

## Author's Accepted Manuscript

Enhanced performance arising from low-temperature preparation of  $\alpha$ -alumina membranes via titania doping assisted sol-gel method

Xianfu Chen, Dong Zou, Yuqing Lin, Wei Zhang, Minghui Qiu, Yiqun Fan



PII: S0376-7388(17)33191-5  
DOI: <https://doi.org/10.1016/j.memsci.2018.04.032>  
Reference: MEMSCI16116

To appear in: *Journal of Membrane Science*

Received date: 13 January 2018  
Revised date: 8 April 2018  
Accepted date: 20 April 2018

Cite this article as: Xianfu Chen, Dong Zou, Yuqing Lin, Wei Zhang, Minghui Qiu and Yiqun Fan, Enhanced performance arising from low-temperature preparation of  $\alpha$ -alumina membranes via titania doping assisted sol-gel method, *Journal of Membrane Science*, <https://doi.org/10.1016/j.memsci.2018.04.032>

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.

# Enhanced performance arising from low-temperature preparation of $\alpha$ -alumina membranes via titania doping assisted sol-gel method

*Xianfu Chen, Dong Zou, Yuqing Lin<sup>1</sup>, Wei Zhang, Minghui Qiu, Yiqun Fan\**

State Key Laboratory of Materials-Oriented Chemical Engineering, College of Chemical Engineering, Nanjing Tech University, Nanjing, 210009, P. R. China

<sup>1</sup> Yuqing Lin is now working in Singapore Membrane Technology Centre, Nanyang Environment and Water Research Institute, Nanyang Technological University

\*Corresponding author: Tel.: +86 25 83172277; Fax: +86 25 83172292.

E-mail: yiqunfan@njtech.edu.cn

## Abstract

A high-efficiency alumina-titania membrane was proposed and fabricated, by using a titania-doping assisted sol-gel method. Two kinds of aqueous titania sols with different particle size distributions were introduced into boehmite sol. The phase transition temperature of alumina from  $\gamma$  to  $\alpha$  phase is prone to reducing with the aid of titania doping of 10 dwb%, thus a good  $\alpha$  phase membrane was obtained under a relatively lower thermal treatment of 1050 °C. Compared to the  $\alpha$ -alumina membrane without the titania addition, the resultant  $\text{Al}_2\text{O}_3$ - $\text{TiO}_2$  membrane presented a better separation precision and higher water permeability. The average pore size was decreased from 16.0 to 9.8 nm, while the pure water permeability was improved from 200 to 233  $\text{L}\cdot\text{m}^{-2}\cdot\text{h}^{-1}\cdot\text{bar}^{-1}$ .

**Keywords:** ceramic membrane, mesoporous,  $\alpha$ -alumina, titania doping, phase transition

## 1. Introduction

Membrane technologies play an increasingly important role in many separation processes in the petrochemical, food, environmental, and other industries [1, 2]. Ceramic membranes have a number of advantages compared to polymeric ones: they offer a higher mechanical strength, they are very resistant to organic solvents and some can be used in rather wide pH and temperature

Download English Version:

<https://daneshyari.com/en/article/7019802>

Download Persian Version:

<https://daneshyari.com/article/7019802>

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