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The smart fabrication of interconnected microspheres constructed by $\text{Li}_4\text{Ti}_5\text{O}_{12}$ regular nanosheets and their lithium storage properties

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Abstract: Herein, a unique hierarchical structure of interconnected microspheres constructed by regular lithium titanate ($\text{Li}_4\text{Ti}_5\text{O}_{12}$) nanosheets has been prepared via a facile and smart approach. When evaluated as anode materials for lithium-ion batteries (LIBs), the as-prepared $\text{Li}_4\text{Ti}_5\text{O}_{12}$ 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 $\text{Li}_4\text{Ti}_5\text{O}_{12}$ 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, $\text{Li}_4\text{Ti}_5\text{O}_{12}$ (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

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