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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<sub>2</sub> nanoparticles, *Journal of Membrane Science*, <http://dx.doi.org/10.1016/j.memsci.2015.03.009>

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# Improved Separation and Antifouling Performance of PVA Thin Film Nanocomposite Membranes Incorporated with Carboxylated TiO<sub>2</sub> Nanoparticles

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## 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<sub>2</sub> 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<sub>2</sub> surface using chloroacetic acid. Electron microscopy studies identified various topographies upon functionalization of the coating and incorporation of TiO<sub>2</sub> nanoparticles. The carboxylation of TiO<sub>2</sub> 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

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