www.elsevier.com/locate/memsci

Polyol-functionalized Thin-Film Composite Membranes with Improved Transport Properties and Boron Removal in Reverse Osmosis

M. Di Vincenzo, M. Barboiu, A. Tiraferri, Y.M. Legrand

PII: S0376-7388(17)31021-9
DOI: http://dx.doi.org/10.1016/j.memsci.2017.06.034
Reference: MEMSCI15346

To appear in: *Journal of Membrane Science*

Received date: 11 April 2017
Revised date: 12 June 2017
Accepted date: 14 June 2017

Cite this article as: M. Di Vincenzo, M. Barboiu, A. Tiraferri and Y.M. Legrand, Polyol-functionalized Thin-Film Composite Membranes with Improve Transport Properties and Boron Removal in Reverse Osmosis, *Journal o Membrane Science,* http://dx.doi.org/10.1016/j.memsci.2017.06.034

Polyol-functionalized Thin-Film Composite Membranes with Improved Transport Properties and Boron Removal in Reverse Osmosis

M. Di Vincenzo[a,b], M. Barboiu[a], A. Tiraferri[b], Y.M. Legrand[a]

[a]Institut Européen des membranes (IEM), UMR-5635 (Université de Montpellier, ENSCM, CNRS), Place Eugène Bataillon, 34095 Montpellier cedex 5, France

[b]Politecnico di Torino, Department of Land, Environment and Infrastructure Engineering (DIATI), Turin, Italy

[*]Corresponding author. Y.M. Legrand, yves-marie.legrand@umontpellier.fr

Abstract

Thin-film composite membranes comprising modified polyamide layers were cast on an ultrafiltration polysulfone support using sequential interfacial polymerization, thus obtaining bilayer membranes with a final layer of polyols at the surface. A traditional polyamide layer made by interfacial polymerization of trimesoyl chloride and m-phenylene diamine, as well as a reference bilayer membrane with a topmost layer of m-phenylenediamine, were compared with novel bilayer membranes containing N-Methyl-D-glucamine, (±) 3-amino-1,2-propanediol, or serinol functionalizations. Filtration experiments performed with pure water, or with solutions containing 2000 mg/L NaCl and 5 mg/L boric acid, indicated that the water permeance of the modified membranes was improved with no associated loss of salt rejection compared to reference membranes. In particular, functionalization using (±)-3-amino-1,2-propanediol allowed achievement of the highest water flux and the best rejection (NaCl permeance, B, of 0.18 L m^{-2} h^{-1}) with 40% reduction in salt passage compared to the reference membranes (B of 0.26 L m^{-2} h^{-1}). Bilayer membranes also showed enhancement in boron