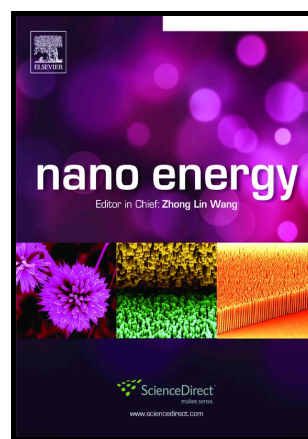


Author's Accepted Manuscript

Superior Performance of Ordered Macroporous TiNb_2O_7 Anodes for Lithium Ion Batteries: Understanding from the Structural and Pseudocapacitive Insights on Achieving High Rate Capability

Shuaifeng Lou, Xinqun Cheng, Yang Zhao, Andrew Lushington, Jinlong Gao, Qin Li, Pengjian Zuo, Biqiong Wang, Yunzhi Gao, Yulin Ma, Chunyu Du, Geping Yin, Xueliang Sun



PII: S2211-2855(17)30065-4
DOI: <http://dx.doi.org/10.1016/j.nanoen.2017.01.058>
Reference: NANOEN1772

To appear in: *Nano Energy*

Received date: 6 November 2016
Revised date: 30 January 2017
Accepted date: 31 January 2017

Cite this article as: Shuaifeng Lou, Xinqun Cheng, Yang Zhao, Andrew Lushington, Jinlong Gao, Qin Li, Pengjian Zuo, Biqiong Wang, Yunzhi Gao, Yulin Ma, Chunyu Du, Geping Yin and Xueliang Sun, Superior Performance of Ordered Macroporous TiNb_2O_7 Anodes for Lithium Ion Batteries Understanding from the Structural and Pseudocapacitive Insights on Achieving High Rate Capability, *Nano Energy* <http://dx.doi.org/10.1016/j.nanoen.2017.01.058>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Superior Performance of Ordered Macroporous TiNb_2O_7 Anodes for Lithium Ion Batteries: Understanding from the Structural and Pseudocapacitive Insights on Achieving High Rate Capability

Shuaifeng Lou^{a,b}, Xinqun Cheng^a, Yang Zhao^b, Andrew Lushington^b, Jinlong Gao^a, Qin Li^a, Pengjian Zuo^a, Biqiong Wang^b, Yunzhi Gao^a, Yulin Ma^a, Chunyu Du^a, Geping Yin^{a*}, Xueliang Sun^{b*}

^aMIT Key Laboratory of Critical Materials Technology for New Energy Conversion and Storage, School of Chemistry and Chemical Engineering, Harbin Institute of Technology, Harbin 150001, China

^bDepartment of Mechanical and Materials Engineering, University of Western Ontario, London, ON, Canada N6A 5B9

yingeping@hit.edu.cn

xsun@eng.uwo.ca

Abstract:

Titanium niobium oxide (TiNb_2O_7) has been regarded as a promising anode material for high-rate lithium ion batteries (LIBs) due to its potential to operate at high rates with improved safety and high theoretical capacity of 387 mA h g^{-1} . Herein, three-dimensionally ordered macroporous (3DOM) TiNb_2O_7 composed of interconnected single-crystalline nanoparticles was prepared using polystyrene (PS) colloidal crystals as a hard template. The final products yields a homogeneous, continuous, and effective honeycomb-like construction. This architecture provides facile Li^+ insertion/extraction and fast electron transfer pathway, enabling high-performance lithium ion pseudocapacitive behavior, leading to good electrochemical performance. As a result, the 3DOM- TiNb_2O_7 shows a remarkable rate capability (120 mA h g^{-1} at 50 C) and durable long-term cyclability (82% capacity retention over 1000 cycles at 10 C). The work presented herein holds great promise for future design

Download English Version:

<https://daneshyari.com/en/article/5451905>

Download Persian Version:

<https://daneshyari.com/article/5451905>

[Daneshyari.com](https://daneshyari.com)