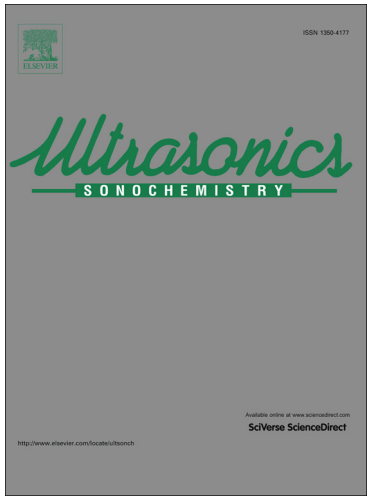

One-pot sonochemical synthesis of magnetite@reduced graphene oxide nanocomposite for high performance Li ion storage

Kaipeng Wu, Diwei Liu, Weiwei Lu, Kuibao Zhang

PII: S1350-4177(18)30477-2
DOI: https://doi.org/10.1016/j.ultsonch.2018.03.015
Reference: ULTSON 4128

To appear in: *Ultrasonics Sonochemistry*

Received Date: 17 November 2017
Revised Date: 17 March 2018
Accepted Date: 24 March 2018

Please cite this article as: K. Wu, D. Liu, W. Lu, K. Zhang, One-pot sonochemical synthesis of magnetite@reduced graphene oxide nanocomposite for high performance Li ion storage, *Ultrasonics Sonochemistry* (2018), doi: https://doi.org/10.1016/j.ultsonch.2018.03.015

One-pot sonochemical synthesis of magnetite@reduced graphene oxide nanocomposite for high performance Li ion storage

Kaipeng Wu,* Diwei Liu, Weiwei Lu, Kuibao Zhang*

State Key Laboratory Cultivation Base for Nonmetal Composites and Functional Materials, Southwest University of Science and Technology, Mianyang 621010, China

*Corresponding author, E-mail: wukaipeng@126.com (K.Wu), xiaobao320@163.com (K.Zhang).

Abstract

In this research, we introduce a one-pot sonochemical method for the fabrication of magnetite@reduced graphene oxide (Fe_3O_4@rGO) nanocomposite as anode material for Li-ion batteries. Fe_3O_4@rGO is synthesized under ultrasonic irradiations by using iron (II) salt and GO as raw materials. An in-situ oxidation-reduction occurs between GO and Fe^{2+} during the ultrasonic chemical reaction process. Fe_3O_4 particles with the size of ~20 nm are uniformly deposited on the surface of rGO nanosheets. The electrochemical activity of Fe_3O_4@rGO is systematically evaluated as an anode material in Li-ion battery. Li-ion cells using Fe_3O_4@rGO as electrode deliver high discharge and charge capacities of 1433.6 and 907.8 mAh g^{-1} in the initial cycle at 200 mA g^{-1}. Even performed at 500 and 5000 mA g^{-1}, it is able to deliver reversible capacities of 846.4 and 355.6 mAh g^{-1}, respectively, demonstrating outstanding Li-ion storage performance. This research presents a straightforward and efficient method for the fabrication of Fe_3O_4@rGO, which holds great potential in synthesis of other metal oxides on graphene sheets.

Key Words: Sonochemical synthesis; Fe_3O_4@rGO; Nanocomposite; Electrochemical