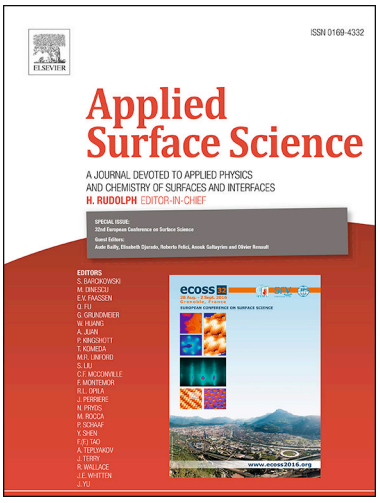
Accepted Manuscript



Full Length Article

Heterostructured binary Ni-W sulfides nanosheets as pH-universal electrocatalyst for hydrogen evolution

Shan-Shan Lu, Xiao Shang, Li-Ming Zhang, Bin Dong, Wen-Kun Gao, Fang-Na Dai, Bin Liu, Yong-Ming Chai, Chen-Guang Liu

PII: S0169-4332(18)30862-6
DOI: https://doi.org/10.1016/j.apsusc.2018.03.177
Reference: APSUSC 38925

To appear in: *Applied Surface Science*

Received Date: 15 January 2018
Revised Date: 18 March 2018
Accepted Date: 22 March 2018

Please cite this article as: S-S. Lu, X. Shang, L-M. Zhang, B. Dong, W-K. Gao, F-N. Dai, B. Liu, Y-M. Chai, C-G. Liu, Heterostructured binary Ni-W sulfides nanosheets as pH-universal electrocatalyst for hydrogen evolution, *Applied Surface Science* (2018), doi: https://doi.org/10.1016/j.apsusc.2018.03.177

Heterostructured binary Ni-W sulfides nanosheets as pH-universal electrocatalyst for hydrogen evolution

Shan-Shan Lu, Xiao Shang, Li-Ming Zhang, Bin Dong*, Wen-Kun Gao,

Fang-Na Dai, Bin Liu, Yong-Ming Chai*, Chen-Guang Liu

College of Science, State Key Laboratory of Heavy Oil Processing, China University of Petroleum (East China), Qingdao 266580, PR China

Abstract

Developing effective and robust electrocatalysts that are applicable for different pH conditions is promising for variable industrial hydrogen evolution reaction (HER), whereas it remains challenging for designing proper materials and protocols. Herein, we have developed a two-step electrodeposition-hydrothermal strategy to construct heterostructured binary Ni-W sulfides nanosheets based on carbon fiber (NiWS/CF). The electrodeposited nickel oxides film on CF in the first step is sulfurized and concurrently incorporated with tungsten disulfide in the following hydrothermal process. Benefiting from synergistic advantages of bimetallic sulfides as well as interwoven nanosheets for efficient mass/charge transport, the NiWS/CF electrode shows excellent HER performances over a broad pH range from acidic (pH=0), neutral (pH=7) to alkaline (pH=14) media. The NiWS/CF electrode also presents stability in long-term electrolysis in wide PH range for at least 12 h, and its interlaced nanosheets structure are well maintained. Our work may provide general and

* Corresponding author. Email: dongbin@upc.edu.cn (B. Dong), ymchai@upc.edu.cn (Y.-M. Chai)

Tel: +86-532-86981376, Fax: +86-532-86981787