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Preparation and characterization of a thin-film composite reverse osmosis membrane using a polysulfone membrane including metal-organic frameworks

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Abstract

The objectives of this paper were to elucidate the performance of a thin-film composite (TFC) reverse osmosis (RO) membrane by modifying the support layer. In order to improve the hydrophilicity and porosity of the support layer, we prepared a polysulfone (PSf) membrane containing an HKUST-1 [Cu₃(BCT₂)] metal organic framework (MOF) treated with sulfuric acid for the stability of water. N,N-dimethylformamide (DMF)/water was used as the solvent/non-solvent pair, and the TFC RO membrane was formed by the interfacial polymerization of m-phenylene diamine (MPD) in aqueous solution with trimesoyl chloride (TMC) in organic solution on the MOF/PSF support layer. The optimized concentration of MPD-TMC was investigated through XPS, and the manufactured membrane had a thin, smooth film when paired with a hydrophilic and porous support layer. The

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