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Acrylamide Functionalized Graphene oxide/Polyephenylsulfone (FGO/PPSU) Nanocomposite Membrane: Enhanced hydrophilicity, permeability, retention and fouling resistance

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ABSTRACT

(FGO/PPSU) nanocomposite membranes were prepared by electrospinning method. Acrylamide was used for functionalization of GO via RAFT polymerization. Fourier transform infrared spectroscopy (FTIR), field emission scanning electron microscopy (FESEM) and thermogravimetric analysis (TGA) was used to confirm the surface modification of (GO/PPSU).

The performance of the nanocomposite membranes was investigated in detail for water permeability, salt rejection, removing heavy metals, protein antifouling and dye removal.

Keywords: Polyephenylsulfone, Nanocomposite, Membrane

1. INTRODUCTION

One of the major challenges of modern society is providing adequate water resources with desirable quality for various designated uses. To address this challenge: Membrane technology is a rapidly growing research area with several applications such as desalination and water purification. [1]

Among other potential membrane materials, (PPSU) is an amorphous high performance engineering polymer that is reported to offer more toughness, strength, rigidity, hydrolytic stability, chemical and mechanical resistance than other polymer materials, and capacity to operate at high temperatures. Its glass transition temperature of 220 C is higher than that of polysulfone (190 C) and almost equal to that of polyethersulfone (225 C). However, PPSU has a higher solvent resistance than other polymers. [2, 3]

Nanocomposite membranes, as new class materials with nanomaterials, which fabricated by combining polymeric materials with nanomaterials, are emerging as a promising solution to these challenges. The advanced nanocomposite membrane could be designed to meet specific water treatment applications by tuning their structure