

# Accepted Manuscript

Nickel-iron diselenide hollow nanoparticles with strongly hydrophilic surface for enhanced oxygen evolution reaction activity

Lin Lv, Zhishan Li, Yunjun Ruan, Yaoxing Chang, Xiang Ao, Jian-Gang Li, Zhaoxi Yang, Chundong Wang



PII: S0013-4686(18)31806-1

DOI: [10.1016/j.electacta.2018.08.039](https://doi.org/10.1016/j.electacta.2018.08.039)

Reference: EA 32473

To appear in: *Electrochimica Acta*

Received Date: 21 May 2018

Revised Date: 6 July 2018

Accepted Date: 8 August 2018

Please cite this article as: L. Lv, Z. Li, Y. Ruan, Y. Chang, X. Ao, J.-G. Li, Z. Yang, C. Wang, Nickel-iron diselenide hollow nanoparticles with strongly hydrophilic surface for enhanced oxygen evolution reaction activity, *Electrochimica Acta* (2018), doi: 10.1016/j.electacta.2018.08.039.

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.

# Nickel-iron diselenide hollow nanoparticles with strongly hydrophilic surface for enhanced oxygen evolution reaction activity

Lin Lv, Zhishan Li, Yunjun Ruan, Yaoxing Chang, Xiang Ao, Jian-Gang Li, Zhaoxi Yang and Chundong Wang\*

*School of Optical and Electronic Information, Huazhong University of Science and Technology, Wuhan 430074, P.R. China*

## ABSTRACT

It is highly desired while remains challenging to explore stable, earth-abundant, low-cost, and high-efficient electrocatalysts towards eco-friendly utilization of green energy. In this study, we report a one-pot hydrothermal synthesis of polyvinyl-pyrrolidone (PVP)-decorated nickel-iron diselenide hollow nanoparticles with strongly hydrophilic surface, the hollow architecture of which could be assigned to the Kirkendall effect. As the lactam groups in PVP are strongly polar and incline to interact with water molecules, the surface wettability of the electrocatalyst was effectively improved after PVP was introduced. Compared with the pristine one, such PVP decorated nickel-iron diselenide hollow nanoparticles demands only a low overpotential of 255 mV to drive a geometrical current density of  $10 \text{ mA cm}^{-2}$  in 1 M KOH aqueous solution. Moreover, this PVP involved electrocatalyst yields a low Tafel slope of  $56 \text{ mV dec}^{-1}$  and possesses remarkably long-term durability. This surface engineering insight provides an indication for fabrication of high-efficient OER electrocatalysts.

**Keywords:** Electrocatalyst, Selenide, Hollow structures, Hydrophilic surface, Kirkendall effect

---

\*Corresponding author.

E-mail address: [apcdwang@hust.edu.cn](mailto:apcdwang@hust.edu.cn) (C.D. Wang).

Download English Version:

<https://daneshyari.com/en/article/6601749>

Download Persian Version:

<https://daneshyari.com/article/6601749>

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