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Fabrication of hierarchical poly (vinylidene fluoride) micro/nano-composite membrane with anti-fouling property for membrane distillation

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Abstract:

Hierarchical poly (vinylidene fluoride) (PVDF) micro/nano-composite membranes were fabricated by the immersion-deposition method. As a practical surface modification way, the immersion-deposition was explored to obtain superhydrophobic membranes via coating SiO_2 nanoparticles onto PVDF membrane surface, following by fluoroalkylsilane coupling agents 1H, 1H, 2H, 2H - perfluorooctyltrichlorosilane (PFOTS) grafted on the silica. As a binder, PVDF was applied to immobilize silica nanoparticles in the process of modification. A variety of techniques were performed to examine the effects of surface modification on surface morphology, chemical composition and wettability of derived membranes, such as scanning electron microscopy (SEM), atomic force microscopy (AFM), attenuated total reflectance-Fourier transform infrared spectroscopy (ATR-FTIR) and contact angle goniometry. The surface modification endowed the membrane surface superhydrophobicity, deriving from the hierarchical structures with PVDF