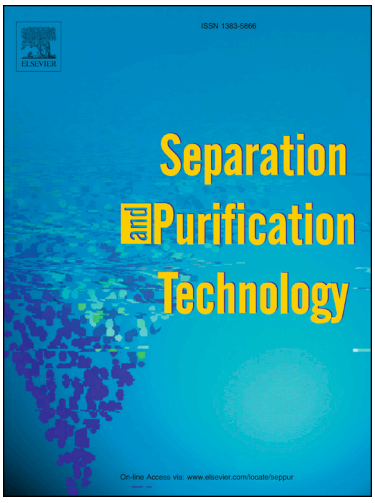

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COATING TECHNIQUES FOR MEMBRANE DISTILLATION: AN EXPERIMENTAL ASSESSMENT

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Abstract

Membrane distillation is a thermal membrane technology, commonly used for desalination. The industrial breakthrough of the technology requires high performing and inexpensive membranes. In this paper, an alternative for the traditional hydrophobic membrane materials has been explored through the deposition of a hydrophobic coating on a commercial hydrophilic membrane with a microporous structure. The coatings enable obtaining the required hydrophobicity and preventing membrane wetting. The effect of the surface chemistry and structure on the membrane distillation performance was investigated for 5 different coatings. The coatings were applied only on the top surface or on the entire membrane cross-section and the effect of this difference in morphology was investigated. The atmospheric toplayer coating and vacuum plasma coating on the entire cross-section were selected for further optimization. The stability of the coating and the relation of the membrane structure and performance at different salinities were also investigated using direct contact membrane distillation.

Keywords: Direct contact membrane distillation, Hydrophobic, Oleophobic, Plasma, Polyethersulfone