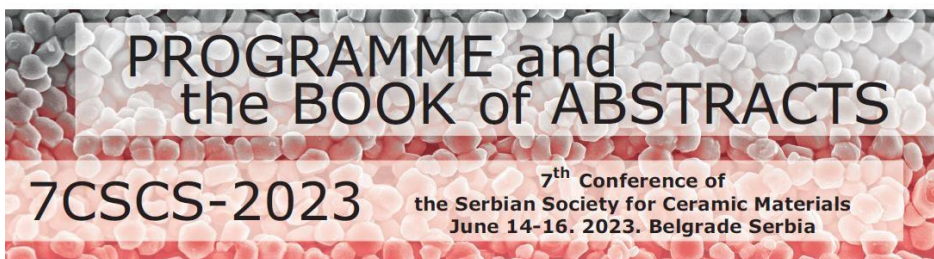


The Serbian Society for Ceramic Materials  
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Institute of Physics, University of Belgrade  
Center of Excellence for the Synthesis, Processing and Characterization of  
Materials for use in Extreme Conditions "CEXTREME LAB" - Institute of  
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Faculty of Mechanical Engineering, University of Belgrade  
Center of Excellence for Green Technologies, Institute for Multidisciplinary  
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# **PROGRAMME AND THE BOOK OF ABSTRACTS**

**7<sup>th</sup> Conference of The Serbian Society for  
Ceramic Materials**

**June 14-16, 2023**  
**Belgrade, Serbia**  
**7CSCS-2023**

Edited by:  
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**Jelena Maletaškić**  
**Vladimir V. Srdić**

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## ANDESITE BASALT AS A NATURAL RAW MATERIAL FOR OBTAINING GLASS-CERAMICS

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The industrial requirements in the 21<sup>st</sup> century are environmentally friendly and light construction materials with good physical-mechanical properties manufactured from cheap natural raw materials available in large quantities. One of these materials is basalt. Basalt is a natural igneous rock of volcanic origin, with a significant amount in Serbia. Basalt belongs to the group of non-hazardous and eco-friendly materials.

Andesite basalt aggregate from the "Donje Jarinje" site, Serbia, was used as the starting natural raw material for obtaining the glass-ceramic material. The aggregate is from 2 to 5 mm in size. The aggregate was milled in the tungsten-carbide vibrating cup mill for 30 min to obtain a fine powder for synthesis. The homogenization of andesite basalt powder and binder was carried out in the mortar and pestle for 10 min. The paraplast was used as a binder with a content of 0.6 wt.%. After that, uniaxial pressing of the powder at a pressure of 50 MPa was performed. A forming green compact, cold isostatic pressing was performed with a pressure of 230 MPa to increase its density. The sintering was carried out at the temperature of 1060 °C for 60 min in the air. The sintered glass-ceramic sample was a relative density of 99.5%, a macrohardness of 6.7 GPa and a fracture toughness of 2.2 MPa·m<sup>1/2</sup> [1].

The andesite basalt powder was characterized using the laser light diffraction method, X-ray diffraction method and scanning electron microscopy. Sintered glass-ceramic material was characterized using the X-ray diffraction method, Archimedes principle, scanning electron and optical light microscopy and the Vickers hardness test.

The glass-ceramic material obtained by sintering andesite basalt powder could be used for various industrial applications in the civil engineering, mechanical, chemical, and petrochemical industries, as well as for the making of containers to store nuclear waste.

1. V. Pavkov G. Bakić, V. Maksimović, I. Cvijović-Alagić, M. Prekajski Đorđević, D. Bučevac, B. Matović, *Process. Appl. Ceram.*, **16** [2] (2022) 143.