**124 *Chemistry and technology of materials, including nanomaterials***

**ACTIVATED COMBUSTION OF MIXTURE SiO2-CaCO3-Al**

**AND RECEPTION OF SHS-COMPOSITES**

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The process of combustion and phase formation in the regime of selfpropagating high temperature synthesis (SHS) of quartz and calcite mixture with aluminium in a stoichiometric ratio to each of the components was studied. Quartz and calcite were subjected to mechanochemical treatment (MCT) depending on time and the ratio of the mass powder to the mass of balls (Mp/Mb) and with the use of different carbon- and nitrogen containing modifiers (polyvinyl alcohol, succinic acid, ammonium hydroxide and others). Activation and modification of the surface of charge mixture particles result in change of kinetic parameters of technological combustion and formation of the structural components of SHS-composites [1].

The induction period significantly decreases after preliminary MCT of quartz and calcite. Usage of preactivated components in the charge mixture (quartz + calcite) with presence of modifiers the rate and temperature of combustion increase.

In combustion products of a non-activated system SiO2 was detected helenite – Ca2Al(AlSi)O7. After activation of minerals, in the reaction products there appears anorthite – Ca(Al2Si2O8) as well as compounds CaAl4O7. Modification of charge mixture particles causes the formation in synthesired materials different forms of wollastonite the amount of which is determined by the ratio of quartz and calcite contents. The greatest amount of wollastonite phase (up to 36%) is formed at the ratio CaCO3:SiO2=50/50 and with presence of nitrogen containing modifiers. In modified reaction products there were also discovered silicon carbide and aluminium nitride.

MCT of the mixture (SiO2+CaCO3) in the presence of modifiers contributes to a considerable change (by an order and more) of strength characteristics of the material being obtained. In all cases, the increase in the strength corresponds to formation of wollastonite, anorthite, aluminium nitride and silicon carbide in synthesis products.

REFERENCES

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