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## DIFFERENTLY PREPARED ILLITE CLAY COMPOSITIONS FOR POROUS CERAMICS

GAIDA SEDMALE, ANDRIS CELMS\*, ANDRIS CIMMERS

*Riga Technical University, Institute of Silicate Materials, Azenes Str.14/24, Riga Azenes Str. 14/24, Latvia  
andris.celms@lode.lv, gsedmale@ktf.rtu.lv*

Illite clay sediment from Quaternary clay deposits of Latvia can be characterized by mineralogical composition (wt.%) of illite  $(\text{KH}_3\text{O})\text{Al}_2(\text{OH})_2[(\text{Si Al})_4\text{O}_{10}]\cdot n\text{H}_2\text{O}$  35-45, quartz  $\text{SiO}_2$  10-15, calcite  $\text{CaCO}_3$  + dolomite  $\text{CaCO}_3\cdot\text{MgCO}_3$  10-20, magnetite  $\text{Fe}_3\text{O}_4$  + goethite  $\alpha\text{-FeOOH}$  5-9 and kaolinite  $\text{Al}_4[(\text{OH})_8[\text{Si}_4\text{O}_{10}]] - 5-10$  [1]. It can be indicated to relatively high presence of carbonates and Fe containing minerals in these clays causing the development of porous ceramics. In its turn predominant amount of illite as well as chemical composition in accordance to eutectic is reason for relatively low sintering/melting temperature of ceramic. Crystalline phases formed from gehlenite  $\text{Ca}_2\text{Al}[\text{SiAlO}_7]$ , anorthite  $\text{Ca}[\text{Al}_2\text{Si}_2\text{O}_8]$ , diopside  $\text{Ca}(\text{Mg,Fe})[\text{Si}_2\text{O}_6]$ , hematite  $\text{Fe}_2\text{O}_3$ , quartz in ceramic develop at sintering temperature 900-1050<sup>0</sup>C. Glassy phase forms as well.

The aim of this study is to compare two ways - ceramic way and geopolymer of porous light ceramic building materials obtaining with low thermal conductivity using as starting raw material Quaternary clay (Q). Composition from Q with addition of natural substances– straw and sawdust up to 25 vol. % as starting materials were used. For geopolymer bound ceramics product Q was used both without thermal treatment and with thermal activation at temperatures range from 550 to 650 °C.

Geopolymers purpose of this research is showing the effect of alkalines on illite clay/illite structure transformation and in its turn – to ceramic properties (shrinkage, bulk density), porosity, compressive strength and finally to thermal conductivity. This investigation stage is in process now.

It is shown that using of traditional preparing from illite clay with addition of straw and sawdust ceramic product was obtained at 980-1020<sup>0</sup>C and can be characterized by compressive strength 9-10 MPa and thermal conductivity 0.25-0.30W/m.K.

**Keywords:** Illite, Ceramic, Traditional, Geopolymer.

[1] G.Sedmale, I.Sperberga, A.Hmelov Formation of Ceramic in the System  $\text{Al}_2\text{O}_3\text{-SiO}_2\text{-ZrO}_2$  by Presence of Mineralizers. High-temparature and Techical Ceramics. Vol..5, 18-23, 2008 (in Russian).