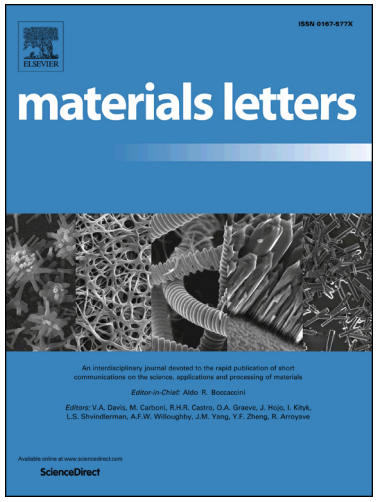

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Synthesis and Li-storage property of flower-like $SbPO_4$ microspheres

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Abstract

Hierarchical $SbPO_4$ flower-like microspheres ($SbPO_4$ FM) have been successfully prepared by a facile solvothermal method. The XRD, TEM, SEM and BET techniques were adopted to inspect the obtained $SbPO_4$ products. Experimental results indicated that the as-prepared $SbPO_4$ flower-like microspheres belonged to a monoclinic phase and were assembled by numerous nanoplates to form hierarchical porous architectures. A self-assembly mechanism accounted for the formation of the as-prepared $SbPO_4$ flower-like microspheres. Besides, the electrochemical Li-storage property was also investigated as an anode for lithium-ion battery.

Keywords: Nanocrystalline materials; Crystal growth; Energy storage and conversion; Microstructure.

1. Introduction

Over the past few decades, lithium-ion batteries (LIBs) have sprung up to be the potential contestants for energy storage and conversion owing to their high capacity, long cycle life, high energy density, and good safety [1]. The commercialized graphite is widely applied as an anode material for LIBs but is subjected to the low capacity and poor rate capability [2]. It is imperative to develop other alternative electrode materials for LIBs with larger capacity.

Recently, 2D materials such as transition metal phosphates [3, 4] become promising anodes for LIBs. Among them, $SbPO_4$ (antimony phosphate) is a layered phosphate applied in material research field related to catalysis, refractories and (doped) glasses [5]. Moreover, $SbPO_4$ can serve as an electrode for LIBs based on redox transitions between Sb^{3+} and Sb metal states as well as alloying reaction of Sb with lithium [6-10], which gives arise to a theoretical capacity of ~742 mAh g^{-1}. Till date, nanosized $SbPO_4$ materials with different morphologies including nanoparticles, nanorods and ribbons

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