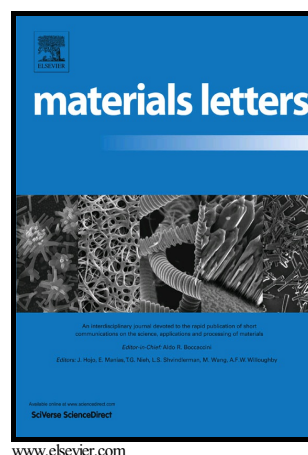


A facile hydrothermal synthesis of tungsten doped monoclinic vanadium dioxide with B phase for supercapacitor electrode with pseudocapacitance

Yifu Zhang, Yuting Huang



PII: S0167-577X(16)31101-6  
DOI: <http://dx.doi.org/10.1016/j.matlet.2016.07.007>  
Reference: MLBLUE21135

To appear in: *Materials Letters*

Received date: 27 May 2016  
Revised date: 29 June 2016  
Accepted date: 3 July 2016

Cite this article as: Yifu Zhang and Yuting Huang, A facile hydrothermal synthesis of tungsten doped monoclinic vanadium dioxide with B phase for supercapacitor electrode with pseudocapacitance, *Materials Letters* <http://dx.doi.org/10.1016/j.matlet.2016.07.007>

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

# A facile hydrothermal synthesis of tungsten doped monoclinic vanadium dioxide with B phase for supercapacitor electrode with pseudocapacitance

Yifu Zhang\*, Yuting Huang

School of Chemistry, Dalian University of Technology, Dalian 116024, PR China

\*Corresponding author. E-mail address: yfzhang@dlut.edu.cn

## Abstract

Tungsten doped monoclinic vanadium dioxide with B phase (W-doped VO<sub>2</sub>(B)) was successfully synthesized by a facile hydrothermal route. The composition, structure and morphology were characterized by EDS, element mapping, XRD, XRF and TEM. The results showed that W atom was successfully doped into the crystal lattice of VO<sub>2</sub>(B) matrix, and the homogeneous solid-solutions of W-doped VO<sub>2</sub>(B) nanobelts were prepared. The electrochemical properties of W-doped VO<sub>2</sub>(B) nanobelts as a supercapacitor electrode were investigated by cyclic voltammetry (CV) and galvanostatic charge-discharge (GCD) methods. W-doped VO<sub>2</sub>(B) nanobelts displayed excellent pseudocapacitance property and their specific capacitance were 253, 239, 207, 164 and 148 F·g<sup>-1</sup> at the current density of 1, 2, 5, 10 and 20 A·g<sup>-1</sup>, respectively. They also exhibited excellent energy densities of 323, 305, 265, 209 and 189 W·h·kg<sup>-1</sup> at power densities of 2882, 5758, 14433, 28828 and 57661 W·kg<sup>-1</sup>. The results showed the electrochemical performance of VO<sub>2</sub>(B) can be greatly improved by W-doped VO<sub>2</sub>(B).

## Graphical Abstract

W-doped VO<sub>2</sub>(B) nanobelts exhibit the specific capacitance of 253 F·g<sup>-1</sup> at the current density of 1 A·g<sup>-1</sup> and retain 148 F·g<sup>-1</sup> even at high current density of 20 A·g<sup>-1</sup>.

Download English Version:

<https://daneshyari.com/en/article/8016365>

Download Persian Version:

<https://daneshyari.com/article/8016365>

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