

PREPARATION AND CHARACTERIZATION OF MICROFILTRATION CERAMIC MEMBRANES BASED ON NATURAL QUARTZ SAND

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Abstract. The effect of phase and chemical composition of natural quartz sand, binder and burnable additives was studied. The conditions of application of the membrane and biocide layers on the formation of porous ceramic and microfiltration membranes were investigated. It is shown that a crystalline oxide of Si(IV) is determinant for obtaining the ceramic materials. The presence of carbonates (calcite, dolomite, aragonite, *etc.*) and crystalline aluminosilicates (microcline, albite, phlogopit, *etc.*) leads to a decrease in mechanical strength of ceramics. The ceramic samples with porosity 30-34% and mechanical strength >35 MPa were obtained. Microfiltration membranes are characterized by an average pore size of 4.3 μm and water permeability of 36.3 $\text{m}^3/(\text{h}\cdot\text{m}^2\cdot\text{bar})$. The biocide coating designed to protect the ceramic membrane surfaces from biofouling was applied and its anti-bacterial activity was shown.

Keywords: ceramic, membrane, microfiltration, quartz sand.

Received: 02 April 2017/ Revised final: 28 May 2017/ Accepted: 30 May 2017