

Influence of Ag doping on the morphological and magnetic properties in CuO nanopowders

Maria Čebela, Uroš Čakar, Vesna Lojpur, Maja Milošević, Sanja Krstić, Vladimir Dodevski, Milena Rosić



Дигитални репозиторијум Рударско-геолошког факултета Универзитета у Београду

[ДР РГФ]

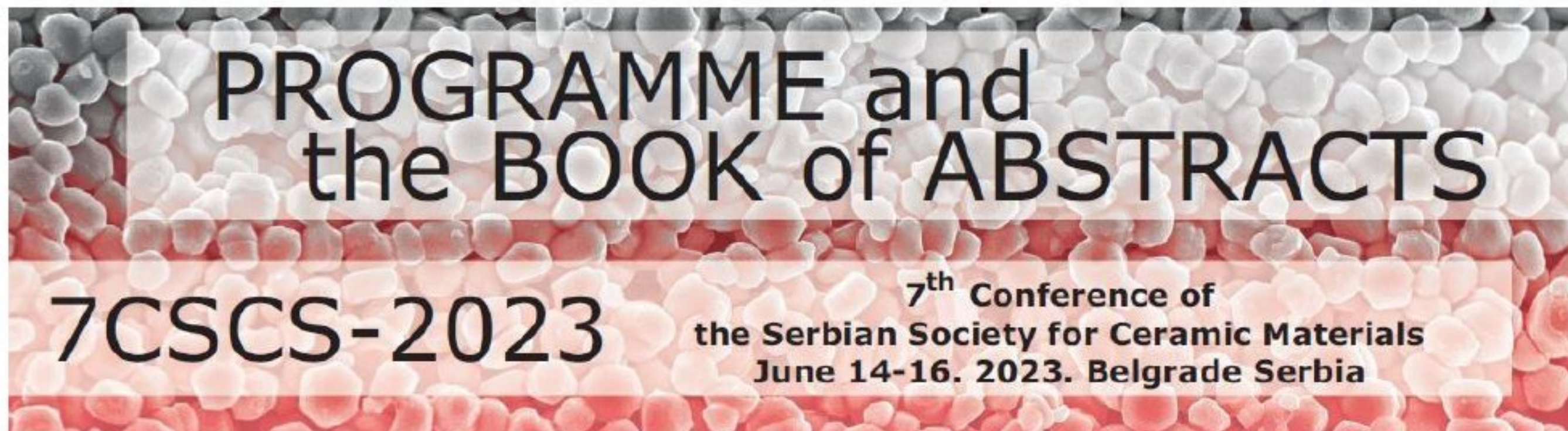
Influence of Ag doping on the morphological and magnetic properties in CuO nanopowders | Maria Čebela, Uroš Čakar, Vesna Lojpur, Maja Milošević, Sanja Krstić, Vladimir Dodevski, Milena Rosić | Programme ; and the Book of Abstracts / 7th Conference of The Serbian Society for Ceramic Materials, 7CSCS-2023, June 14-16, 2023 Belgrade, Serbia | 2023 | |

<http://dr.rgf.bg.ac.rs/s/repo/item/0008189>

Дигитални репозиторијум Рударско-геолошког факултета Универзитета у Београду омогућава приступ издањима Факултета и радовима запослених доступним у слободном приступу. - Претрага репозиторијума доступна је на www.dr.rgf.bg.ac.rs

The Digital repository of The University of Belgrade Faculty of Mining and Geology archives faculty publications available in open access, as well as the employees' publications. - The Repository is available at: www.dr.rgf.bg.ac.rs

The Serbian Society for Ceramic Materials
Institute for Multidisciplinary Research (IMSI), 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
Center of Excellence for Green Technologies, Institute for Multidisciplinary
Research, University of Belgrade
Faculty of Technology and Metallurgy, University of Belgrade



Edited by:
Branko Matović
Jelena Maletaškić
Vladimir V. Srdić

Programme and Book of Abstracts of The Seventh Conference of The Serbian Society for Ceramic Materials **publishes abstracts from the field of ceramics, which are presented at international Conference.**

Editors-in-Chief

Dr Branko Matović
Dr. Jelena Maletaškić
Prof. Vladimir V. Srdić

Publisher

Institut za multidisciplinarna istraživanja
Kneza Višeslava 1, 11000 Belgrade, Serbia

For Publisher

Dr Dragica Stanković

Printing layout

Dr. Jelena Maletaškić, Vladimir V. Srdić

Press

Faculty of Technology and Metalurgy, Research and Development Centre of Printing Technology, Karnegieva 4, Belgrade, Serbia

Published: 2023

Circulation: 120 copies

CIP – Каталогизacija u publikaciji
Narodna biblioteka Srbije, Beograd

666.3/.7(048)
66.017/.018(048)

DRUŠTVO za keramičke materijale Srbije, Konferencija (7; 2023, Beograd)

Programme ; and the Book of Abstracts / 7th Conference of The Serbian Society for Ceramic Materials, 7CSCS-2023, June 14-16, 2023 Belgrade, Serbia ; [organizers] The Serbian Society for Ceramic Materials ... [et al.] ; edited by Branko Matović, Aleksandra Dapčević, Vladimir V. Srdić. - Belgrade :

Institut za multidisciplinarna istraživanja, 2023 (Belgrade : Faculty of technology and metalurgy, Research and development centre of printing technology). -124 str. : ilustr. ; 25 cm

Tiraž 120. – Str. 7: Welcome message / Branko Matović. - Registar.

