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Preparation and characterization of sulfonated polysulfone and N-phthloyl chitosan blend composite cation-exchange membrane for desalination

Abstract :

Sulfonated polysulfone (sPSf) was prepared and used as a polymer matrix for cation-exchange membranes (CEM). The sulfonation reaction was carried out at room temperature and the degree of sulfonation was calculated by titration method. Blend composite membranes were prepared using different ratios of sPSf and modified chitosan (CS). Membrane properties were studied in terms of water flux, water swelling ratio, molecular weight cut off (MWCO), ion-exchange capacity (IEC) and contact angle measurement. Charge on the membrane was confirmed by ionic diffusion potential (DP). It was observed that, DP increased with the increase in the concentration of sPSf. The membrane sPSf:CS 60:40 showed 1000Da MWCO, 14.6mV diffusion potential (DP) and 0.083mM/g of IEC. Similarly sPSf:CS 90:10 showed 10,000Da MWCO, 71.7mV diffusion potential (DP) and 0.176mM/g of IEC. Moreover, membrane sPSf:CS 60:40 showed 93%, 89% and 69% for MgSO 4, Na 2SO 4 and NaCl rejection respectively.