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
categorized by an average pore size of 4.3 μm and water permeability of 36.3 m³/(h·m²·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.

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