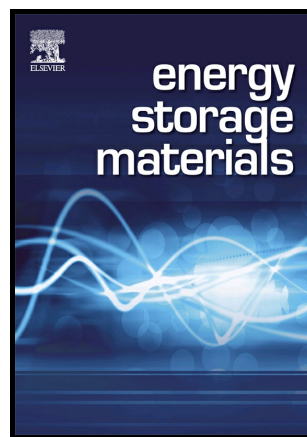


Author's Accepted Manuscript

Interfacial Engineering of Metal Oxide/Graphene Nanoscrolls with Remarkable Performance for Lithium Ion Batteries

Zhigang Zhang, Jinping Zhao, Jin Zhou, Yi Zhao, Xiaonan Tang, Shuping Zhuo



PII: S2405-8297(17)30016-8
DOI: <http://dx.doi.org/10.1016/j.ensm.2017.03.003>
Reference: ENSM129

To appear in: *Energy Storage Materials*

Received date: 7 January 2017
Revised date: 3 March 2017
Accepted date: 3 March 2017

Cite this article as: Zhigang Zhang, Jinping Zhao, Jin Zhou, Yi Zhao, Xiaonan Tang and Shuping Zhuo, Interfacial Engineering of Metal Oxide/Graphene Nanoscrolls with Remarkable Performance for Lithium Ion Batteries, *Energy Storage Materials*, <http://dx.doi.org/10.1016/j.ensm.2017.03.003>

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 a 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.

Interfacial Engineering of Metal Oxide/Graphene Nanoscrolls with Remarkable Performance for Lithium Ion Batteries*Zhigang Zhang, Jinping Zhao^{*}, Jin Zhou, Yi Zhao, Xiaonan Tang, Shuping Zhuo^{*}*

School of Chemical Engineering, Shandong University of Technology, Zibo 255049, P. R. China

jpzhao@sdut.edu.cn

zhuosp_academic@yahoo.com

Abstract

The strong interfacial interaction between graphene nanosheets (GNS) and metal oxides (MO) intensively enhances Li^+ diffusion, achieving superior rate capability and excellent cycle stability as such interaction strongly restricts the expansion of MO near the interface during lithiation. However, how to design strong interface between GNS and MO is a challenge. Herein, strong interface was achieved by adding sodium citrate (SC) during the dispersion and mixing process of GO and MO (i.e., Fe_3O_4 , Co_3O_4 and NiO). The use of SC enables better dispersion of MO particles and allows every MO particle to be attached on the GNS. The discharge capacity of $\text{Fe}_3\text{O}_4@\text{GNS}(\text{SC})$ was 1882 mAh g^{-1} in the second cycle at 0.1 C which is higher than $\text{Fe}_3\text{O}_4@\text{GNS}$ (1120 mAh g^{-1}), and maintained at 1610 mAh g^{-1} after 100 cycles much better than that of $\text{Fe}_3\text{O}_4@\text{GNS}$ (810 mAh g^{-1}). The $\text{Fe}_3\text{O}_4@\text{GNS}(\text{SC})$ composite material also delivered excellent rate performance of 1035 mAh g^{-1} at 1C, in contrast to $\text{Fe}_3\text{O}_4@\text{GNS}$ (680 mAh g^{-1}). In the case of NiO and Co_3O_4 , the corresponding composites displayed the same tendency as $\text{Fe}_3\text{O}_4@\text{GNS}(\text{SC})$. These results imply that SC with an oxygen functional group and short carbon chain can ensure a large contact area between MO and GNS and short diffusion path for lithium ions in the

Download English Version:

<https://daneshyari.com/en/article/5453714>

Download Persian Version:

<https://daneshyari.com/article/5453714>

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