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ADVANCED CERAMICS AND APPLICATION II
New Frontiers in Multifunctional Material Science and Processing

Serbian Ceramic Society
Institute of Chemistry Technology and Metallurgy
Institute for Technology of Nuclear and Other Raw Mineral Materials
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Archeological Institute of SASA

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Influence of MoO₃ on sintering temperature of mechanically activated MgO-Al₂O₃-SiO₂ system

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Cordierite, 2MgO·2Al₂O₃·5SiO₂, 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% MoO₃ 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 and sintered samples was analyzed by the X-ray diffraction method. 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. Sintering process was performed in air at 1200°C for 2h.

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Structural characterization of mechanically activated MgO-TiO₂ system

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In this article the influence of ball milling process on structure of MgO-TiO₂ system was investigated. The mixtures of MgO-TiO₂ powders were mechanically activated in a planetary ball mill for the time period from 0 to 120 minutes. The influence of mechanical activation on the lattice vibrational spectra was studied by Raman spectroscopy at room temperature. Structural investigations have been performed on produced powders. Nitrogen adsorption method was used to determine the BET specific surface area and pore size distribution. Unusual results have been obtained: specific surface area continuously decreased up to 40 minutes of activation and increased after that, reaching its minimum value of 5.5 m²/g. The Raman spectra of activated powders have shown that anatase modes have been decreasing in intensity and broadening as the time of