

Fabrication and performance of PSf/CA blend ultrafiltration membrane on effect of different polymer ratio

ABSTRACT

The study is focussed on the fabrication of various polysulfone/cellulose acetate (PSf/CA) polymer ratio with high polymer concentration of 20 wt. % via dry/wet phase inversion technique for membrane performances. These membranes were prepared by blending four different polysulfone/cellulose acetate ratios of 100/0, 90/10, 80/20 and 70/30 in a solvent, known as N-methyl-2-pyrrolidone (NMP). The effect of different polymer ratio on membrane characteristic are discussed in term of flux permeation, morphology, mechanical strength, fourier transform infrared spectroscopy (FTIR) analysis and flux recovery ratio (FRR). The increment of cellulose acetate composition resulted in different behaviours of membrane characteristic. The highest CA ratio (70/30) in PSf/CA composition obtained the highest flux permeation. Meanwhile, the flux recovery of 90/10 wt % membrane achieved the highest flux recovery, 59 % compared to 80/20 wt. % and 70/30 wt. % membranes with values of 12 % and 25 %, respectively. Interestingly, membrane with 80/20 wt. % observed an average improvement in flux permeation with a consistent increased. The formation of uniform finger-like voids in the sublayer of this membrane (80/20) encouraged a good mechanical strength for the membrane structure.

Keyword: Blend membrane; Polysulfone; Cellulose acetate; Polymer ratio