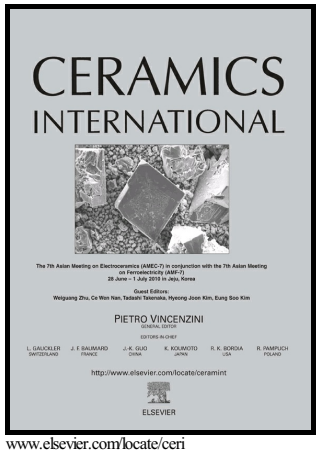

www.elsevier.com/locate/ceri

Enhancing the Lithium Storage Capabilities of TiO_2 Nanoparticles Using Delaminated MXene Supports

Shuhao Xiao, Xiaoqiang Zhang, Junwei Zhang, Shiming Wu, Jin Wang, Jun Song Chen, Tingshuai Li

PII: S0272-8842(18)31674-2
DOI: https://doi.org/10.1016/j.ceramint.2018.06.228
Reference: CERI18672

To appear in: *Ceramics International*

Received date: 16 June 2018
Revised date: 23 June 2018
Accepted date: 27 June 2018

Cite this article as: Shuhao Xiao, Xiaoqiang Zhang, Junwei Zhang, Shiming Wu, Jin Wang, Jun Song Chen and Tingshuai Li, Enhancing the Lithium Storage Capabilities of TiO_2 Nanoparticles Using Delaminated MXene Supports, *Ceramics International,* https://doi.org/10.1016/j.ceramint.2018.06.228

Enhancing the Lithium Storage Capabilities of TiO_2 Nanoparticles Using Delaminated MXene Supports

Shuhao Xiao[1], Xiaoqiang Zhang[1], Junwei Zhang[3],
Shiming Wu[2], Jin Wang[2], Jun Song Chen[1]*, Tingshuai Li [1]*

[1] School of Materials and Energy, University of Electronic Science and Technology of China, 2006 Xiyuan Ave, West Hi-Tech Zone, 611731, Chengdu, Sichuan, PR China

[2] Dongfang Electric Corporation, & Co., Ltd, Chengdu, Sichuan 610041, PR China.

[3] North China University of Science and Technology，21 Bohai Road, Caofeidian Xincheng, Tangshan 063210, Hebei, China

*Corresponding author Tel.: +086-18200234059; fax: +86-028-61831080.

*E-mail: litingshuai@uestc.edu.cn

Abstract

MXenes, an emerging family of two-dimensional materials, were promising electrode materials due to their excellent electronic conductivity and hydrophilicity. MXenes exhibit extraordinary rate performance and cycling stability when serving as the anode materials for Li-ion batteries, but they have relatively low capacities. We thus prepared $Ti_3C_2T_x/TiO_2$ composites using a simple route to coat TiO_2 nanoparticles onto the delaminated few-layered MXenes, which functioned as spacers in the composite to suppress the restacking of MXene layers. The sample demonstrated excellent performance in the galvanostatic charge-discharge test, where a reversible capacity of 143 mAh g^{-1} could still be maintained after 200 cycles at 0.5 A g^{-1} and a distinct plateau region could be clearly observed in the charge-discharge profiles. Density Theory Function calculation revealed that the hybridization of few-layered MXene was able to improve the structural stability of the composite