www.elsevier.com/locate/memsci

Improved separation and antifouling performance of PVA thin film nanocomposite Membranes incorporated with carboxylated TiO_2 nanoparticles

Babak Rajaeian, Anna Heitz, Moses O. Tade, Shaomin Liu

PII: S0376-7388(15)00185-4
DOI: http://dx.doi.org/10.1016/j.memsci.2015.03.009
Reference: MEMSCI13518

To appear in: *Journal of Membrane Science*

Received date: 5 December 2014
Revised date: 5 February 2015
Accepted date: 4 March 2015

Cite this article as: Babak Rajaeian, Anna Heitz, Moses O. Tade, Shaomin Liu, Improved separation and antifouling performance of PVA thin film nanocomposite Membranes incorporated with carboxylated TiO_2 nanoparticles, *Journal of Membrane Science,* http://dx.doi.org/10.1016/j.memsci.2015.03.009

Improved Separation and Antifouling Performance of PVA Thin Film Nanocomposite Membranes Incorporated with Carboxylated TiO_2 Nanoparticles

Babak Rajaeian[a,b], Anna Heitz[a], Moses O. Tade[b], Shaomin Liu[b*]

[a]Department of Civil Engineering, Curtin University, Perth, WA 6845, Australia

[b]Department of Chemical Engineering, Curtin University, Perth, WA 6845, Australia

[*]Corresponding author. Tel.: +61 8 92669056.
Email: shaomin.liu@curtin.edu.au

Abstract

In this study, a series of thin film nanocomposite membranes was developed by coating a surface-modified porous poly (vinylidene fluoride) (PVDF) support with poly (vinyl alcohol) (PVA) doped solution containing TiO_2 nanoparticles. In order to improve the interfacial adhesion of nanoparticles in the PVA blend, an endothermic carboxylation reaction under acidic conditions was carried out on the TiO_2 surface using chloroacetic acid. Electron microscopy studies identified various topographies upon functionalization of the coating and incorporation of TiO_2 nanoparticles. The carboxylation of TiO_2 nanoparticles promoted particle dispersion within the PVA doped solution with significantly reduced particle agglomeration, demonstrating a potential solution to a significant difficulty in the synthesis of state-of-the-art nanocomposite