

# Accepted Manuscript

Full Length Article

## Fe<sub>3</sub>O<sub>4</sub>@NiS<sub>x</sub>/rGO Composites with Amounts of Heterointerfaces and Enhanced Electrochemical Properties for Oxygen Evolution

Guoxing Zhu, Xulan Xie, Yuanjun Liu, Xiaoyun Li, Keqiang Xu, Xiaoping Shen, Yinjie Yao, Sayyar Ali Shah

PII: S0169-4332(18)30441-0  
DOI: <https://doi.org/10.1016/j.apsusc.2018.02.097>  
Reference: APSUSC 38555

To appear in: *Applied Surface Science*

Received Date: 19 December 2017  
Revised Date: 7 February 2018  
Accepted Date: 9 February 2018

Please cite this article as: G. Zhu, X. Xie, Y. Liu, X. Li, K. Xu, X. Shen, Y. Yao, S. Ali Shah, Fe<sub>3</sub>O<sub>4</sub>@NiS<sub>x</sub>/rGO Composites with Amounts of Heterointerfaces and Enhanced Electrochemical Properties for Oxygen Evolution, *Applied Surface Science* (2018), doi: <https://doi.org/10.1016/j.apsusc.2018.02.097>

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 proof before it is published in its final 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.



# **Fe<sub>3</sub>O<sub>4</sub>@NiS<sub>x</sub>/rGO Composites with Amounts of Heterointerfaces and Enhanced Electrocatalytic Properties for Oxygen Evolution**

Guoxing Zhu,<sup>a,\*</sup> Xulan Xie,<sup>a</sup> Yuanjun Liu,<sup>b</sup> Xiaoyun Li,<sup>a</sup> Keqiang Xu,<sup>a</sup> Xiaoping Shen,<sup>a,\*</sup> Yinjie Yao,<sup>a</sup> Sayyar Ali Shah<sup>a</sup>

<sup>a</sup>School of Chemistry and Chemical Engineering, Jiangsu University, Zhenjiang 212013, China

E-mail: [zhuguoxing@ujs.edu.cn](mailto:zhuguoxing@ujs.edu.cn); [xiaopingshen@ujs.edu.cn](mailto:xiaopingshen@ujs.edu.cn)

<sup>b</sup>School of Environmental and Chemical Engineering, Jiangsu University of Science and Technology, Zhenjiang 202018, China

## **Abstract**

The sluggish oxygen evolution kinetics involved in water splitting and various metal-air batteries makes the effective and inexpensive electrocatalysts be highly desirable for oxygen evolution reaction (OER). Herein, an effective and facile two-step route is developed to construct Fe<sub>3</sub>O<sub>4</sub>@NiS<sub>x</sub> composite loaded on reduced graphene oxide (rGO). The morphology and microstructure of the composites were characterized by different characterization techniques. The obtained composites show amounts of heterointerfaces. The shift of binding energy in X-ray photoelectron spectrum demonstrates the existence of interfacial charge transfer effect between Fe<sub>3</sub>O<sub>4</sub> and NiS<sub>x</sub>. The optimized Fe<sub>3</sub>O<sub>4</sub>@ /rGO sample exhibits excellent electrocatalytic performance toward OER in alkaline media, showing 10 mA·cm<sup>-2</sup> at  $\eta = 330$  mV, lower Tafel slope (35.5 mV·dec<sup>-1</sup>), and good durability, demonstrating a great perspective. The excellent OER performance can be ascribed to the synergetic effect between Fe and Ni species. It is believed that the heterointerfaces between Fe<sub>3</sub>O<sub>4</sub> and NiS<sub>x</sub> perform as active centers for OER.

**Keywords:** Heterointerfaces; Oxygen evolution; Nickel sulfides; FeNi materials; Electrocatalysts; Iron oxide

Download English Version:

<https://daneshyari.com/en/article/7834799>

Download Persian Version:

<https://daneshyari.com/article/7834799>

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