Fabrication and characterization of new PSF/PPSU UF blend membrane for heavy metal rejection

Irfana Moideen K, Arun M. Isloor, A.F. Ismail, Abdulrahman Obaid, Hoong-Kun Fun

ABSTRACT

Polysulfone and polyphenylsulfone-blend ultrafiltration membranes of different compositions were prepared by the phase inversion method, with and without hydrophilic additive poly (ethylene glycol) 1,000 (PEG). The membrane morphology was studied using scanning electron microscope, which displayed the asymmetric structure of the membrane. The hydrophilicity of the membranes was measured by contact angle, porosity, water uptake, and permeability studies. The blend membrane showed enhanced permeability, hydrophilicity, and antifouling property as compared to the pristine polymer membrane. The pure water flux of the membrane, which was blended with PEG additive was relatively higher than the blend membranes without the additive. The flux recovery ratio (FRR) was measured to study the antifouling property. The membranes with PEG additive exhibited better antifouling property with maximum FRR of 72.84%. The heavy metal rejection by the membrane was carried out by complexing the metal ions with polyethyleneimine, which exhibited highest rejection of 99.48 and 95.5% of Pb²⁺ and Cd²⁺, respectively.

Keywords: Polymers; Membranes; Flux recovery ratio; Metal complexes; Heavy metal rejection

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