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PII: S0376-7388(18)32121-5
DOI: https://doi.org/10.1016/j.memsci.2018.09.042
Reference: MEMSCI16487

To appear in: *Journal of Membrane Science*

Received date: 1 August 2018
Revised date: 24 August 2018
Accepted date: 15 September 2018

Cite this article as: Mohamed H. Abdellah, Liliana Pérez-Manríquez, Tiara Puspasari, Colin A. Scholes, Sandra E. Kentish and Klaus-Viktor Peinemann, A Catechin/Cellulose Composite Membrane for Organic Solvent Nanofiltration, *Journal of Membrane Science,* https://doi.org/10.1016/j.memsci.2018.09.042

A Catechin/Cellulose Composite Membrane for Organic Solvent Nanofiltration

Mohamed H. Abdellah[a,1], Liliana Pérez-Manríquez[b,1], Tiara Puspasari[b], Colin A. Scholes[a], Sandra E. Kentish[a], Klaus-Viktor Peinemann[b*]

[a]Department of Chemical Engineering, The University of Melbourne, 3010 Parkville, Australia

[b]Advanced Membranes and Porous Materials Center, King Abdullah University of Science and Technology (KAUST), 23955-6900 Thuwal, Saudi Arabia

[*]Corresponding author: klausviktor.peinemann@kaust.edu.sa

Abstract

In this work, a novel thin-film composite membrane composed of a polyester film on a cellulose support was successfully synthesised. The polyester film was formed from the interfacial reaction between catechin, a bio-derived poly-phenol, and terephthaloyl chloride (TPC). The cellulose support was prepared by non-solvent induced phase separation from a 12.5 wt % cellulose dope solution in 1-ethyl-3-methylimidazolium acetate ionic liquid. The composite membrane was characterized by Fourier Transform Infrared and X-Ray Photoelectron Spectroscopy to confirm the success of the interfacial reaction. Scanning electron and atomic force microscopy were used to study the surface morphology and roughness of the membranes produced. The performance of the composite membranes in terms of solvent permeance and solute rejection was investigated by studying the rejection of a broad range of different molecular weight dyes in dimethylformamide (DMF) solution. The membranes showed an average DMF permeance of 1.2 L m^{-2} h^{-1} bar^{-1} with a molecular

[1] Both authors contributed equally to this work.