

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

Sang Gon Kim, Ki Tae Park, Byung-Hee Chun, Joona Bang, Sung Hyun Kim*

Department of Chemical & Biological Engineering, Korea University, 1 Anam-Dong, Seongbuk-Gu, Seoul 136-701, Korea
Tel. +82 (2) 3290-3297; Fax +82 (2) 926-6102; email: kimsh@korea.ac.kr

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ABSTRACT

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 (IP) 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 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 (31 L/m²h) and salt rejection (95.1%).

Keywords: Desalination; Reverse osmosis; RO membrane; Sulfonated poly(arylene ether sulfone); Chlorine-resistance

* Corresponding author.