Fabrication and properties of polyvinyl chloride hollow fiber membranes plastified by dioctyl phthalate

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ABSTRACT

Polyvinyl chloride (PVC) hollow fiber membranes were prepared by twin-screw extrusion method. Dioctyl phthalate (DOP) as the plasticizer was used in this study. The influence of stretching and DOP weight fraction on morphology and performance were investigated. The membranes were characterized by scanning electron microscope, pure water flux, mean pore size measurement, and mechanical strength test. The results show that the PVC hollow fiber membrane was a kind of homogeneous membrane. The pure water flux increased with the theoretical draw ratio and the DOP weight fraction increment. The plastic deformation ratio increased with the theoretical draw ratio increment, but decreased with the DOP weight fraction increment. The deformation-recovery ratio was governed by the DOP weight fraction and was slightly controlled by theoretical draw ratio. Both stretching and increment of DOP weight fraction could increase the mean pore size. At the same time, the tensile strength increased and the elongation at break decreased with the increment of theoretical draw ratio. On the contrary, the tensile strength decreased and the elongation at break increased with the increment of DOP weight fraction.

Keywords: Polyvinyl chloride; Hollow fiber membrane; Dioctyl phthalate; Stretching

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