Hydrothermal Synthesis of Flower-like Fe-doped VO₂(B) with Enhanced Lithium Ion Storage Performance

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Flower-like Fe_xVO₂(B) samples (x=0-0.045mol%) have been successfully fabricated via a hydrothermal method followed with annealing in argon atmosphere at 350°C for 1 h. The physical properties of the prepared samples were analyzed by XRD, XPS, FESEM, and EDS analyses. The electrochemical properties of the prepared samples were characterized by cyclic voltammetry(CV), electrochemical impedance spectroscopy (EIS), and charge-discharge tests. The results demonstrated that Fe doping could enhance the electrochemical reaction reversibility, decrease charge transfer resistance, and increase the specific capacity of VO₂(B). In particular, the Fe_{0.03}VO₂(B) sample showed the best lithium storage performance with initial discharge capacity of 306 mAh g⁻¹ at the current density of 0.1 C in the voltage range from 1.5 to 4.0 V, much higher than that (195 mAh g⁻¹) of the pure VO₂(B).

Keywords: lithium-ion batteries; electrochemical performance; VO₂(B); Fe doping; hydrothermal method

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