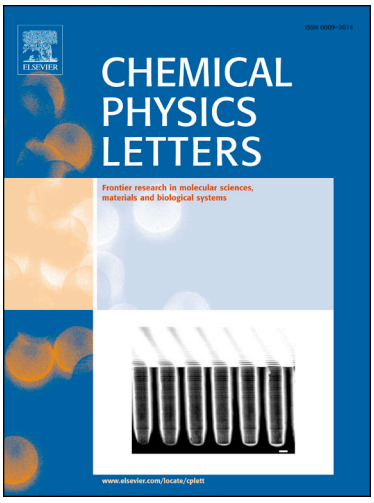

Research paper

The Mg/Zr codoping on morphology and electrochemical properties of $Li_4Ti_5O_{12}$ anode materials

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PII: S0009-2614(18)30737-1
DOI: https://doi.org/10.1016/j.cplett.2018.09.012
Reference: CPLETT 35924

To appear in: *Chemical Physics Letters*

Received Date: 30 June 2018
Revised Date: 29 August 2018
Accepted Date: 7 September 2018

Please cite this article as: Q. Li, B. Xue, Y. Tan, J. Sun, K. Wang, The Mg/Zr codoping on morphology and electrochemical properties of $Li_4Ti_5O_{12}$ anode materials, *Chemical Physics Letters* (2018), doi: https://doi.org/10.1016/j.cplett.2018.09.012

The Mg/Zr codoping on morphology and electrochemical properties of $Li_4Ti_5O_{12}$ anode materials

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Abstract: Homogeneous nanoparticles of $Li_4Ti_5O_{12}$ are prepared by solid-state method assisted with codoping of Mg and Zr. In this present study, orthogonal test is taken and the optimal case is $Li_{3.9}Mg_{0.1}Ti_{3.95}Zr_{0.05}O_{12}$ heated at 750℃ for 10h. We find temperature and Mg ions are the more powerful factors on particles size and morphology. The results show $Li_{3.9}Mg_{0.1}Ti_{3.95}Zr_{0.05}O_{12}$ have the most fine particles with diameters distributed in the range of 10-100nm and have relatively good rate capacity and cycling stability. Moreover, $Li_{3.9}Mg_{0.1}Ti_{3.95}Zr_{0.05}O_{12}$ first discharge capacity is 186.6mAhg^{-1} at 0.57C, the pure $Li_4Ti_5O_{12}$ is 164.7mAhg^{-1} at 0.57C. The electrochemical of $Li_{3.9}Mg_{0.1}Ti_{3.95}Zr_{0.05}O_{12}$ improved obviously.

Key words: Mg-Zr codoped $Li_4Ti_5O_{12}$ solid-state method orthogonal test

1. Introduction

In response to the demands for next generation electric vehicles（EVs）and hybrid electric vehicles (HEVs) , lithium ion batteries which are light weight, cost effective, high safety and long lasting have become the research focus[12]. Conventional anode materials carbon cannot meet the requirement of high safety as its product lithiun