Short Communication

Synthesis and Electrochemical Characteristics of $\text{Li}_3\text{V}_2(\text{PO}_4)_3/\text{C}$ as a Novel Li-ion Battery Cathode Material

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Herein, we describe the two-step synthesis of $\text{Li}_3\text{V}_2(\text{PO}_4)_3/\text{C}$, a novel Li-ion battery cathode material, and characterize it by X-ray diffraction, X-ray photoelectron spectroscopy, high-resolution transmission electron microscopy, and electrochemical methods. The obtained results reveal that the above composite has a monoclinic crystal structure and features a carbon-coated surface, consequently exhibiting increased conductivity. Constant current charge-discharge, cyclic voltammetry, and electrochemical impedance spectroscopy tests show that samples annealed at 800°C for 12h exhibit an increased discharge capacity of 130.8 mAh/g (which is close to the theoretical specific capacity of 133 mAh/g) and are characterized by high cycleability in the voltage range of 3.0–4.5 V at 0.1 C, e.g., a discharge capacity of 120.2 mAh/g is observed after 50 cycles, corresponding to a capacity retention of 91.9%.

Keywords: lithium-ion battery, cathode material, $\text{Li}_3\text{V}_2(\text{PO}_4)_3/\text{C}$, two-step synthesis.

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