Cellulose membranes for Organic Solvent Nanofiltration

F.M. Sukma, P.Z. Çulfaz-Emecen

www.elsevier.com/locate/memsci

PII: S0376-7388(17)31843-4
DOI: https://doi.org/10.1016/j.memsci.2017.09.080
Reference: MEMSCI15620

To appear in: *Journal of Membrane Science*

Received date: 21 July 2017
Revised date: 25 September 2017
Accepted date: 26 September 2017

Cite this article as: F.M. Sukma and P.Z. Çulfaz-Emecen, Cellulose membranes for Organic Solvent Nanofiltration, *Journal of Membrane Science,* https://doi.org/10.1016/j.memsci.2017.09.080

Cellulose membranes for Organic Solvent Nanofiltration

F. M. Sukma[a], P.Z. Çulfaz-Emecen[a]

[a]*Middle East Technical University, Chemical Engineering Department, Ankara, Turkey*

Abstract

Cellulose membranes were fabricated by phase inversion from solutions of cellulose in 1-ethyl-3-methylimidazolium acetate ([EMIM]OAc) as solvent and acetone as volatile cosolvent. The rejection of Bromothymol Blue (624 Da) in ethanol increased and the permeance decreased by increasing the cellulose concentration in the solution prior to coagulation, either by having more cellulose in the starting solution or by evaporating the volatile cosolvent. Drying the membranes after coagulation further increased the dye rejection while decreased the permeance by an order of magnitude. The highest Bromothymol Blue rejection obtained was 94.0% accompanied by a permeance of 0.3 L/h.m^{2}bar with the membrane fabricated from a 20% cellulose - 80% [EMIM]OAc solution and dried after coagulation. The membrane fabricated from a 12% cellulose - 63% [EMIM]OAc - 20% acetone solution and subjected to pre-evaporation before coagulation had 69.8% Bromothymol Blue rejection, with a permeance of 8.4 L/h.m^{2}bar. Overall, the membranes' separation performance was comparable to OSN membranes reported in literature. The rejection for dyes of different charge and polarity was observed to be strongly dependent on solute-membrane interactions, Crystal Violet that did not sorb

*Corresponding author
Email address: zculfaz@metu.edu.tr (P.Z. Çulfaz-Emecen)