

The Serbian Society for Ceramic Materials
Institute for Multidisciplinary Research, University of Belgrade
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 Nuclear Sciences "Vinča",
University of Belgrade
Faculty of Mechanical Engineering, University of Belgrade

A microscopic image of ceramic grains, showing a transition from white to red. The grains are spherical and densely packed. The top half is white, and the bottom half is red, with a horizontal boundary line.

PROGRAMME and the BOOK of ABSTRACTS

4CSCS-2017

4th Conference of
the Serbian Society for Ceramic Materials
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Branko Matović
Zorica Branković
Dušan Bućevac
Vladimir V. Srdić

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PROGRAMME AND THE BOOK OF ABSTRACTS

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4CSCS-2017**

Edited by:
**Branko Matović
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Vladimir V. Srdić**

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ENHANCEMENT OF THERMOELECTRIC PROPERTIES INDUCED BY Cu SUBSTITUTION IN NaCo₂O₄

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In this work polycrystalline samples of NaCo_{2-x}Cu_xO₄ (x = 0, 0.01, 0.03, 0.05) were obtained from the powder precursors synthesized in two different ways: 1) by a mechanochemically assisted solid-state reaction method (MASSR) and 2) a citric acid complex method (CAC). Ceramic samples were prepared by pressing into disc-shaped pellets and subsequently sintered at 880 °C in inert argon atmosphere. The electrical resistivity (ρ), the thermal conductivity (κ) and the Seebeck coefficient (S) were measured simultaneously in the temperature range from 330 K to 830 K, and the effect of small concentrations of the dopant and syntheses procedures on the thermoelectric properties was observed. According to the temperature dependence of ρ , all MASSR samples showed metal-insulator transition. The values of κ were lower for undoped samples in both syntheses. S increased with temperature and it was higher in all Cu doped samples, reaching 145 $\mu\text{V/K}$ at 830 K for the sample with 3 mol% of Cu prepared by the CAC method. High thermopower is the consequence of the strong electron correlation, present in this type of compounds. The CAC samples showed higher ZT compared with the MASSR samples of the same composition. The highest figure of merit ($ZT = 0.056$) was obtained for the sample with 5 mol% of Cu prepared by the CAC method, and it was 1.5 times higher than the highest value obtained for the MASSR sample ($ZT(\text{NCO3-MASSR}) = 0.036$). This result confirmed that, beside the dopant concentration, synthesis procedure considerably affected the thermoelectric properties of NaCo₂O₄.