Short Communication

Engineering a Hierarchical Microtubular NiCoO₂ Architecture for Electrochemical Energy Storage Applications

Quande Che*, Fei Ma, Jingwen Wang, Ping Yang*

School of Materials Science and Engineering, University of Jinan, Jinan 250022, China

*E-mail: mse_cheqd@ujn.edu.cn (Q. Che), mse_yangp@ujn.edu.cn (P. Yang)

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This paper demonstrates a novel approach to prepare hierarchical mesoporous NiCoO₂ microtubes *via* a biomorphic mineralization technique by using natural cotton fibers as the template. As an anode material for lithium-ion batteries, the NiCoO₂ microtubes exhibited high reversible capacity, good rate capability, and outstanding cycle performance. Specifically, it delivered a reversible capacity of 603 mA h g⁻¹ at 200 mA g⁻¹ after 50 cycles and a capacity of 470 mA h g⁻¹ at 1200 mA g⁻¹. Importantly, the electrode exhibited a nearly stable cycling performance, with 85.3% capacity retention from 2–50 cycles at 200 mA g⁻¹ with approximately 98% coulombic efficiency. The impressive electrochemical performances can be attributed to two beneficial features of the as-prepared NiCoO₂ microtubes: the hollow porous structure and mesopores, which are accommodated the volume expansion and promoted Li-ion diffusion and electron transfer. Overall, the as-developed hierarchical microtubular mesoporous NiCoO₂ architecture is a prospect material for lithium ion batteries.

Keywords: Nickel cobalt oxides; Hierarchical microtubes; Mesoporous; Lithium ion batteries

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