ISBN 978-86-80109-24-4

a) Keramika -- Апстракти b) Наука о материјалима – Апстракти v)
Наноматеријали -- Апстракти

COBISS.SR-ID 117544969

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
Center of Excellence for Green Technologies, Institute for Multidisciplinary
Research, University of Belgrade
Faculty of Technology and Metallurgy, University of Belgrade

PROGRAMME AND THE BOOK OF ABSTRACTS

**7th Conference of The Serbian Society for
Ceramic Materials**

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

Edited by:
Branko Matović
Jelena Maletaškić
Vladimir V. Srdić

SPECIAL THANKS TO



**Република Србија
МИНИСТАРСТВО НАУКЕ,
ТЕХНОЛОШКОГ РАЗВОЈА И ИНОВАЦИЈА**



**NATIONAL TOURISM
ORGANISATION of
SERBIA**



**Turistička
organizacija
Beograda**

Committees

Organizer

- The Serbian Society for Ceramic Materials
- Institute for Multidisciplinary Research (IMSI), 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
- Center of Excellence for Green Technologies, Institute for Multidisciplinary Research, University of Belgrade
- Faculty of Technology and Metallurgy, University of Belgrade

Scientific Committee

1. Dr. Snežana Bošković, Institute of Nuclear Sciences “Vinča”, University of Belgrade, *Serbia*
2. Prof. Biljana Stojanović, Institute for Multidisciplinary Research, University of Belgrade, *Serbia*
3. Dr. Branko Matović, Institute of Nuclear Sciences “Vinča”, University of Belgrade, *Serbia*
4. Prof. Vladimir V. Srdić, Faculty of Technology, University of Novi Sad, *Serbia*
5. Dr. Zorica Branković, Institute for Multidisciplinary Research, University of Belgrade, *Serbia*
6. Dr. Goran Branković, Institute for Multidisciplinary Research, University of Belgrade, *Serbia*
7. Dr. Zorana Dohčević-Mitrović, Institute of Physics, University of Belgrade, *Serbia*
8. Prof. Tatjana Volkov-Husović, Faculty of Technology and Metallurgy, University of Belgrade, *Serbia*
9. Dr. Gordana Bakić, Faculty of Mechanical Engineering, University of Belgrade, *Serbia*
10. Dr. Aleksandar Maslarević, Faculty of Mechanical Engineering, University of Belgrade, *Serbia*
11. Dr. Zvezdana Baščarević, Institute for Multidisciplinary Research, University of Belgrade, *Serbia*
12. Dr. Dejan Zagorac, INN Vinca, University of Belgrade, *Serbia*

P-43

INFLUENCE OF Ag DOPING ON THE MORPHOLOGICAL AND MAGNETIC PROPERTIES IN CuO NANOPOWDERS

Maria Čebela^{1,2}, Uroš Čakar³, Vesna Lojpur¹, Maja Milošević⁴,
Sanja Krstić¹, Vladimir Dodevski¹, Milena Rosić¹

¹*Vinča Institute of Nuclear Sciences, National Institute of the Republic of Serbia,
University of Belgrade, Belgrade, Serbia*

²*Department of Physics, Faculty of Science, University of Zagreb, Bijenička c.
32, HR-10000 Zagreb, Croatia*

³*University of Belgrade, Faculty of Pharmacy, Department of Bromatology,
Belgrade, Serbia*

⁴*Department of Mineralogy, Crystallography, Petrology and Geochemistry,
Faculty of Mining and Geology, University of Belgrade, Đušina 7, 11000
Belgrade, Serbia*

We studied the influence of Ag doping on the crystal structure and magnetic properties of CuO nanopowders. For the synthesis of nanoparticles of copper-silver oxides solid solutions with the composition $\text{Cu}_{1-x}\text{Ag}_x\text{O}$ ($x=0.01-0.05$), a self-propagating synthesis was applied at room temperature, during which a successful reaction between metal nitrate and sodium hydroxide occurred. Prepared powders were calcinated at 700 °C for 2 h. The diffraction pattern was recorded at room temperature and atmospheric pressure without of any re-heating of the sample. The Rietveld method for fitting refinement procedure was performed which showed the incorporation of Ag^{3+} ions in the CuO crystal lattice, where they substitute Cu^{2+} ions. SQUID magnetometer was used for investigation of magnetic behavior of synthesized materials in temperature interval 2–400 K. It is known that copper(II) oxide exhibits ferroelectricity driven by magnetic order at temperature as high as 230 K [1]. Multiferroic phase is present above the first order phase transition at $T_{N1} = 213$ K and exists up to the subsequent first order phase transition $T_{N2} = 230$ K [1,2]. It was shown that disorder in the form of impurities can stabilize the ferroelectric phase [2] this was our motivation to dope CuO with Ag in order to improve further its multiferroic properties. Compared with CuO, we observed small changes in magnetic properties in $\text{Cu}_{1-x}\text{Ag}_x\text{O}$. The size and morphology of the particles were successfully determined by transmission electron microscopy (TEM) and scanning electron microscopy (SEM).

1. T. Kimura, Y. Sekio, H. Nakamura, T. Siegrist, A.P. Ramirez, *Nature Mater.*, **7** (2008) 291.
2. J. Hellsvik, M. Balestieri, T. Usui, A. Stroppa, A. Bergman, L. Berqvist, D. Pabhakaran, O. Eriksson, S. Picozzi, T. Kimura, J. Lorenzana, *Phys. Rev. B*, **90** (2014) 014437.