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Investigation of impact of carbon nanotubes on a polysulfone membrane for oil - water treatment

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Blended polysulfone (PSF) membrane was produced by the immersion precipitation phase inversion method using three different solvents: Chloroform, dimethylformamide and tetrahydrofurane. Multi - walled carbon nanotubes (MWCNTs) functionalized by acid treatment were synthesized using chemical vapour deposition. Scanning Electron Microscope (SEM) was used to view the morphology of the blended membrane and CNTs. The Raman spectroscope was used to confirm the functionalization of the MWCNTs by comparing the defects on the CNTs introduced by acid treatment. It was found that the Flux, permeation properties, Selectivity improve with the content in MWCNTs composition in the polymeric membrane. The membrane with the most MWCNTS composition (0.4% w/w CNTS) demonstrated the highest flux and solute rejection. The blended polysulfone membrane produced with the three different solvents with functionalized MWCNTs increase the permeate flux. The greatest effect of blending with functionalized MWCNTs was experienced by the polysulfone membrane produced from the dimethylformamide solvent since it had the highest increase percentage of 97.87.

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