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www.elsevier.com/locate/memsci

PII: S0376-7388(18)32013-1
DOI: https://doi.org/10.1016/j.memsci.2018.08.034
Reference: MEMSCI16408

To appear in: *Journal of Membrane Science*

Received date: 21 July 2018
Revised date: 21 August 2018
Accepted date: 21 August 2018

Cite this article as: Farrukh Arsalan Siddiqui, Qianhong She, Anthony G. Fane and Robert W. Field, Exploring the Differences between Forward Osmosis and Reverse Osmosis Fouling, *Journal of Membrane Science,* https://doi.org/10.1016/j.memsci.2018.08.034

# Exploring the Differences between Forward Osmosis and Reverse Osmosis Fouling

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## Abstract

A comparison of alginate fouling in forward osmosis (FO) with that in reverse osmosis (RO) was made. A key experimental finding, corroborated by membrane autopsies, was that FO is essentially more prone to fouling than RO, which is opposite to a common claim in the literature where deductions on fouling are often based solely on the water flux profiles. Our theoretical analysis shows that, due to a decrease in the intensity of internal concentration polarization (ICP), and thus an increase in the effective osmotic driving force during FO fouling tests, the similarity of experimental water flux profiles for FO and RO is in accordance with there being greater fouling in FO than RO. The specific foulant resistance for FO was also found to be greater than that for RO. Possible explanations are discussed and these include the influence of reverse solute diffusion from draw solution. Whilst this explanation regarding specific foulant resistance is dependent on the draw solution properties, the finding of greater overall foulant accumulation in FO is considered to be a general finding.