Synthesis of Hollow Paramontroseite VO₂ Microspheres as Stable Electrode Materials for Lithium-ion Batteries

Hailong Fei

State Key Laboratory of Photocatalysis on Energy and Environment, College of Chemistry, Fuzhou University, Fuzhou, Fujian 350002, China

E-mail: hailongfei@fzu.edu.cn

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A simple and versatile method was developed to prepare hollow Paramontroseite VO₂ microspheres. Hollow VO₂ microspheres were formed via an Ostwald ripening mechanism. The morphology, crystalline structure and electrochemical performance were systematically studied. It was found that hollow Paramontroseite VO₂ microspheres can be used as stable anode and cathode materials for lithium-ion batteries with acceptable rate cycling performance. In addition, the discharge capacities of hollow paramontroseite VO₂ microsphere-based negative electrodes were found to reach 384.2 mAhg⁻¹ at a current density of 750 mA g⁻¹. A discharge capacity of 195.6 mA g⁻¹ was achieved when the microspheres were used as a cathode material for lithium-ion batteries at a current density of 20 mA g⁻¹. Vanadium-based dual electrode materials are seldom reported in the literature.

Keywords: Paramontroseite VO₂; Hollow microspheres; Anode; Lithium-ion battery; Cathode

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