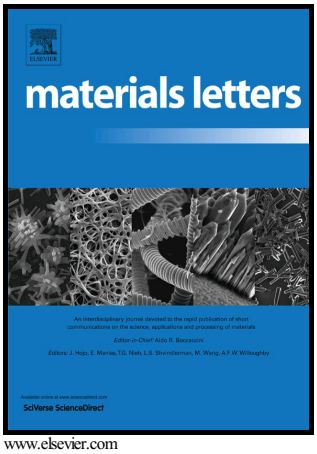

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Sn Nanoparticles Uniformly Dispersed in N-doped Hollow Carbon Nanospheres as Anode for Lithium-ion Batteries

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Abstract

Sn-contained N-doped carbon composite (Sn@NC) with Sn nanoparticles of 5-30 nm uniformly dispersed in N-doped hollow carbon nanosphere matrix was produced by in situ polymerization of pyrrole, and reduction of SnO_2 synchronous with decomposition of polypyrrole. SnO_2 nanospheres serve as both the template of hollow carbon nanospheres and the Sn source. Due to the cooperation of the uniformly dispersed Sn particles and N-doped hollow carbon structure, the obtained Sn@NC shows a reversible capacity of 1070 mA h g^{-1} over 200 cycles at 0.2 C and 500 mA h g^{-1} over 500 cycles at 5 C.

Keywords: Sn nanopartilces; N-doped hollow carbon nanospheres; Lithium-ion batteries; Nanocomposites; Energy storage and conversion

1. Introduction

Nowadays, Sn has been explored as a promising lithium-ion battery anode material owing to the high theoretical capacity (993 mA h g^{-1}) and electronic conductivity.[1, 2] However, Sn suffers from