



# COIN2022

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## CONTEMPORARY BATTERIES AND SUPERCAPACITORS

INTERNATIONAL SYMPOSIUM  
BELGRADE 2022

## PROGRAM AND BOOK OF ABSTRACTS

June 1-2, 2022,  
Serbian Academy of Sciences and Arts  
Belgrade, Serbia

**COIN2022**

**CONTEMPORARY BATTERIES AND  
SUPERCAPACITORS**

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**Program and Book of Abstracts**

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## SCOPE

Serbian Academy of Sciences and Arts will host world-renowned professors and their collaborators to share their activities and achievements in the energy storage and conversion field, thus shedding light on future opportunities. Besides, Alumni of University of Belgrade will present their ongoing research activities.

The conference will cover different research and industrial perspectives in Europe and also educational activities within the prestigious MESC+ study program. Students will get acquainted with possibilities of upgrading their skills and knowledge through postgraduate studies in the best European and world institutions.

## FOCUS

- Advances and challenges of contemporary batteries and supercapacitors
- Interactive opportunities for students within MESC+ activities.  
<https://mesc-plus.eu>
- Future perspectives on battery research within Battery 2030+ initiative.  
<https://battery2030.eu>
- Future industrial battery developments in Serbia
- Activities within research projects in Europe and especially those in Serbia and Montenegro funded by Science Fund of the Republic of Serbia and NATO Science for Peace and Security Programme

## RESEARCH TOPICS

- Battery and supercapacitor systems
- Metal-ion (Li-, Na-...) batteries
- Metal-air batteries
- Multivalent charge storage systems
- Materials for energy storage and conversion

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## Complex Metal Oxide Oxidation State Changes Monitoring by TGA and Dilatometric Means

Nebojša Labus<sup>1</sup>, Milena Rosić<sup>2</sup> and Maria Čebela<sup>2</sup>

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Oxidation processes during metal oxide heat treatment are important events that can be monitored by the means of well-known TGA/DTA and dimensional change diagrams. Powders  $\text{Mn}_{0.63}\text{Zn}_{0.37}\text{Fe}_2\text{O}_4$  oxide was milled in different time duration and thermal analysis techniques afterwards during heating were observed. Cation that serves this purpose well for is Mn ion that passes through  $\text{Mn}^{2+}$  to  $\text{Mn}^{3+}$  state at 360 °C by oxidation and after that from  $\text{Mn}^{4+}$  to  $\text{Mn}^{3+}$  reduction process at 580 °C. Minimal data treatment of first derivative on shrinkage for obtaining shrinkage rate diagrams and as well first derivative on thermal gravimetric diagram for obtaining differential thermal gravimetric analysis diagram enable the oxidation and reduction processes monitoring.

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### References:

[1] Nebojša Labus, Zorka Vasiljević, Obrad Aleksić, Miloljub Luković, Smilja Marković, Vladimir Pavlović, Slavko Mentus, Maria Vesna, Nikolić, Characterisation of  $\text{Mn}_{0.63}\text{Zn}_{0.37}\text{Fe}_2\text{O}_4$  Powders After Intensive Milling and Subsequent Thermal Treatment, *Science of Sintering*, 49 (2017) 455-467, doi: <https://doi.org/10.2298/SOS1704455L>