ABSTRACT

Thesis comprises 97 pages, 18 figures, 8 tables, 56 references.

The aim of this research work is to study the impact of type ultrasonic mixing on porosity, structure and phase composition of ceramic Al_2O_3-50%vol. SiO_2.

For research use at work: structural analysis, X-ray analysis method defined porosity by impregnation in a liquid, the method of research porosity and specific surface area for adsorption-desorption of gas.

The object of study is the porous structure and phase composition of the sintered ultrafine powders of highly porous ceramic consist of Al_2O_3-50% vol.SiO_2 with $(NH_2)_2CO$ as pore foring agent, obtained by wet uniaxial pressing at a pressure of 100 MPa and sintering temperature - 1200 °C.

Scientific novelty: found that materials made of nano Al_2O_3 and SiO_2 are volume shrinkage of 30-40%; ultrasonic mixing application allows you to control the porous structure; using of nanopowders make possible to obtain highly porous materials with an average micropores size in a range of 6-12 nm.

Practical iportance: The features and properties of highly ceramic materials produced from nano oxides was investigated. These materials have a high open porosity and specific surface area, and thus can be used as filters for the purification of liquids and gases, catalyst supports, membranes for separating liquids. Of particular importance is getting nanoscale pores. Materials with an average pore size of 10 nm or less can be used for food and medicine to sterilize liquids without boiling.

Keywords: ALUMINA NANOCOMPOSITES, MICROPORES, PORE-FORMING AGENT, ULTRASONIC MIXING, SONICATION, MECHANICAL ACTIVATION, SINTERING, OXIDE CERAMIC.