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Heba Abdallah, Radwa Taman, Dina Elgayar, Hassan Farag

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Heba Abdallah^{a*}, Radwa Taman^b, Dina Elgayar^b, Hassan Farag^b

^a Chemical Engineering and Pilot Plant Department, Engineering Research Division, National Research Centre, Dokki, Giza, Egypt.

^b Chemical Engineering Department, Faculty of Engineering, Alexandria University, Alexandria, Egypt.

* **Corresponding Author:**

Dr. Heba Abdallah
Chemical Engineering and Pilot Plant Department,
Engineering Research Division, National Research Centre (NRC),
33 El Bohouth St. (Former El Tahrir St.), Dokki, Giza, Egypt
PO box 12622, Dokki, Giza, Egypt
Affiliation ID: 60014618, Tel: 202 33335494
Fax: 202 33370931
E-mail: heba_nasr94@yahoo.com

Abstract

Polyvinylidene fluoride/ polyethyleneimine (PVDF/PEI) membranes were prepared using the phase inversion technique for oil separation. The membranes were described by scanning electron microscopy (SEM), Fourier transforms infrared (FTIR) spectrophotometer, contact angle, Thermogravimetric analysis (TGA) and mechanical properties. The membrane performance was tested using a synthetic emulsion solution of different percentages of oil and real salty emulsion oil from the Gulf of Suez Petroleum field. The results indicate that using M3 (0.5% wt PEI) provides the highest oil removal percentage (95% at 0.1 g oil/ L). While, M5 (0.9% wt PEI) provides highest permeate flux (180 L/m².h at 0.1 g oil/ L). Increasing PEI blending percentage leads to increase in the membranes hydrophilicity and decrease in membrane contact angle. Blending with PEI enhances the mechanical properties of prepared membranes. Bacteria removal test was applied on prepared membranes, where the results indicate that M3 (0.5% wt PEI) and M4 (0.7% wt PEI) present highest removal percentage for coliform bacteria. Fouling test was applied on M1 (bare PVDF) and M3 (0.5% wt PEI) which indicates that flux recovery reached 98% using M3 (0.5% wt PEI) with very low irreversible resistance 0.93%.

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