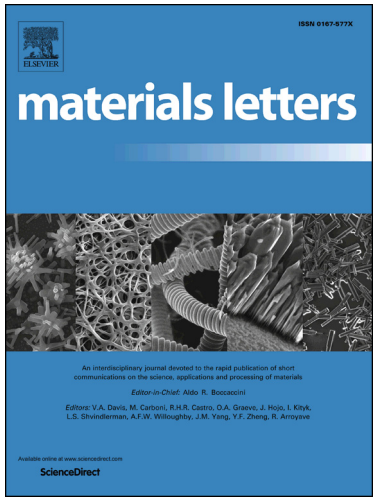
Accepted Manuscript



The smart fabrication of interconnected microspheres constructed by $Li_4Ti_5O_{12}$ regular nanosheets and their lithium storage properties

Qinghua Tian, Jizhang Chen, Zhengxi Zhang, Li Yang

PII: S0167-577X(17)30218-5
DOI: http://dx.doi.org/10.1016/j.matlet.2017.02.037
Reference: MLBLUE 22139

To appear in: *Materials Letters*

Received Date: 1 December 2016
Revised Date: 10 January 2017
Accepted Date: 12 February 2017

Please cite this article as: Q. Tian, J. Chen, Z. Zhang, L. Yang, The smart fabrication of interconnected microspheres constructed by $Li_4Ti_5O_{12}$ regular nanosheets and their lithium storage properties, *Materials Letters* (2017), doi: http://dx.doi.org/10.1016/j.matlet.2017.02.037

The smart fabrication of interconnected microspheres constructed by $Li_4Ti_5O_{12}$ regular nanosheets and their lithium storage properties

Qinghua Tian[a,b]*, Jizhang Chen[c], Zhengxi Zhang[b] and Li Yang [b*]

[a]*Department of Chemistry, School of Sciences, Zhejiang Sci-Tech University, Hangzhou 310018, P. R. China*

[b]*School of Chemistry and Chemical Engineering, Shanghai Jiao Tong University, Shanghai 200240, P. R. China*

[c]*College of Materials Science and Engineering, Nanjing Forestry University, Nanjing 210037, P. R. China*

**Corresponding author e-mail address: liyangce@sjtu.edu.cn, 09tqinghua@163.com*

Abstract: Herein, a unique hierarchical structure of interconnected microspheres constructed by regular lithium titanate ($Li_4Ti_5O_{12}$) nanosheets has been prepared via a facile and smart approach. When evaluated as anode materials for lithium-ion batteries (LIBs), the as-prepared $Li_4Ti_5O_{12}$ shows outstanding lithium storage performance, delivering a high reversible specific capacity of 161.9 and 141.1 mAh g^{-1} after 300 and 1200 cycles at 20 and 200 mA g^{-1}, respectively. This work may open up a broader vision into developing advanced $Li_4Ti_5O_{12}$ anode materials for LIBs.

Keywords: Crystal structure; Functional; Lithium titanate; Anode; Lithium-ion batteries

1 Introduction

Currently, thanks to the intrinsic characteristics of zero strain and safe operation potential, $Li_4Ti_5O_{12}$ (denoted as LTO) has attracted great attention as a promising anode for advanced LIBs [1-3]. Nevertheless, its wide practical use is yet hindered by two major drawbacks: one is the inherently kinetic problem, that is, low electrical conductivity and lithium-ion diffusion coefficient, eventually lead to rate capability poor [4]; the other one is the relatively low theoretical capacity of 175 mAh g^{-1} [3]. One of the strategies for effectively overcoming above mentioned issues is design and fabrication of nanoscale LTO materials [5]. Thus, many LTO anodes with elaborate