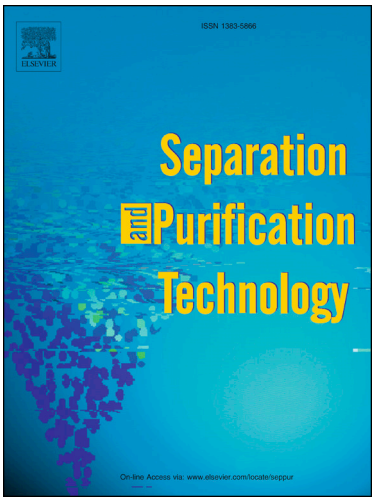

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Parametric Optimisation for the Fabrication of Polyetherimide-sPEEK Asymmetric Membranes on a non-Woven Support Layer

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Abstract

Casting of a novel polyetherimide-sulfonated poly (ether ether ketone) membrane onto a non-woven support layer to improve mechanical strength and robustness of the resulting membrane is studied. The resultant membrane performance is optimised by considering the phase inversion parameters of polymer concentration, casting thickness, casting speed, evaporation time and coagulation bath temperature. Performance analysis was measured by membrane flux and rejection of PEG 10,000, along with structural characterisation of the membrane by SEM. Polymer concentration and coagulation bath temperature had the greatest influence on the final rejection properties of the membrane; increasing rejection from 0.72 to 0.96 when increasing from 16 wt% to 28 wt% and decreasing rejection from 0.95 to 0.60 when increasing the temperature from 3°C to 50°C respectively. Increasing the polymer concentration had the adverse effect of significantly reducing the permeation rate of the membrane from 50 LMH/bar to 1 LMH/bar when increasing from 16 wt% to 28 wt%. Using defined control of the phase inversion parameters the membrane was changed from an open pore ultrafiltration membrane with a molecular weight cut-off of >10 kDa to a much narrower pore size membrane in the nanofiltration range with a molecular weight