MATERIALS RESEARCH SOCIETY OF SERBIA
INSTITUTE OF TECHNICAL SCIENCES OF SASA

Programme and the Book of Abstracts

NINETEENTH YOUNG RESEARCHERS' CONFERENCE MATERIALS SCIENCE AND ENGINEERING

Belgrade, December 1-3, 2021

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Materials Research Society of Serbia
&
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Aim of the Conference

Main aim of the conference is to enable young researchers (post-graduate, master or doctoral student, or a PhD holder younger than 35) working in the field of materials science and engineering, to meet their colleagues and exchange experiences about their research.

Topics

Biomaterials
Environmental science
Materials for high-technology applications
Materials for new generation solar cells
Nanostructured materials
New synthesis and processing methods
Theoretical modelling of materials

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Results of the Conference

Beside printed «Program and the Book of Abstracts», which is disseminated to all conference participants, selected and awarded peer-reviewed papers will be published in journal "Tehnika – Novi Materijali". The best presented papers, suggested by Session Chairpersons and selected by Awards Committee, will be proclaimed at the Closing Ceremony. Part of the award is free-of-charge conference fee at YUCOMAT 2022.

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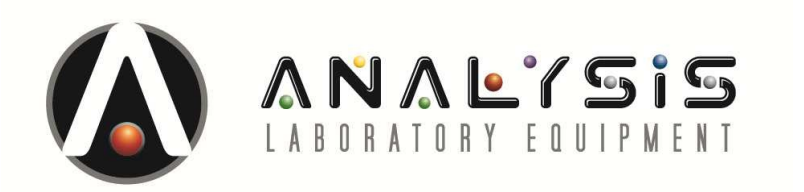

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Simply prepared Mg-V-O as potential cathode material for rechargeable aqueous magnesium ion batteries

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Although today widely used in electronic devices and electric vehicles, lithium ion batteries encounter problem of future application, resulting from limited Li resources, relatively high costs and operational safety problems. Rechargeable magnesium batteries as a potential alternative to the Li-ion ones stand out because of their high theoretical specific capacity, high abundance of Mg resources, atmospheric stability, safety of handling, eco friendliness and low cost. Layered materials including oxides, sulphides and selenides are promising candidates for host materials for Mg^{2+} storage in rechargeable magnesium batteries.
Slow migration of Mg^{2+} in the layered oxides, ascribed to the strong interaction between Mg and neighbouring O atoms, inspires researchers to look for the ways of improving their electrochemical performance. In this work, Mg-V-O material was synthesized by simple precipitation method, followed by thermal annealing. The obtained material is single-phase material consisted of MgV_2O_6 phase, according to the results of XRD, FTIR and Raman spectroscopy. Electrochemical test by cyclic voltammetry in aqueous solution revealed redox peaks corresponding to the insertion/deinsertion of Mg^{2+} ions into/from the material, but with poor current densities. In order to improve the electrochemical performance of the simply prepared Mg-V-O material, carbon was integrated with the Mg-V-O by sucrose-assisted thermal treatment. Although composed of several phases, the obtained Mg-V-O/C material exhibited around 40 times higher maximal specific current values of Mg^{2+} insertion/deinsertion than the Mg-V-O. Also, the electrochemical performance of the Mg-V-O/C for the insertion/deinsertion of Mg^{2+} ions was better than those of Al^{3+} and Li^{+} ions.
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