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

PROGRAMME and the BOOK of ABSTRACTS

7CSCS-2023

7th Conference of the Serbian Society for Ceramic Materials June 14-16. 2023. Belgrade Serbia

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 – Каталогизација у публикацији Народна библиотека Србије, Београд

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

а) Керамика -- 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





SERBIA



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

Scientiific 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

International Advisory Board

GERMANY:

Žaklina Burghard, Institute for Material Science, Univeristy of Stuttgard

UNITED STATES OF AMERICA:

Yuri Rostovtsev, Department of Physics and the Center for Nonlinear Sciences, University of North Texas, Denton

Miladin Radović, Department of Material Science and Engineering, Texas A&M University

SLOVENIA:

Matejka Podlogar, *Jožef Stefan Institute, Ljubljana* Slavko Bernik, *Jožef Stefan Institute, Ljubljana*

CROATIA:

Tomislav Ivek, Institut of Physics, Zagreb

INDIA:

Hari Kumar, Laboratory for High Performance Ceramics, Department of Metallurgical and Materials Engineering & Ceramic Technologies Group-Centre of Excellence in Materials & Manufacturing for Futuristic Mobility, Indian Institute of Technology-Madras

Ravi Kumar, Laboratory for High Performance Ceramics, Department of Metallurgical and Materials Engineering & Ceramic Technologies Group-Centre of Excellence in Materials & Manufacturing for Futuristic Mobility, Indian Institute of Technology-Madras

SLOVAKIA:

Peter Tatarko, Institute of Inorganic Chemistry, Slovak Academy of Sciences, Dúbravská cesta 9. 845 36. Bratislava

Organizing Committee

- 1. Dr. Jelena Maletaškić, Institute of Nuclear Sciences "Vinča", University of Belgrade, *Serbia*
- Prof. Marija Milanović, Faculty of Technology, University of Novi Sad, Serbia
- 3. Dr. Maria Čebela, Institute of Nuclear Sciences "Vinča", University of Belgrade, *Serbia*
- 4. Aleksa Luković, Institute of Nuclear Sciences "Vinča", University of Belgrade, *Serbia*

- 5. Emilija Nidžović, Institute of Nuclear Sciences "Vinča", University of Belgrade, *Serbia*
- 6. Dr. Milica Počuča Nešić, Institute for Multidisciplinary Research, University of Belgrade, *Serbia*
- 7. Jelena Mitrović, Institute for Multidisciplinary Research, University of Belgrade, *Serbia*
- 8. Dr. Bojan Stojadinović, Institute of Physics, University of Belgrade, Serbia
- 9. Dr. Bojana Simović, Institute for Multidisciplinary Research, University of Belgrade, *Serbia*
- 10. Natalija Milojković, Faculty of Technology and Metallurgy, University of Belgrade, *Serbia*
- 11. Dr. Nikola Kanas, Biosense Institute, University of Novi Sad, Serbia

P-23

ZnMn₂O₄ AS A CATHODE MATERIAL IN AN AQUEOUS SOLUTION OF ZnCl₂ AND Mn(NO₃)₂ FOR Zn-ION BATTERIES

<u>Nenad Nikolić</u>¹, Jelena Senćanski², Stevan Blagojević², Maja Pagnacco³, Ivana Stojković Simatović⁴

¹University of Belgrade, Institute for Multidisciplinary Research, Kneza
Višeslava 1, 11030 Belgrade, Belgrade, Republic of Serbia

²University of Belgrade, Institute of General and Physical Chemistry, Studentski
trg 12-16, 11000 Belgrade, Republic of Serbia

³University of Belgrade, Institute of Chemistry, Technology and Metallurgy,
Njegoševa 12, 11000 Belgrade, Republic of Serbia

⁴University of Belgrade, Faculty of Physical Chemistry, Belgrade, Studentski trg
12-16, 11000 Belgrade, Republic of Serbia

Due to Li-ion batteries having become the main power source of most portable electronic devices, their waste has also become a significant environmental problem. To find batteries that would be environmentally friendly, this work examines Zn-ion batteries in an aqueous solution of ZnCl₂. The ZnMnO₄ was synthesized by glycine nitrate combustion of Zn(NO₃)₂, Mn(NO₃)₂ and glycine as a chelating agent [1]. The structure of the material obtained was characterized by X-ray powder diffraction (XRPD) showing a spinel structure; the morphology was characterized by scanning electron microscopy (SEM) showing that nano-particles were obtained. The electrochemical characterization was done by cyclic voltammetry in an aqueous solution of ZnCl₂. The mixture pasted on the glossy carbon electrode was prepared by mixing the cathode material, graphite and polyvinyl diene difluoride (PVDF) in a ratio 85:10:5 [2]. Due to the low discharge capacity obtained of ~14 mAh g⁻¹ for 5 mV s⁻¹, further examination was done by adding 1 ml of 1M Mn(NO₃)₂ into 10ml of a saturated aqueous solution of $ZnCl_2$. After adding the $Mn(NO_3)_2$, the discharge capacity increased from ~14 mAh g⁻¹ to ~65 mAh g⁻¹ at the same polarization rate, making this additive a promising one for aqueous Zn-ion batteries. Further investigation needs to be directed to adding the same additive in larger amounts compared to 1ml to the same volume of the electrolyte. The results obtained suggest the aqueous Zn-ion battery described in this work to be a potentially promising "green" battery that may replace harmful commercial organic Li-ion batteries.

- 1. J. Senćanski, Russian J. Phys. Chem. A, 96 (2022) 2783.
- 2. J. Senćanski, J. Power Sources, 342 (2017) 690.