Preparation of PVDF-CTFE hydrophobic membrane by non-solvent induced phase inversion: Relation between polymorphism and phase inversion

Libing Zheng, Jun Wang, Dawei Yu, Yong Zhang, Yuansong Wei

www.elsevier.com/locate/memsci

PII: S0376-7388(17)33085-5
DOI: https://doi.org/10.1016/j.memsci.2018.01.013
Reference: MEMSCI15867

To appear in: *Journal of Membrane Science*

Received date: 29 October 2017
Revised date: 17 December 2017
Accepted date: 8 January 2018

Cite this article as: Libing Zheng, Jun Wang, Dawei Yu, Yong Zhang and Yuansong Wei, Preparation of PVDF-CTFE hydrophobic membrane by non-solvent induced phase inversion: Relation between polymorphism and phase inversion, *Journal of Membrane Science,* https://doi.org/10.1016/j.memsci.2018.01.013

Preparation of PVDF-CTFE hydrophobic membrane by non-solvent induced phase inversion: Relation between polymorphism and phase inversion

Libing Zheng[a,b,c], Jun Wang[c], Dawei Yu[a,c], Yong Zhang[c], Yuansong Wei[a,c*]

a. Laboratory of Water Pollution Control Technology, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing, 100085, China
b. University of Chinese Academy of Sciences, No.19A Yuquan Road, Beijing 100049, China
c. State Key Laboratory of Environmental Aquatic Chemistry, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing, 100085, China

** Corresponding author: 18 Shuangqing Road, Haidian District, Beijing 100085, PR China. Tel.: +86 10 62849109; Fax: +8610 62849109.E-mail: yswei@rcees.ac.cn (Y. S Wei)*

Abstract

Semi-crystalline polymers poly(vinylidene fluoride) and PVDF-based copolymer were common membrane materials which have found broad application. In an attempt to illuminate the relation between phase inversion and the polymer crystalline polymorphism, the effect of LiCl on PVDF polymorphs, membrane morphology, pore structure, hydrophobicity, thermal property, and permeability were investigated for Poly(vinylidene fluoride-co-chlorotrifluoroethylene) (PVDF-CTFE) membrane prepared by non-solvent induced phase inversion method. Both thermodynamic and kinetic effect were observed, and LiCl was found to favor the crystallization process. The phase inversion route and rate were significantly influenced by LiCl, result in the increase of the content of β-phase, membrane crystallinity, thermo-resistance, overall pore size, and pore interconnectivity when increase LiCl content. The surface pore size and porosity increased firstly when LiCl content was lower than 5%, but