



Study on removal of organic matters in water by PVA modified PA-TFC nanofiltration membrane

Quanfu An^{a,*}, Feng Li^b, Yanli Ji^b, Zhenghua Zhang^a, Huanlin Chen^b

^aMOE Key Laboratory of Macromolecular Synthesis and Functionalization, Department of Polymer Science & Engineering, Zhejiang University, Hangzhou, China

Tel./Fax: (+86)-571-87953780; email: anqf@zju.edu.cn

^bDepartment of Chemical Engineering and Bioengineering, Zhejiang University, Hangzhou, China

Received 3 September 2010; Accepted 3 January 2011

ABSTRACT

Polyvinyl alcohol (PVA) modified polyamide thin film composite (PA-TFC) nanofiltration membranes were prepared by the interfacial polymerization of trimesoyl chloride (TMC), piperazine (PIP) and PVA on polysulfone supporting membranes, and were used for separating organic compounds from water. The results show that composite nanofiltration membranes are effective in retaining negatively charged organic compounds with molecular weight higher than 100 Da. For example, rejections to tyrosine, salicylic acid, and terephthalic acid were 63%, 77% and 97%, respectively. The effect of operation pressure, feed temperature, pH value and salt concentration on separation performances was also studied. It is found that both the flux and rejection of PVA modified PA-TFC nanofiltration membranes increase with increasing feed temperature and pH value, and decrease with increasing salt concentration. In detail, the flux and rejection of PVA modified PA-TFC nanofiltration membranes are $J_{\text{water}} = 33.9 \text{ l/m}^2\text{h}$, $R_{\text{chromic acid}} = 99.5\%$ and $R_{\text{NaCl}} = 17.0\%$ in simulated dye wastewater treatment at 25°C and 0.6 Mpa operating pressure, indicating that they are efficient in separating of negatively charged organic compounds and inorganic salts.

Keywords: Polyvinyl alcohol; Polyamide; Interfacial polymerization; Composite membrane; Nanofiltration; Organic matter

*Corresponding author.