

Sulfonated poly(arylene ether sulfone) RO membranes for high water flux and chlorine resistance

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Sulfonated poly(arylene ether sulfone) copolymers containing carboxylic groups (cPES) were successfully prepared by an aromatic substitution polymerization reaction from phenolphthalin (PP), 3,3'-disulfonated-4,4'-dichlorodiphenyl sulfone (SDCDPS), phenolphthalein containing amino group (PPH-NH₂) as novel thin film composite (TFC) reverse osmosis (RO) membrane material for high water flux. TFC membranes were fabricated by an interfacial polymerization reaction with trimesoyl chloride (TMC) and amine solution, containing m-phenylenediamine (MPDA) and cPES, on a polysulfone (PS) ultrafiltration (UF) support membrane. The synthesized copolymers and fabricated membranes were characterized by nuclear magnetic resonance spectroscopy (NMR), Fourier transform infrared spectroscopy (FT-IR), scanning electron microscope (SEM), salt rejection and water permeability measurements. The chlorine resistance is evaluated using sodium hypochlorite (NaOCl) solution. The cPES RO membrane has much higher chlorine resistance than that of PA RO membrane and shows good RO performances such as water flux and salt rejection.