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Using Nanofiber-Like Attapulgite Microfiltration Membranes to Treat Oily Wastewater

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Abstract : The environmentally acceptable disposal of oily wastewater is a current challenge to many industries. The membrane separation technologies, which is no phase change, without pharmaceutical dosing, reprocessing costs low, less energy consumption, etc., have been widely applied in oily wastewater treatment. In our lab, a kind of low cost ceramic microfiltration membranes with a separation layer of attapulgite nanofibers (attapulgite nanofiber-like microfiltration membranes) has been prepared and applied in the purification of cellulase fermentation broth and TiO2 nanoparticles system successfully. In this paper, this new attapulgite nanofiber-like microfiltration membrane was selected to try to separate water from oily wastewater. The oil-in water emulsion was obtained from mixing 1 g/L engine oil, 0.5 g/L Tween-80, 0.5 g/L Span-80 and distilled water at mild speed in blender for 2 min. The particle size distribution of the oil-in-water emulsion was controlled. The maximum steady flux and COD rejection for a 0.2 um attapulgite nanofiber-like microfiltration membrane can reach about 450 L. m-2. h-1 and 98% at 0.2 MPa. The results obtained in this work indicated that the attapulgite microfiltration membrane may represent a feasible pretreatment for oily wastewater.

Keywords : attapulgite, microfiltration membrane, oily wastewater, cross-flow filtration
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