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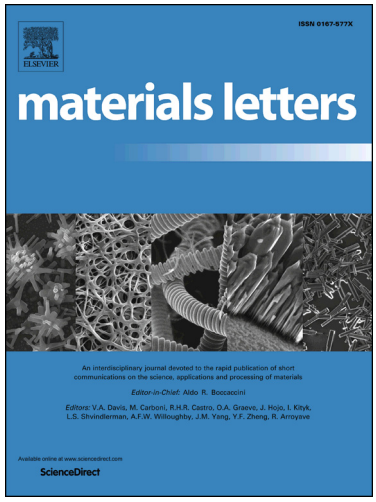

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Hollow microspherical vanadium pentoxide fabricated via non-hydrothermal route for lithium ion batteries

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Abstract

We developed a non-hydrothermal/solvothermal template-free route to synthesize hollow microspherical vanadium pentoxides (V_2O_5). The as-prepared hollow V_2O_5 microspheres demonstrated a higher capacity and improved cycle life when evaluated as cathode materials for LIBs in comparison with commercial V_2O_5.

Keywords: Hollow microstructure; Non-hydrothermal route; V_2O_5; Lithium ion batteries

1. Introduction

Hollow micro/nanostructures have attracted widely interest due to their potential application in the fields of drug delivery, catalysis, adsorption, energy storage and conversion.[1-5] Up to now, many efforts focus on the facile and large-scale synthesis of hollow structures with controllable microstructures, such as porous, core-shelled and yolk-shelled structures. Among these synthesis routes, hydrothermal/solvothermal method is considered as the most popular synthetic strategy for hollow structures.[6-10] Even so, this strategy has well-known bottleneck problems of rigorous condition and high-cost for large-scale production. Therefore, it is highly desirable to develop facile and low-cost approaches for large-scale fabrication of hollow structures.

Vanadium oxides, a family of interesting materials with exceptional catalytic, energy storage and photoelectronic properties.[11-14~~11~~-16] Particularly, hollow V_2O_5 materials have drawn great interest in the field of lithium ion batteries due to their facile Li^+ ions insertion and excellent cycling stability.[~~15,16~~17-18] However, non-hydrothermal/solvothermal and template-free fabrication of hollow structured vanadium oxides with uniformity and desirable morphologies is still a great challenge. In this letter, we report ~~the~~ a non-hydrothermal/solvothermal template-free synthesis strategy for hollow microspherical V_2O_5 through. Compared with commercial V_2O_5, the as-obtained hollow V_2O_5 microspheres exhibited a higher capacity and enhanced cycle life when evaluated as cathode materials for LIBs

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