



New ceramic membranes from natural Moroccan phosphate for microfiltration application

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ABSTRACT

This paper is devoted to preparation of low-cost microfiltration (MF) membranes using lixiviated phosphate powder crushed at 50 μm . The filtering layer was coated on phosphate tubular support with 10 μm pore diameter and 43% porosity. The preparation of this ceramic layer was performed by the slip-casting method. A deflocculated slip was obtained by mixing mineral powder, polyvinyl alcohol, and water with dispersant. After drying at room temperature for 24 h, the MF layer was heated to 800 $^{\circ}\text{C}$ for consolidation. Scanning electron microscopy observation showed homogeneous layers without cracks with an average pore diameter of 0.35 μm for the active layer, the thickness is approximately 10 μm . Water permeability obtained is about 700 L/h m^2 bar. The membranes have been tested to treat wastewater of phosphate industry, to clarify synthetic solutions of lime and aluminum hydroxide, and to remove bacteriological pollution present in water wells. The experiments carried out show that elaborated MF membrane is very efficient for the reduction of turbidity, total phosphorus, and number of bacterial germs with almost the same performances than that obtained with a commercial α -alumina membrane.

Keywords: Phosphate; Ceramic membrane; Microfiltration; Crossflow filtration; Water treatment

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