

MANUFACTURING HYDROPHOBIC MEMBRANES FROM RECYCLED MATERIAL FOR VACUUM MEMBRANE DISTILLATION OF BRACKISH AND SEA WATER

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Abstract

In this work, we developed flat membranes for membrane vacuum distillation for brackish and sea water desalination. The recycled low density polyethylene available at low cost is the material chosen for the elaboration of these membranes to enhance it. The preparation of these membranes was made by the chemical method via phase inversion which xylene was used as solvent. A full factorial experimental plan has been followed to organize the experiences and characterize these membranes. The porosity and the contact angle are determined by a morphological analysis using a scanning electron microscope (SEM) and a topographical one using an atomic force microscope (AFM). Indeed, a good hydrophobicity has been reached (contact angle ranging between 110 ° and 120 °) and a good mechanical strength where we found a LEP value of the membrane LDPE / Xylène5 / 95/1 equal to 2.5 bar and an acceptable porosity varying between 20 and 35% comparing with the recent work [1]. A good roughness has been obtained and this is a positive sign because it increases the exchange surface of the membrane. In the other case, the membrane thickness and the concentration of polymer (LDPE) adversely affect the porosity of this membrane. Finally, we can say that the membranes characterizations has enabled us to see that the hydrophobicity character is attained but the porosity is far from the commercial membranes and it is necessary to add pore-forming agent to improve it.

Keywords: membrane, hydrophobic, vacuum membrane distillation, brackish water, characterization

References

[1]Kaikai Chen (2015) *Study on vacuum membrane (VMD) using FEP hollow fiber membrane* », *J. of Desalination* 375.