

Author's Accepted Manuscript

Graphene Oxide-in-Polymer Nanofiltration
Membranes with Enhanced Permeability by
Interfacial Polymerization

Ruirui Hu, Rujing Zhang, Yijia He, Guoke Zhao,
Hongwei Zhu



PII: S0376-7388(18)31052-4
DOI: <https://doi.org/10.1016/j.memsci.2018.07.087>
Reference: MEMSCI16366

To appear in: *Journal of Membrane Science*

Received date: 17 April 2018
Revised date: 11 June 2018
Accepted date: 29 July 2018

Cite this article as: Ruirui Hu, Rujing Zhang, Yijia He, Guoke Zhao and Hongwei Zhu, Graphene Oxide-in-Polymer Nanofiltration Membranes with Enhanced Permeability by Interfacial Polymerization, *Journal of Membrane Science*, <https://doi.org/10.1016/j.memsci.2018.07.087>

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.

Graphene Oxide-in-Polymer Nanofiltration Membranes with Enhanced Permeability by Interfacial Polymerization

Ruirui Hu, Rujing Zhang, Yijia He, Guoke Zhao, Hongwei Zhu*

State Key Laboratory of New Ceramics and Fine Processing, School of Materials Science and Engineering, and Center for Nano and Micro Mechanics, Tsinghua University, Beijing 100084, P. R. China

*Email: hongweizhu@tsinghua.edu.cn

Abstract

Membranes with high permeability and selectivity are desired for energy-efficient liquid separation. In the present work, a highly wrinkled surface and ultrafast water transport channels centered in a graphene oxide (GO)-in-polyamide membrane were prepared by *in-situ* embedding GO nanosheets into the separation layer of a nanofiltration (NF) membrane via an interfacial polymerization. The rough and hydrophilic surface enabled the attraction of large amounts of water molecules to the membrane, and the sub-20 nm membrane thickness and two-dimensional capillary network formed by the stacked GO nanosheets accelerated the transport of water molecules through the membrane. This wrinkled and sandwich structured ultrathin NF composite membrane gave a water flux up to 242 LMH/MPa (nearly four-fold higher than those of reported NF membranes) and an unchanged high salt rejection, simultaneously.

Graphical Abstract

A highly wrinkled surface and ultrafast water transport channels centered in a polyamide membrane are prepared by *in-situ* embedding graphene oxide nanosheets into the separation layer of a nanofiltration membrane by interfacial polymerization, delivering an improved water flux with a high salt rejection.

Download English Version:

<https://daneshyari.com/en/article/7019650>

Download Persian Version:

<https://daneshyari.com/article/7019650>

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