Serbian Ceramic Society Conference
ADVANCED CERAMICS AND APPLICATION

Organized by
Serbian Ceramic Society
&
Institute of Technical Sciences of SASA

PROGRAM AND THE BOOK OF ABSTRACTS

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S1.3 – invited

Influence of Mechanical Activation on the Constituents of the $MgO-Al_2O_3-SiO_2-TiO_2$ System

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Cordierite, $2MgO{\cdot}2Al_2O_3{\cdot}5SiO_2$, is a very attractive high-temperature ceramic material, due to its outstanding electrical characteristics, such as the low temperature expansion coefficient, low dielectric constant and good mechanical properties. In order to accelerate the process of sintering, 5.00 mass% TiO_2 has been added to the starting mixtures. The mechanical activation of the starting mixtures was performed in a high energy ball mill during 0-80 minutes. The particle size analysis (PSA) was employed in order to determine the changes in the particle size of the mechanically treated powders. The phase composition of the starting powders was analyzed by the X-ray diffraction method. XRD showed decrease in peaks intensities and no new phases. Furthermore, differential thermal analysis (DTA) was used in order to determine characteristic temperatures within the system during heating. Based on the obtained DTA results, it was established that mechanical activation has some influence on temperatures of phase transitions.

S1.4 – invited

Explanation of the Driving Force of the Sintering Process on the Basis of Integral Characteristic of the Functions of the Distributions

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The well known electronic theory of the sintering process is based on the configuration model of material. At the same time the macroscopic theory of the sintering process is based on the thermodynamically analyses of different models of diffusion and different models of defects. By analyzing the diffusion of atoms during the isothermal sintering process, by separating subsystems with constant number of the particles, and with constant energy, for maximal subsystem entropies, and on the basis of integral characteristics of the function of the distribution of the grain size, we are made the contributions to the theory of sintering process. It leads to changes of the particle number in accessible states. This way, an original model of thermo diffusion was obtained which enables a relatively simple analysis of some stages of the sintering process. Using obtained results, with unique view, we were able to consider different ways during the sintering process of ceramic powders.