



Preparation and characterization of PVC/PAN blend ultrafiltration membranes: Effect of PAN concentration and PEG with different molecular weight

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ABSTRACT

The current study investigates the effect of polyacrylonitrile (PAN) addition on morphology and antifouling properties of poly(vinyl chloride) (PVC) asymmetric flat ultrafiltration (UF) membranes. The membranes are prepared via phase inversion method induced by immersion precipitation at different PVC/PAN blending ratio up to 40 wt% PAN. Also, membranes with blending ratio of PVC/PAN:70/30, which showed the highest water flux and flux recovery ratio, were used for membrane preparation with 4 wt% of Polyethylene glycol (PEG) addition in four different molecular weight, 600 Da, 1,000 Da, 6,000 Da and 20,000 Da, which was used as pore former and hydrophilic polymeric additive. The performance of the membranes was studied by using pure water and bovine serum albumin (BSA) as feed at operating pressure of 3 bar. The cross-sections of the fabricated membranes were studied using SEM, and the images showed remarkable changes in morphology and structure of the prepared membranes after PAN and PEG addition. PAN addition led to increment in water flux up to 30 wt% and then decreased. The similar trend was observed in the case of flux recovery ratio. Also, viscosity of polymeric solution, contact angle and porosity of the membranes, antifouling and flux recovery of the membranes were studied.

Keywords: Ultrafiltration blended membranes; Poly(vinyl chloride); Polyacrylonitrile; Desalination; Antifouling

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