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P73. Porous Mullite Ceramics Formation by Slip Casting of Suspension of Raw Materials

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Development of modern technologies requires the production of materials with perfect and sometimes universal properties. Mullite and mullite-corundum ceramics are the examples of such materials, which were known already in medieval Europe and whose improvement also continues nowadays. Mullite ceramics display favorable refractoriness at temperatures above 1580°C together with excellent resistance to chemical corrosion and very low gas permeability [1, 2]. Mullite ceramics have been widely used for crucibles, thermocouple tubes, moreover refractory ceramics with high porosity serve as a heat insulator in the thermal protection systems.

The aim of this work was to investigate the influence of different ratio of kaolin, alumina with different grain size and silica as raw materials on mullite formation and its quantity in our ceramics, improve its properties by doping materials, method of preparation and sintering temperature [1, 2]. The porous mullite materials were prepared by slip casting of suspension of raw materials where the aluminium paste (0.18 wt.%) was used as a pore former. Pore formation occurred as a result of hydrogen formation in a chemical reaction between aluminium paste and raw materials, when water suspension is with $\text{pH} > 7$, because it is prerequisite condition for gas elimination reaction ability of metallic aluminium. This method was used, because it is more ecological than the combustible additive method [1-2]. Mullite and corundum phases were formed when the firing temperature was 1700°C and the amount of kaolin was 10 wt.% [Fig.1], but in the samples from mix with 30 wt.% of kaolin-only mullite phase.

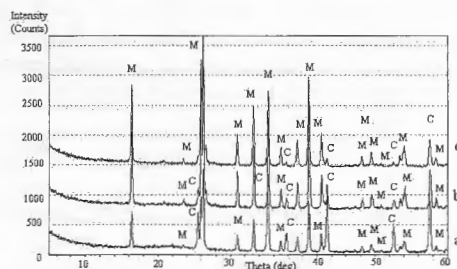


Fig.1 XRD patterns: 10 wt.% content of kaolin, fired at: a) 1650°C; b) 1700°C; c) 1750°C; M-Mullite; C-Corundum.

Keywords: mullite, kaolin, alumina, silica, porosity, refractory ceramics.

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