



Study on the evolution of reinforced PVDF hollow fiber membrane morphology and strong hydrophobicity

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ABSTRACT

Reinforced polyvinylidene fluoride (PVDF) hollow fiber membranes that contained hollow braided tube and coated surface were prepared by concentric circles spinning method. The braided tube was prepared by two-dimensional braided technique using polyester (PET) filaments, while PVDF as the coated surface was obtained by nonsolvent-induced phase separation method. The effects of vapor-bath time on the structure and morphology of hollow fiber membrane were investigated, and the results could be concluded: (1) Extension of vapor-bath time would induce the roughness of coated surface which was observed by atomic force microscopy (AFM). When the vapor-bath time was 18 h, the static water contact angle reached as high as 139.2°; (2) Not only the porosity but also the mean pore size of the hollow fiber membranes was promoted as the increase of vapor-bath time. However, the liquid entrance pressure decreased obviously; (3) The characterization of membranes' cross-section morphologies disclosed that the evolution of pore's morphology switched from fingerlike to spongelike when the coagulation condition changed.

Keywords: Polyvinylidene fluoride (PVDF); Two-dimensional braid; Reinforced; Hollow fiber membrane; Vapor-bath

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