HYDROPHOBICITY ENHANCEMENT OF POLY (VINYLIDENE FLUORIDE-*co*-HEXAFLUORO PROPYLENE) FOR MEMBRANE DISTILLATION

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ABSTRACT

Poly (vinylidene fluoride-co-hexafluoropropylene), (PVdF-*co*-HFP) hollow fibre membrane was prepared by phase inversion method using different concentrations of PVP as a pore former additives in the dope solution. Surface modification was done using a formic acid through immersion technique. It was observed that the contact angle for all membranes increased due to the surfaces modification (10% of hydrophobicity increment). Based on SEM and FTIR analysis the study found that the hydrophobicity of (PVdF-*co*-HFP) hollow fibre membrane can be enhanced via formic acid surface modification process.

Keywords*:* contact angle; membrane distillation; PVdF-*co*-HFP membrane; surface modification;

INTRODUCTION

Having clean drinking water is a major problem for developing countries all over the world. Improvement in the efficiency and cost of water treatment is a great challenge to overcome the shortage of drinking water. Various membrane separation methods have been used for water purification, including micro filtration (MF), ultrafiltration (UF), nano-filtration (NF), reverse osmosis (RO) and membrane distillation (MD). UF and MF are sophisticated techniques used for water handling, whereas RO is widely used for sea water desalination and purification. MD is a new advanced technology and it has high possibilities for the desalination of high salinity water. The membranes play a major role in water treatment processes based on membranes and they determine the technological and economic efficiency of the technologies mentioned above; in fact, improving the membrane can significantly leave an impact on the performance of the existing technology [1,2]. MD is a separation process that is driven thermally which enables separation due to phase alteration. Hydrophobic membrane shows an impediment to the liquid phase, allowing the vapour phase (such as water vapour) to pass through pores of the membrane.

However, disadvantages associated with the MD process are the fluxes are lower than in other membrane processes for industrial applications. It is because the material of MD production is so sensitive to the surface tension and undesirable wetting of the membrane pores [3,4].