

## **Preparation, modification, characterization, and evaluation of modified poly (vinyl chloride) (PVC) ultrafiltration membranes for water treatment applications**

**M A Abd El-Ghaffar and Hossam A Tieama**  
National Research Center, Egypt

**D**ue to the hydrophobicity of poly vinyl chloride (PVC), the application of PVC membranes has been limited. In this paper, poly (ethylene imine) (PEI) was introduced as the second polymer component to hydrophilized PVC ultrafiltration membranes. The miscibility of PVC/PEI blends in Tetrahydrofuran (THF) at a certain proportion range was characterized by the solubility parameter, glass transition temperature and contact angle of membrane, casting solution viscosity. Using glycerol

or ethylene glycol (EG) as additives, asymmetric poly (vinyl chloride) (PVC) ultrafiltration membranes and the blended ones PVC/PEI were prepared by solvent evaporation technique. The membranes structure, the flux and separation performance and mechanical properties were studied. The physical structure of the membranes (PVC and the blended one) including external surface, internal surface and cross-section were characterized by scanning electron microscopy (SEM), and the mechanical properties were discussed. It was found that using glycerol or EG as additives can increase the membrane porosity and enhance the permeation flux (Average  $\approx 472$  L/D/M<sup>2</sup> and 496 L/D/M<sup>2</sup>), respectively by changing the membrane morphology. The optimum conditions were carried out at a transmembrane pressure of 0.3 MPa at room temperature.

[h\\_tieama@yahoo.com](mailto:h_tieama@yahoo.com)