



Preparation and characterization of xanthated cotton fiber modified cellulose triacetate ultrafiltration membrane

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ABSTRACT

Cellulose triacetate (CTA)/xanthated cotton fiber (XCF) blend ultrafiltration (UF) membranes were prepared via phase inversion in the absence and presence of 2.5 wt.% additive, namely polyethylene glycol 6000 (PEG 6000). The XCF which can adsorb heavy metal ions was chosen as the modifier. The prepared membranes were characterized using pure water flux, contact angle, rejection of the metal ion solution, flux recovery ratio, and mechanical analysis techniques to investigate the influence of XCF and PEG 6000 on the final properties of the membranes. Membrane cross-sectional structures and surface morphology were characterized by scanning electron microscopy and atomic force microscopy, respectively. The results showed that the permeability, ion adsorption, surface hydrophilicity, and mechanical properties of the ultrafiltration membranes were enhanced greatly. According to molecular weight, the interception rate of heavy metal ions followed this order: Cu(II) > Zn(II) > Ni(II) > Cd(II). Compared with the membranes prepared from pure CTA, the CTA/XCF blend UF membranes possessed better performances.

Keywords: Ultrafiltration membrane; Cellulose triacetate; Xanthated cotton fiber; Heavy metal ions

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