



Enhanced permeability and antifouling properties of Poly (vinylidene fluoride) / polyaniline ultrafiltration membrane

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Abstract

Poly (vinylidene) fluoride (PVDF) has advantages as a membrane material compared to other commercialized polymeric materials, it is easily dissolved in common organic solvents and has proper asymmetric structure for separation. However, its hydrophobic nature leads to low water flux and makes PVDF membrane easily fouled when treating natural organic matterssolutions. Blending is a modification methodused to improve membrane morphology, increase hydrophilicity, porosity and enhance membrane performance. The aim of this research is to enhance the permeability and antifouling properties of PVDF ultrafiltration membrane by using Polyaniline (PANI) as additive for application in natural organic matter (NOM) removal from water. Two blending methods of aniline were compared, and the synthesized PANI was used as an additive to produce PANI/PVDF modified membranes. Flux and rejection studies, hydrophilicity, porosity, zeta potential, mechanical properties and morphological assessment by scanning electron microscopy were performed. Results show that water permeability and antifouling properties of the modified PVDF membranes were both improved. Water permeability of PANI/PVDF modified membranes were 7-16 times greater than pristine PVDF with humic acid (HA) rejection ranged from 32% to 78%. Water contact angle measurements show improved hydrophilicity of the resultant membrane compared to the pristine membrane. These esults indicate that the use of PANI as additive has improved the properties of PVDF ultrafiltration membranes with good potential for future water treatment applications.