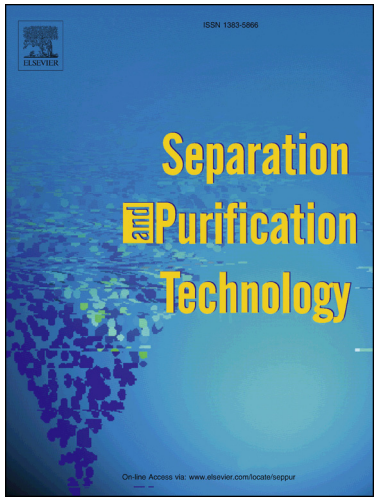

Separation of proteins and antifouling properties of polyphenylsulfone based mixed matrix hollow fiber membranes

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PII: S1383-5866(16)30402-6
DOI: http://dx.doi.org/10.1016/j.seppur.2016.10.040
Reference: SEPPUR 13310

To appear in: *Separation and Purification Technology*

Received Date: 16 May 2016
Revised Date: 23 October 2016
Accepted Date: 24 October 2016

Please cite this article as: L. Arockiasamy Dass, M. Alhoshan, J. Alam, Muthumareeswaran, A. Figoli, A. Kumar, Separation of proteins and antifouling properties of polyphenylsulfone based mixed matrix hollow fiber membranes, *Separation and Purification Technology* (2016), doi: http://dx.doi.org/10.1016/j.seppur.2016.10.040

Separation of proteins and antifouling properties of polyphenylsulfone based mixed matrix hollow fiber membranes

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Abstract:

Polymer mixed matrix membranes are the state-of-the-art materials for membrane based pharmaceuticals and bio-macromolecule separation applications. The present work demonstrates the fabrication of PPSu (polyphenylsulfone) and SPPSu (Sulfonated polyphenylsulfone) / nanoparticle titanium oxide (TiO_2) hollow fiber membranes by phase inversion technique. SPPSu/TiO_2 hollow fiber membranes resulted on higher flux about 25.5 % compare to neat membrane, and with improved thermal and mechanical properties. The tethered of nanoparticle TiO_2 and sulfonation on polymer matrix tailors the surface chemistry of the composite hollow fiber membrane by altering the morphology and water permeability. Cross section morphology was analyzed using a scanning electron microscopy (SEM). Surface topography were scanned using atomic force microscope (AFM) and nanocomposite membrane resulted with smooth surfaces. The pH-dependent surface charge properties of the prepared hollow fibers were determined through electro kinetic analyzer, demonstrating that the sulfonated PPSu blend membrane surface was negatively charged. The prepared membranes were also subjected to rejection ability of varying molecular weights of proteins and assigned the molecular weight cut-off of the membranes. SPPSu/TiO_2 mixed matrix membranes resulted in improved (Rt≈22%) antifouling properties.

Keywords: hollow fiber, PPSu, mixed matrix membrane, Protein separation, nanocomposite, Sulfonated membrane

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