

Author's Accepted Manuscript

Polyethersulfone membranes prepared with Rhodiasolv®Polarclean as water soluble green solvent

Tiziana Marino, Enrico Blasi, Sergio Tornaghi, Emanuele Di Nicolò, Alberto Figoli



PII: S0376-7388(17)31621-6
DOI: <https://doi.org/10.1016/j.memsci.2017.12.007>
Reference: MEMSCI15778

To appear in: *Journal of Membrane Science*

Received date: 6 June 2017
Revised date: 28 October 2017
Accepted date: 4 December 2017

Cite this article as: Tiziana Marino, Enrico Blasi, Sergio Tornaghi, Emanuele Di Nicolò and Alberto Figoli, Polyethersulfone membranes prepared with Rhodiasolv®Polarclean as water soluble green solvent, *Journal of Membrane Science*, <https://doi.org/10.1016/j.memsci.2017.12.007>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Polyethersulfone membranes prepared with Rhodiasolv®Polarclean as water soluble green solvent

Tiziana Marino¹, Enrico Blasi¹, Sergio Tornaghi², Emanuele Di Nicolò³, Alberto Figoli^{1,*}

¹*Institute on Membrane Technology (ITM-CNR), National Research Council, Via Pietro Bucci 17/C, 87036, Rende (CS), Italy*

²*IPM s.r.l., Via Madre Teresa 22-20851, Lissone (MB), Italy*

³*Solvay Specialty Polymers, Viale Lombardia 20, 20021, Bollate (MI), Italy*

*a.figoli@itm.cnr.it

Abstract

Polyethersulfone (PESU) porous membranes with high pure water permeability were successfully produced by coupling non-solvent induced phase separation (NIPS) with vapor induced phase separation (VIPS) techniques by employing Rhodiasolv®Polarclean (Polarclean®) for the first time, as eco-friendly sustainable solvent. Membrane morphology and performance were tailored by varying the casting solution composition and the exposure time to controlled humidity and temperature. Polyvinylpyrrolidone (PVP) and poly(ethylene glycol) (PEG) were used as hydrophilic pore former agent and small-molecule liquid, respectively. The resulting membranes were characterized in terms of morphology, thickness, porosity, contact angle, mechanical features, pore size and pure water permeability. The obtained data indicated that the exposure time to humid air as well as the polymer and the PEG concentration in the casting solution represent the most relevant parameters to obtain hydrophilic membranes with different structure and properties. Both ultrafiltration (UF) and microfiltration (MF) membranes, with a pore size ranging from ~0.04 to ~0.4 μm , were efficiently prepared by using the investigated novel solvent, offering the possibility to replace commonly used toxic diluents in polysulfones' membrane fabrication.

Keywords: Polarclean®; green solvent; polyethersulfone membranes; NIPS-VIPS; water treatment.

1. Introduction

Polysulfones are among the most commonly used polymeric materials [1-3]. Polysulfones are amorphous thermoplastics characterized by sulfone group (SO_2) in the main chain along with a

Download English Version:

<https://daneshyari.com/en/article/7020198>

Download Persian Version:

<https://daneshyari.com/article/7020198>

[Daneshyari.com](https://daneshyari.com)