

Preparation of ceramic preforms by hydrothermal method

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New method of preparation of ceramic preforms with using the mixtures of especially pure fine-grained corundum and gibbsite was developed. The treated under hydrothermal conditions at 200°C mixtures primarily form acicular nano-sized boehmite crystals with size of 400 - 600 nm. Interlocking of these crystals leads to the formation of a binder or "aluminous cement." The dispersed in boehmitic matrix corundum crystals develop a preform with dense structure. (Fig 1) The body of the abstract should be followed by a blank line and then any references should be given using 9 pt type. References should be indicated by numbers in square brackets [1], [2], [3] etc. in the text and be given at the end of the abstract.

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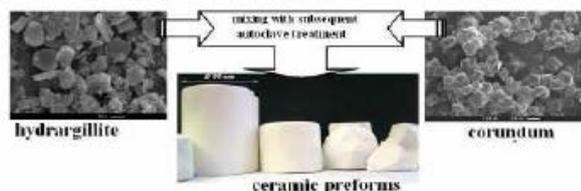


Fig.1 Scheme of preparation of ceramic preforms

The density of the preform after autoclave treatment varies from 2.1 to 2.3 g/cm³ and depends on the initial composition of the mixture. (hydrargillite – corundum) Density of preforms after heating at 1700°C during 3 hours is 3,2 g/cm³ and after heating at 1800°C during 1 hours achieve 3,7 g/cm³ Alumina content of the calcined samples reaches 99.997 wt. %. For continuous hydrothermal treatment of the mixture, its components do not bind as poorly aggregated boehmite powder forms.

(electrocorundum after deep cleaning and autoclave corundum obtained thermovapour treatment of hydrargillite in vapors of water at a temperature of 400°C The most perspective is use of autoclave corundum. Impurity content (ppm) in f initial components and ceramic preforms is presented in the table

elements	Ti	Fe	Mg	Ca	Si	Mn	Cu
hydrargillite	<1	3	<1	4	5	<0,5	<0,5
corundum	<1	4	<1	7	4	<0,5	<0,5
ceramic preforms	<1	5	<1	7	4	<0,5	<0,5

In the way it is possible to produce monolithic performs of different profile: crucibles, gears, threaded products, etc. Compared with traditional methods of ceramic pieces, a useful feature of the new method is the ability to produce high-purity blocks, as there is a substantial autoclave cleaning of raw materials.

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REFERENCES

- [1] Panasyuk G.P., Belan V.N, Voroshilov, I.L J. Phys.: Conf. Ser., 2008, v. 121, p 092001
 [2] Panasyuk G.P., Kozerozhets I.V. Inorganic materials 2013, v 49, № 9, p 899

As components of ceramic preforms it was used especially pure hydrargillite and various corundum