanism through OSN membranes is not fully understood. The complex interactions between membrane, solvent and solute make it difficult to predict the separation performance of the membrane. In order to increase the fundamental understanding of the underlying transport phenomena systematic experimental investigations were carried out. A matrix of solvents, solutes and membranes was defined, covering a wide range of properties. The selection of the solutes was based on their industrial relevance to cover representative solute properties. Another criterion was their molecular weights, which should be rather low in order to obtain rejection less than 100%, to evaluate potential solute specific impact factors. The separation characteristics of 17 polar to apolar solutes with molecular weights from 114 g/mol to 339 g/mol were investigated. Moreover, five solvents and two membranes were included in the systematic investigation. On the basis of the results different solvent dependent solute sensitivity regions were iden-