Template-free Facile Synthesis of α -MnO₂ Nanorods for Lithium Storage Application

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Herein, we report the preparation of α -MnO₂ nanorods by a simple chemical approach following post-annealing treatment, without using any organic or inorganic templates or surfactants. The nanorods have a diameter of 15-50 nm and a length up to 1-3 μ m. A preliminary investigation on the formation mechanism of the α -MnO₂ nanorods was carried out. As an anode material for lithium ion secondary batteries, they exhibited high reversible capacity, excellent cycling stability, and excellent rate capability. This outstanding electrochemical lithium storage performance is attributed to the nanorod structure and efficient one-dimensional electron transport pathways. This synthetic procedure is straightforward and low-cost, and thus simplifies the mass production of α -MnO₂ nanorods.

Keywords: chemical method; nanorods; lithium ion battery; specific capacity

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