Effect of Polyethersulfone (PES)\Al_2O_3 Nanoparticle Composite Membrane on Water Treatment

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Abstract

Synthetic membranes have become the focus of separation processes indifferent industries. Common problems faced by polymeric membranes, such as high hydrophobicity, exposure to biofouling, low fluxes and low mechanical strength. To improve these disadvantages the incorporation of nanoparticles into polymeric membranes has been the trend of our study. Polyethersulfone (PES)\Al2O3 nanoparticle composite membrane was prepared by inverse phase separation method. Synthesized membrane was characterized by SEM images of the membrane surface and cross-section were used to determine the membrane surface porosity, mechanical testing, TGA, permeability and rejection test, porosity measurement and pore size distribution were determined. This study aimed at investigating the Cr (III), Cd (II) and Pb (II) removal efficiencies by using the newly synthesized metal oxides/ polyethersulfone (PES), (PES)\Al2O3 membrane from synthetic wastewater and exploring fouling mechanisms. The results showed that about 99 % and 88 % removal efficiencies were achieved by the tested membrane for Pb (II) and Cr (III), respectively.

Key words: Polyethersulfone**,** Metal oxide nanoparticles, Permeability, polymeric membranes

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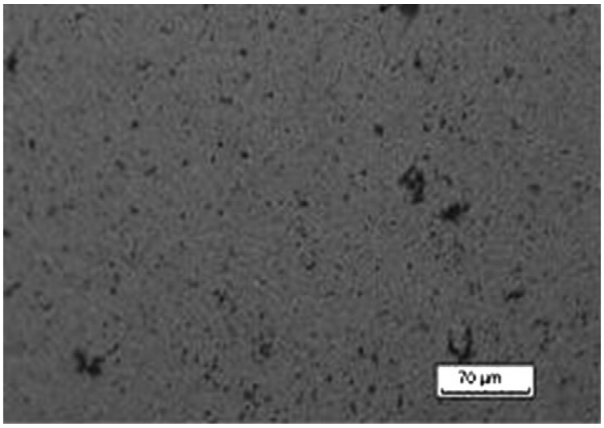
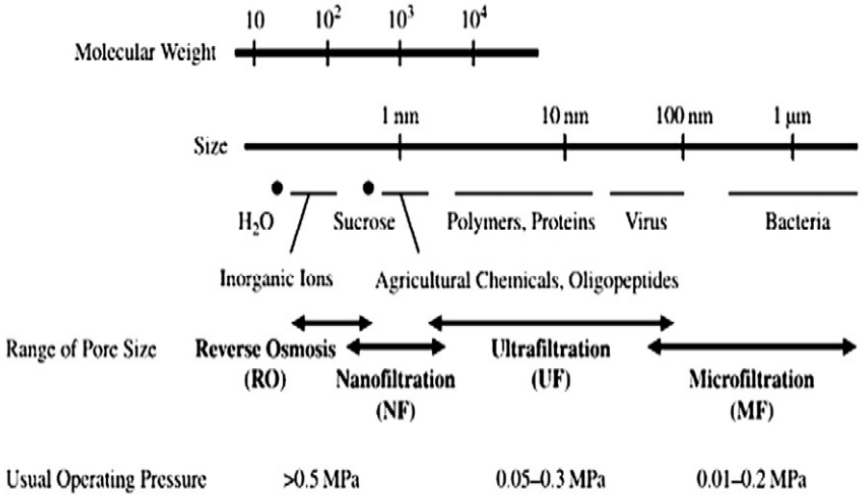


Differential coefficient interference pattern of Al2O3-particle distribution in the modified membrane.



Pore size range of various membranes.