



A novel strategy to fabricate thin film nanocomposite reverse osmosis membranes with enhanced desalination performance

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ABSTRACT

A novel strategy to fabricate thin film nanocomposite (TFN) membrane was reported by dispersing nanofillers in the aqueous and organic phase simultaneously via interfacial polymerization of *m*-phenylenediamine and trimesoyl chloride. Two different nanofillers (hydrophilic MCM-48 and hydrophobic ZIF-8) were used to investigate the new strategy. Both hydrophilic MCM-48 and hydrophobic ZIF-8 can effectively improve the separation performance of the TFN membrane with higher water flux value maintaining high salt rejection via the novel strategy than conventional TFN membrane prepared with same total amount nanoparticles in singly organic phase or aqueous phase. It indicates that the new strategy is feasible to obtain the TFN membrane with excellence separation performance compared with the conventional method by dispersing nanofillers in singly phase. The new strategy is realized by dispersing less amount nanofillers in both phases simultaneously, which is possible to avoid the aggregation of nanoparticles and maximize the effect of nanoparticles.

Keywords: Reverse osmosis membranes; Thin film nanocomposite; Interfacial polymerization; Nanofiller; Polyamide

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