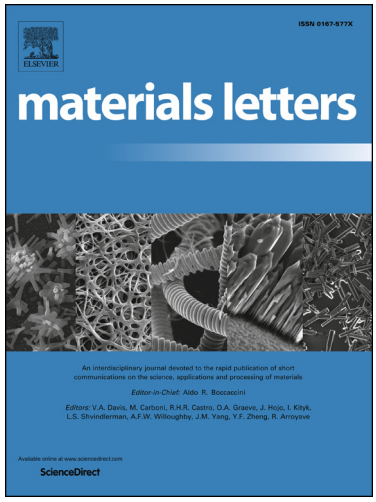

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Yu Xia,[†] *Wan-Sheng Xiong,*[†] *Yun Jiang,*[†] *Si-Yu Zhou,*[†] *Cheng-Long Hu,*[†] *Rong-Xiang He,*[†] *Hong-Qian Sang,*[†] *Bolei Chen,*[†] *Yumin Liu,**[†] *and Xing-Zhong Zhao*[†,§]

[†] Institute for Interdisciplinary Research, Key Laboratory of Optoelectronic Chemical Materials and Devices, Ministry of Education, Jianghan University, Wuhan 430056, China.

[§] School of Physics and Technology, Key Laboratory of Artificial Micro/Nano Structures, Ministry of Education, Wuhan University, Wuhan 430072, China.

E-mail: ymliu@jhun.edu.cn

ABSTRACT

Controllable three-dimensional villose titanium dioxide architectures grown on carbon textiles are fabricated by a facile one-step *in-situ* hydrothermal method at low temperatures. It has in fact been proven to be an effective method to reduce self-aggregation and promote lithium-ion intercalate/extract via building 3D architectures based on 2D conductive materials. More importantly, the freestanding electrodes without any addition of conductive agents and polymeric binders reveal significant improvement in high-rate capacity and cycling performance.

KEYWORDS: controllable TiO_2 architecture; carbon textile; *in-situ* growth; flexible anode; lithium-ion battery.

1. Introduction

High performance lithium-ion batteries (LIBs) with fast charge and discharge rate have attracted intensive research to power future advanced plug-in hybrid electric and electric vehicles [1,2]. Owing to the safety concerns of graphite, such as the formation of lithium dendrite and thermal instability of solid-electrolyte interphase (SEI) film, substantial efforts have been devoted to advanced anode materials over the past decades [3-7]. Titanium dioxide has been regarded as one of the most promising