

Highly efficient visible-light-driven BiVO₄-based Photoelectrode Materials

Tengjiao Niu, Jijuan He, Qizhao Wang*

College of Chemistry and Chemical Engineering, Northwest Normal University, Lanzhou, China
Corresponding Author. Email: qizhaosjtu@gmail.com

Received: 14 June 2017, Accepted: 19 June 2017, Published Online: 28 October 2017

Citation Information: Tengjiao Niu, Jijuan He, Qizhao Wang, *Nano-Micro Conference*, 2017, 1, 01049 doi: 10.11605/cp.nmc2017.01049

Abstract

BiVO₄ is an excellent visible-light-driven photocatalyst that can split water into O₂ for its more positive valence band than that of O₂/H₂O, whereas its positive conduction band makes it difficult to directly generate H₂ from H₂O. But using the PEC, BiVO₄ can become a promising candidate as photoanode for hydrogen evolution performance. In our group, the leaf-like structure BiVO₄ photoelectrodes were prepared by electrochemical deposition, in which Zn²⁺ ions were introduced as a direct agent to control the morphology and size of Bi nanoparticles [1]. NiFe₂O₄ and CoFe₂O₄ nanoparticles were loading on the surface of BiVO₄ to construct heterojunction. The heterojunctions can effectively prevent carriers from recombining and accelerate the separation of electrons and holes [2]. Besides, Bi/BiVO₄ [3] and FeF₂/BiVO₄ can enhanced PEC hydrogen evolution performance.

References

[1] Wanhong He; Ruirui Wang; Chen Zhou; Junjiao Yang; Feng Li; Xu Xiang, Controlling the Structure and Photoelectrochemical Performance of BiVO₄ Photoanodes Prepared from Electrodeposited Bismuth Precursors: Effect of Zinc Ions as Directing Agent. *Industrial & Engineering Chemistry Research*. 54, 10723-10730 (2015). doi:10.1021/acs.iecr.5b02460

[2] Qizhao Wang; Jijuan He; Yanbiao Shi; Shuling Zhang; Tengjiao Niu; Houde She; Yingpu Bi; Ziqiang Lei, Synthesis of MFe₂O₄ (M = Ni, Co)/BiVO₄ film for photoelectrochemical hydrogen production activity. *Applied Catalysis B: Environmental*. 214, 158-167 (2017). doi:10.1016/j.apcatb.2017.05.044

[3] Qizhao Wang; Jijuan He; Yanbiao Shi; Shuling Zhang; Tengjiao Niu; Houde She; Yingpu Bi, Designing non-noble/semiconductor Bi/BiVO₄ photoelectrode for the enhanced photoelectrochemical performance. *Chemical Engineering Journal*. 326, 411-418 (2017). doi:10.1016/j.cej.2017.05.171

Open Access

This article is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).

© The Author(s) 2017