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Li₂SiO₃@Li₂SnO₃/SnO₂ as a high performance lithium-ion battery material

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Abstract: Li₂SiO₃@Li₂SnO₃/SnO₂ composite has been prepared through a hydro-thermal method.

The composite is with well crystalline and more pure when the doping content of Si powder is 0.3 g. The Li₂SnO₃ is a bulk structure with the diameter of 400 nm while Li₂SiO₃@Li₂SnO₃/SnO₂ possesses the bulk structure heaped together by several nanoparticles, which can relieve the large volume change of the composite and then ensure the well cycling and rate properties. When charged and discharged at the current density of 150 mA/g, the composite shows a high initial discharge capacity of 1205.7 mAh/g.

Key words: lithium-ion battery, Li₂SnO₃, Li₂SiO₃, nanocomposites, energy storage and conversation

1. Introduction

Lithium ion battery is widely used for its advantage of high safety, high energy density and the property of environment-friendly [1, 2]. Li₂SnO₃ has been seen as a potential anode material for lithium ion battery for its high theoretical capacity of >600 mAh/g [3], which is much higher than that of the commercial anode material graphite (372 mAh/g) [4]. However, the disadvantage of large volume change during cycling process (~300%) holds back its commercial application. The large volume change means the damage of the electrode material, which can contribute to the

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