Desalination and Water Treatment
www.deswater.com
18 (2010) 198–205
June
1944-3994 / 1944-3986 © 2010 Desalination Publications. All rights reserved.
doi: 10.5004/dwt.2010.1771

Study of sodium alginate/polysulfone composite nanofiltration membrane

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Received 31 May 2009; Accepted 5 January 2010

ABSTRACT

A novel composite nanofiltration (NF) membrane was prepared by over-coating the polysulfone ultrafiltration membrane with an alginate thin layer. The effects of the membrane preparation techniques and operating conditions on the rejection performance of the composite membranes were studied. The structure of the composite NF membrane was characterized by scanning electron microscopy and infrared spectroscopy. The results suggested that composite membrane with excellent performances was prepared while the concentration of sodium alginate was 2%, the concentration of glutaraldehyde was 0.9%, and the cross-linking time was 4 h at 30°C. Characterization suggested: The salt rejections to Na_2SO_4, $MgSO_4$, NaCl and $MgCl_2$ (1000 mg·L^{-1}) were 87.2%, 21.5%, 32.0%, 12.2%, respectively. And the permeation fluxes were 30.6 L·h^{-1}·m^{-2}, 35.2 L·h^{-1}·m^{-2}, 33.5 L·h^{-1}·m^{-2}, 22.4 L·h^{-1}·m^{-2}, respectively. In addition, the curve about the streaming potential illustrated the negatively charged characteristics of this membrane, with a pressure osmobic coeffi cient of −32.971 mV·MPa^{-1}.

Keywords: Composite nanofiltration membrane; Sodium alginate; Polysulfone ultrafiltration membrane; Salt rejection

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