

Accepted Manuscript

Novel high throughput mixed matrix membranes embracing poly ionic liquid-grafted biopolymer: Fabrication, characterization, permeation and antifouling performance

Reda F.M. Elshaarawy, Janina Dechnik, Hassan M.A. Hassan, Dennis Dietrich, Mohamed A. Betiha, Stephan Schmidt, Christoph Janiak



PII: S0167-7322(18)32781-8
DOI: [doi:10.1016/j.molliq.2018.06.100](https://doi.org/10.1016/j.molliq.2018.06.100)
Reference: MOLLIQ 9298
To appear in: *Journal of Molecular Liquids*
Received date: 28 May 2018
Revised date: 22 June 2018
Accepted date: 25 June 2018

Please cite this article as: Reda F.M. Elshaarawy, Janina Dechnik, Hassan M.A. Hassan, Dennis Dietrich, Mohamed A. Betiha, Stephan Schmidt, Christoph Janiak , Novel high throughput mixed matrix membranes embracing poly ionic liquid-grafted biopolymer: Fabrication, characterization, permeation and antifouling performance. Molliq (2018), doi:[10.1016/j.molliq.2018.06.100](https://doi.org/10.1016/j.molliq.2018.06.100)

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 proof before it is published in its final 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.

Novel high throughput mixed matrix membranes embracing poly ionic liquid-grafted biopolymer: fabrication, characterization, permeation and antifouling performance

Reda F.M. Elshaarawy^{a,b,*}, Janina Dechnik^a, Hassan M. A. Hassan^b, Dennis Dietrich^a, Mohamed A. Betiha^c, Stephan Schmidt^d, Christoph Janiak^{a,*}

^a Anorganische Chemie und Strukturchemie Institut, Heinrich-Heine Universität Düsseldorf, 40204 Düsseldorf, Germany.

^b Faculty of Science, Suez University, Suez, Egypt.

^c Egyptian Petroleum Research Institute, Nasr City, Cairo 11727, Egypt

^d Department of Colloidal Adhesion, Organic and Macromolecular Chemistry Institute, Heinrich-Heine Universität Düsseldorf, 40225 Düsseldorf, Germany.

* Corresponding authors

Email: reda.elshaarawy@suezuniv.edu.eg; reel-001@hhu.de

Email: janiak@hhu.de

Abstract

We report a simple and effective protocol for preparation of a poly-ionic liquid (PIL)-grafted chitosan Schiff base (**PILCSB**) and titanium oxide nanoparticles (TNPs) for application as an antibiofouling nanocomposite in the fabrication of new polysulfone (PSU) ultrafiltration mixed matrix membranes (MMMs). The effect new additive (**PILCSB@TNPs**) on the porosity texture, pure water flux (PWF) and antibiofouling profile for modified MMMs was investigated. Interestingly, the surface hydrophilicity of these MMMs was remarkably enhanced in comparison to the neat PSU membrane (M0) as revealed from wettability and water contact- angle results (wettability/ water contact angle = 29.18%/ 93.48° and 83.46%/ 57.35° for M0 and MMM6, respectively).

Keywords: Mixed matrix membranes; PIL-grafted biopolymer; Nanocomposite; Antibiofouling; Water flux.

1. Introduction

During last few decades, the worldwide population has quadrupled while global water demands grown seven-fold [1]. Where by the end of 2030, 3.9 billion people will suffer

Download English Version:

<https://daneshyari.com/en/article/7841881>

Download Persian Version:

<https://daneshyari.com/article/7841881>

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