

Author's Accepted Manuscript

Short fiber/polyurethane composite membrane for gas separation

Mohammad Bagher Karimi, Shadi Hassanajili



PII: S0376-7388(17)31845-8
DOI: <http://dx.doi.org/10.1016/j.memsci.2017.08.043>
Reference: MEMSCI15509

To appear in: *Journal of Membrane Science*

Received date: 28 June 2017
Revised date: 14 August 2017
Accepted date: 18 August 2017

Cite this article as: Mohammad Bagher Karimi and Shadi Hassanajili, Short fiber/polyurethane composite membrane for gas separation, *Journal of Membrane Science*, <http://dx.doi.org/10.1016/j.memsci.2017.08.043>

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.

Short fiber/polyurethane composite membrane for gas separation

Mohammad Bagher Karimi^{a,b}, Shadi Hassanajili^{b,*}

^a Department of Polymer Engineering and Color Technology, Amirkabir University of Technology, P. O. Box:
15875-4413, Tehran, Iran

^b Department of Chemical Engineering, School of Chemical and Petroleum Engineering, Shiraz University, Shiraz
71348-51154, Iran

Abstract

In this research, short fiber/polymer composite membranes is introduced for gas separation. Our attempt is to increase the membranes performance by using wide interface between fiber and polymer. Short glass wool fiber (SGWF) was used as a polar micro size reinforcement and was mechanically dispersed in polyurethane matrix. Scanning electron microscope (SEM) images showed that fibers have a good dispersion and adhesion to polymer matrix. In order to survey the phase separation and crystallization behavior of polyurethane segments, differential scanning calorimetry (DSC) and dynamic mechanical thermal analysis (DMTA) were used. The results indicated that polar surface of glass wool is a suitable site for attraction of hard segments. Thermal transition of soft segments were assisted using DMTA. Obtained results were showed that the presence of glass wool fiber remarkably reduced the soft segments glass transition temperature (T_g). Gas permeation properties of membranes were assisted using pure CO₂, CH₄ and N₂ gases. Presence of SGWF caused a simultaneous increase in permeability and ideal selectivity (permselectivity) in a way that composite membranes showed high performance.

* ajili@shirazu.ac.ir

Download English Version:

<https://daneshyari.com/en/article/4988528>

Download Persian Version:

<https://daneshyari.com/article/4988528>

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