High-yield and Eco-Friendly Fabrication of Ultra-Long $(\text{NH}_4)_2\text{V}_6\text{O}_{16}\cdot 1.5\text{H}_2\text{O}$ Nanowires and Their Electrochemistry Performances

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doi: 10.20964/2017.06.31

Received: 4 March 2017 / Accepted: 16 April 2017 / Published: 12 May 2017

Ultra-long $(\text{NH}_4)_2\text{V}_6\text{O}_{16}\cdot 1.5\text{H}_2\text{O}$ nanowires are synthesized in high-yield by a chitosan (CTS) assisted hydrothermal approach at 180 °C for 24 h. The as-prepared materials are characterized by various characterization methods. The experimental results reveal that the products are pure $(\text{NH}_4)_2\text{V}_6\text{O}_{16}\cdot 1.5\text{H}_2\text{O}$ single crystals with a width of 200-300 nm and a length of more than 150 μm . Such ultra-long $(\text{NH}_4)_2\text{V}_6\text{O}_{16}\cdot 1.5\text{H}_2\text{O}$ nanowires present great lithium-ion transmission ability, high electrochemical storage capacity. The nanowires deliver initial discharge specific capacity of 183.6 mAh g⁻¹ at 50 mA g⁻¹. After 50 cycles, they still retained discharge specific capacity of 161.6 mAh g⁻¹, exhibiting good cyclic stability.

Keywords: Ultra-long $(\text{NH}_4)_2\text{V}_6\text{O}_{16}\cdot 1.5\text{H}_2\text{O}$ nanowires; hydrothermal approach; electrochemical performance; Li-ion batteries

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