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PII: S2211-2855(18)30506-8  
DOI: <https://doi.org/10.1016/j.nanoen.2018.07.018>  
Reference: NANOEN2885

To appear in: *Nano Energy*

Received date: 5 March 2018  
Revised date: 7 July 2018  
Accepted date: 10 July 2018

Cite this article as: Tingcha Wei, Yanan Zhu, Zhenao Gu, Xiaoqiang An, Li-min Liu, Yuxuan Wu, Huijuan Liu, Junwang Tang and Jiuhui Qu, Multi-Electric Field Modulation for Photocatalytic Oxygen Evolution: Enhanced Charge Separation by Coupling Oxygen Vacancies with Faceted Heterostructures, *Nano Energy*, <https://doi.org/10.1016/j.nanoen.2018.07.018>

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# Multi-Electric Field Modulation for Photocatalytic Oxygen Evolution: Enhanced Charge Separation by Coupling Oxygen Vacancies with Faceted Heterostructures

Tingcha Wei<sup>a,b</sup>, Yanan Zhu<sup>b</sup>, Zhenao Gu<sup>d</sup>, Xiaoqiang An<sup>a,c,\*</sup>, Li-min Liu<sup>b,\*</sup>, Yuxuan Wu<sup>b</sup>, Huijuan Liu<sup>a,c</sup>,  
Junwang Tang<sup>e,\*</sup> and Jiuhui Qu<sup>a,d</sup>

<sup>a</sup> Center for Water and Ecology, Tsinghua University, Beijing 100084, China

<sup>b</sup> Beijing Computational Science Research Center, Beijing 100193, China.

<sup>c</sup> School of Environment, State Key Joint Laboratory of Environment Simulation and Pollution Control, Tsinghua University, Beijing 100084, China

<sup>d</sup> University of Chinese Academy of Sciences, Beijing 100049, China.

<sup>e</sup> Department of Chemical Engineering, University College London, Torrington Place, London, WC1E 7JE, UK.

E-mail: xqan@mail.tsinghua.edu.cn

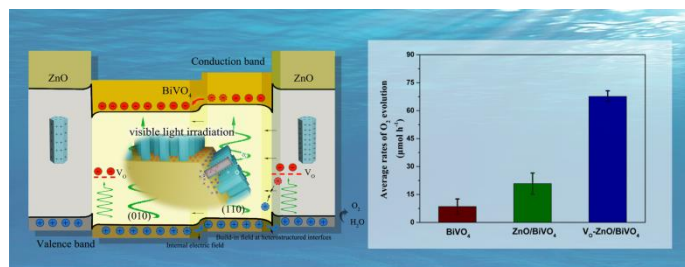
E-mail: limin.liu@csrc.ac.cn

E-mail: junwang.tang@ucl.ac.uk

## Abstract:

A fundamental challenge of photocatalysis is developing efficient strategies to suppress the recombination of photogenerated charge carriers. Herein, ZnO/BiVO<sub>4</sub> hierarchical nanostructures were exemplified to demonstrate new concept of multi-electric field-assisted charge separation. The contribution of both facet engineering and defect modulation to the facilitated photocatalysis was confirmed by both experimental observations and theoretical calculations. Such integration of built-in fields in faceted BiVO<sub>4</sub> and anisotropic ZnO nanorods, together with the possible Z-scheme at the interfaces resulted into 1.36 mmol·h<sup>-1</sup>·g<sup>-1</sup> O<sub>2</sub> produced under visible light irradiation, and more than one order of magnitude enhanced apparent quantum yield at 450 nm. This work not only provides fundamental insights into the facet-dependent distribution of interfacial defects, but also offers a strategy for the design of faceted heterojunctions with controlled vacancies for significantly enhanced charge separation.

Graphical abstract:



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