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YUCOMAT 2021

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Reversible intercalation/deintercalation of lithium ions within γ -LiV₂O₅ polymorph

Miloš Milović¹, Milica Vujković², Dragana Jugović¹, Miodrag Mitrić³

¹Institute of Technical Sciences of SASA, 11 000 Belgrade, Serbia, ²Faculty of Physical Chemistry, University of Belgrade, 11 000 Belgrade, Serbia, ³Vinča Institute of Nuclear Sciences – National Institute of the Republic of Serbia, University of Belgrade, 11 000 Belgrade, Serbia

The electrochemical insertion of lithium ions in V₂O₅ produces various crystal structures depending on lithium concentration. Compositions with lithium content in the range of $1 \leq x \leq 1.8$ take orthorhombic γ -Li_xV₂O₅ form. γ -Li_xV₂O₅ is capable to accommodate more than one lithium ion per formula unit and therefore interesting to be used as a cathode of lithium-ion battery. Here are presented electrochemical performances of γ -LiV₂O₅ obtained through solid-state reaction. Before galvanostatic cycling the as-synthesized powder is characterized by X-ray powder diffraction, field emission scanning electron microscopy, and FTIR spectroscopy. The crystal structure of the powder is refined in the orthorhombic Pbnm space group. During galvanostatic cycling in a large potential window capacity decrease is observed. In order to reveal the origin of capacity decay the bond valence analysis was performed. It provided a model of lithium diffusion network for the γ -Li_xV₂O₅ phase, as well as for the end members obtained at low and high voltages.