Novel sulfonated thin-film composite nanofiltration membranes with improved high water flux and anti-fouling properties

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Abstract

In this paper, a novel sulfonated aromatic diamine monomer ~~was~~ is used to provide the thin-film composite (TFC) nanofiltration (NF) membranes with excellent performance and anti-fouling properties. A sulfonated TFC NF membrane was prepared through an interfacial polymerization technique between amine agents containing 2,5-diaminobenzene sulfonic acid (2,5-DABSS) and piperazine (PIP) in the aqueous phase and trimesoyl chloride (TMC) in the organic phase. The membrane performance results indicated at 50% 2,5-DABSA, water flux reached ~~to~~ 61.2 L/m^2-h ~~which was demonstrated~~demonstrating 34.2% higher water flux compared to membrane provided?? ~~using by~~ PIP without ~~significantly change of~~a significant change in salt rejection. ~~Membrane characteristics were measured~~The membrane was characterized ~~by~~ using FT-IR, SEM, AFM, and contact angle analysis. The Rresults of contact angle and anti-fouling experiments proved that hydrophilicity of the membrane surface improved in the presence of 2,5-DABSA monomer. The high water flux was attributed to the presence of strong hydrophilic sulfonic groups at new polyamide layers ~~which leads~~leading to ~~improving~~ improved membrane anti-fouling ~~property~~properties.

Keyword: Nanofiltration, Interfacial polymerization, 2,5-diaminobenzene sulfonic acid, Anti-fouling, Thin-film composite

1. Introduction

NF membrane filtration technology is one of the most promising techniques ~~for application~~ in water and wastewater treatment systems and plays an important role in the separation technology: because it is cheap, fast, more selective, and flexible to be integrated with other