



**Serbian Ceramic Society Conference  
ADVANCED CERAMICS AND APPLICATION X  
New Frontiers in Multifunctional Material Science and Processing**

**Serbian Ceramic Society  
Institute of Technical Sciences of SASA  
Institute for Testing of Materials  
Institute of Chemistry Technology and Metallurgy  
Institute for Technology of Nuclear and Other Raw Mineral Materials**

**PROGRAM AND THE BOOK OF ABSTRACTS**

**Serbian Academy of Sciences and Arts, Knez Mihailova 35  
Serbia, Belgrade, 26-27. September 2022.**

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## P15

### Formation of nitride powders by carbothermal reduction- nitridation of diatomite

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In the synthesis of silicon nitride ( $\text{Si}_3\text{N}_4$ ) based powders by carbothermal reduction-nitridation of diatomaceous earth, the effects of addition of silicon nitride powder on the phase composition, particle size and shape were investigated in this paper. Activated carbon was used as carbon sources. In order to obtain better quality  $\text{Si}_3\text{N}_4$  powder in a faster and more efficient way,  $\alpha$ - $\text{Si}_3\text{N}_4$  powder was introduced into starting mixtures as seeds. The starting mixtures of diatomaceous earth, carbon source and commercial  $\alpha$ - $\text{Si}_3\text{N}_4$  powder (5,10,15 and 20 wt.%) were thermally treated at 1350 °C and 1450. X-ray diffraction (XRD), infrared spectroscopy with Fourier transform (FTIR) and scanning electron microscopy (SEM) were employed to characterize the phases, functional groups, microstructure of the obtained powders. The major reduction of diatomaceous earth took place at 1450 °C. At 1350 °C particles retained the morphological characteristics of the starting diatomaceous earth. At 1450 °C, observed particles possess a polygonal habitus, which is characteristic for silicon nitride crystals.

## P16

### Crosslinking of rare earth ions into aluminosilicate inorganic polymer

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Rare earth oxides have been broadly utilised in different research areas due to their unique properties. This research aims to examine the effect of Nd and Sm in the form of oxide addition in the metakaolin-based geopolymer matrix. Metakaolin-based geopolymers with the addition of different percentages of  $\text{Sm}_2\text{O}_3$  and  $\text{Nd}_2\text{O}_3$  (S<sub>1</sub>-S<sub>6</sub>) were synthesised. Samples contained 0.1% Sm; 1% Sm; 5% Sm, and 0.1% Nd, 1% Nd, and 5% Nd. The focus was on monitoring the polymerisation process using the DRIFT method for 7, 14, 21 and 28 days. The phase composition of the samples was confirmed by the XRD method, while the morphology of the samples was analysed by SEM analysis. After 28 days, due to the polymerisation process, the binding of Neodymium and Samarium ions were incorporated into the structure.