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Probing influences of support layer on the morphology of polyamide selective layer of thin film composite membrane

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Abstract

In this work, the influences of polysulfone (PSf) support layer on the morphology of polyamide (PA) selective layer was investigated. Interfacial polymerization was conducted on PSf support layers with different surface pore size or at the bulk interface. The bottom surface of PA layer was exposed by carefully dripping *N,N*-dimethylformamide onto the back side of thin film composite membranes. Morphological study showed that the porous structure of the bottom surface of PA layer was always accompanied by PSf layer with small surface pores. Conversely, when synthesized on PSf layer with large surface pores or at the bulk interface, this porous structure turned into featureless flat areas. In addition, the top side ridge-and-valley structure was also found to be linked to the porous structure on the bottom side. Based on the observations, a “nascent particles aggregation” model was proposed. By investigating how the morphology of PA layer was swayed by PSf layer, better understanding regarding the correlation between membrane performance and support layer properties could be obtained.

Keywords

Polysulfone; interfacial polymerization; thin film composite membrane; support layer; morphology

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