Porous Copolymer Hollow Fiber Membrane Preparation and Characterization: Direct Contact Membrane Distillation

M. Khayet [C, S], M.C. García-Payo and M. Essalhi
Department of Applied Physics I, Faculty of Physics, University Complutense of Madrid, Madrid, Spain

Porous poly(vinylidene fluoride–hexafluoropropylene) hollow fiber membranes were prepared by the dry/wet spinning technique using different copolymer concentrations. Polyethylene glycol was used as a nonsolvent additive and water was employed as internal and external coagulant. The morphology and structure of the obtained fibers were studied by different techniques such as atomic force microscopy (AFM) and scanning electron microscopy (SEM). The inner and outer diameters of the fibers were evaluated. The cross-section structure of the fibers was studied by SEM, whereas the mean pore size, pore size distribution, porosity and roughness of both the internal and external surfaces of the fibers were determined by AFM. The non-isothermal separation process, direct contact membrane distillation (*DCMD*), in which the driving force is the transmembrane temperature difference was applied to evaluate the permeability of the hollow fibers. In DCMD the temperature difference induces water vapour pressure difference through a porous hydrophobic membrane. It was found that the morphological structure of the fibers as well as their *DCMD* performance depend on the copolymer concentration used. The pore size and porosity decreases with the copolymer concentration enhancement leading to lower hollow fiber permeability.