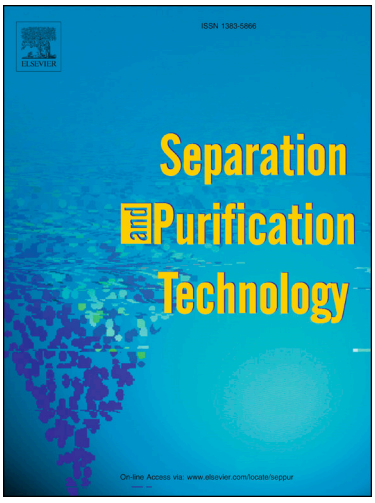

Nanoporous hollow fiber polyethersulfone membranes for the removal of residual contaminants from treated wastewater effluent: Functional and molecular implications

Adewale Giwa, Sudip Chakraborty, Musthafa O. Mavukkandy, Hassan A. Arafat, Shadi W. Hasan

PII: S1383-5866(17)31329-1
DOI: http://dx.doi.org/10.1016/j.seppur.2017.07.058
Reference: SEPPUR 13915

To appear in: *Separation and Purification Technology*

Received Date: 27 April 2017
Revised Date: 16 July 2017
Accepted Date: 21 July 2017

Please cite this article as: A. Giwa, S. Chakraborty, M.O. Mavukkandy, H.A. Arafat, S.W. Hasan, Nanoporous hollow fiber polyethersulfone membranes for the removal of residual contaminants from treated wastewater effluent: Functional and molecular implications, *Separation and Purification Technology* (2017), doi: http://dx.doi.org/10.1016/j.seppur.2017.07.058

Nanoporous hollow fiber polyethersulfone membranes for the removal of residual contaminants from treated wastewater effluent: Functional and molecular implications

Adewale Giwa [a†], Sudip Chakraborty [b†], Musthafa O. Mavukkandy [c], Hassan A. Arafat [d,*§], Shadi W. Hasan [e,*§]

[a-e] Department of Chemical Engineering, Khalifa University of Science and Technology, Masdar Institute, Masdar City, P.O. Box 54224, Abu Dhabi, United Arab Emirates

[b] Department of DIMES, University of Calabria, Via- P. Bucci, Cubo 42/A, 87036 Rende (CS), Italy

*§ Corresponding authors: swajih@masdar.ac.ae; Tel: +971 2 810 9237 (S.W. Hasan); harafat@masdar.ac.ae (H.A. Arafat)

Adewale Giwa [†] and Sudip Chakraborty [†] who both share first authorship of our paper.

Adewale Giwa:

- Department of Chemical Engineering, Khalifa University of Science and Technology, Masdar Institute, Masdar City, P.O. Box 54224, Abu Dhabi, United Arab Emirates, Email: agiwa@masdar.ac.ae

Sudip Chakraborty:

- First affiliation: Department of Chemical Engineering, Khalifa University of Science and Technology, Masdar Institute, Masdar City, P.O. Box 54224, Abu Dhabi, United Arab Emirates
- Second affiliation: Department of DIMES, University of Calabria, Via- P. Bucci, Cubo 42/A, 87036 Rende (CS), Italy, Email: sudip.chakraborty@unical.it

Abstract

Hollow fiber membranes consisting of polyethersulfone (PES) reformed with high proportions of –OH, aryl-N and alkyl-F groups in nonsolvent additives were compared for the removal of residual Cr (VI), COD, and bacteria from treated wastewater effluent by studying the underlying functional and molecular interactions during dope preparation and phase separation. These interactions were also studied and compared in the context of dope and membrane characteristics such as dope viscosity, membrane morphology, water contact angle, functionalities in the fabricated membranes, pure water permeability and rejection of residual solute. The membranes were characterized via Scanning Electron Microscopy (SEM), Fourier Transform Infrared (FT-