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Preparation and characterization of tubular membrane supports using centrifugal casting

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ABSTRACT

In this paper, the manufacture of a tubular supports ceramics membrane is described. The main objective of this work consists of the preparation and characterization of adequate and less expensive membrane supports, using abundant local raw materials. A porous raw materials tube of 20 mm in diameter and 170 mm in length were successfully fabricated by centrifugal casting technique. Moreover, the obtained samples were characterized, using different techniques. The structure was analyzed by X-ray diffraction (XRD) and mercury porosimetry techniques. The pore size and the presence of possible defects in the supports were determined by scanning electron microscopy (SEM). It has been found that tubular ceramic membrane supports had a highly homogeneous product and a smooth inside-surface. The influence of the sintering temperature on the total porosity, average pore size and pore size distribution of supports is taken into account. The obtained results enabled to conclude that clay supports can be used alone (without any additions), successfully, in tangential microfiltration or as a support for ultrafiltration membranes. Finally, this investigation demonstrates that centrifugal casting may be also considered as a promising technique in order to fabricate tubes for membrane application.

Keywords: Supports; Membranes; Centrifugation; Porosity

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