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High capacity and fast charge-discharge LTO nanoflakes/TiO_2 nanotubes composite anode material for lithium ion battery

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Lithium titanate (LTO) nanoflakes and titania (TiO_2) nanotubes were synthesized and mechanically mixed to form a composite anode material with high specific capacitance, fast charge-discharge capability, and long cycle life for lithium ion battery. The special chemical and electrochemical characteristics of the nanostructured materials have a synergistic effect which enables the superior electrochemical performance of this material. To analyze the morphological and chemical characteristics of the composite, we have conducted scanning electron microscopy, transmission electron microscopy, X-ray diffraction, X-ray photoelectron spectroscopy, and Brunauer–Emmett–Teller method. To investigate the electrochemical properties of this material, various tests have been conducted including galvanostatic charge-discharge, cyclic voltammetry, and impedance spectroscopy. The charge-discharge tests show that the composite LTO/TiO_2 nanostructured material has increased specific capacitance and cycling performance up to 5 C, which means higher energy and power density for various energy storage applications including automotive use.

Biography

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