Short Communication

Hydrothermal Synthesis and Electrochemical Properties of TiO₂ Nanotubes as an Anode Material for Lithium Ion Batteries

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In this work, TiO₂ nanotubes were successfully prepared by using TiO₂ nanoparticles as the precursor through a simple hydrothermal method followed by calcination. The phase structure and surface morphologies of as-prepared TiO₂ nanotubes were identified by X-ray diffraction (XRD), field-emission scanning electron microscope (FESEM) and transmission electron microscope (TEM) measurements. The as-prepared TiO₂ nanotubes presented an obvious one-dimensional nanotube structure with a tube diameter of 4~8 nm and a length of 2~10 μm. The as-prepared TiO₂ nanotubes anode delivered an initial discharge capacity of 300 mAh g⁻¹ at 0.3 C, and retained a discharge capacity of 162 mAh g⁻¹ (about 54% of the initial discharge capacity) after 100 cycles. The electrochemical measurements demonstrated that the as-prepared TiO₂ nanotubes anode offered a relatively high reversible capacities and good cycling stabilities, which could be attributed to the large surface area of nanotubular structure as well as the 1D nanostructure-induced fast migration of lithium ions within TiO₂ nanotubes.

Keywords: TiO₂ nanotubes; Hydrothermal synthesis; Anode materials; Lithium ion batteries

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