Electrochemical creation of surface charge transfer channels on Mo-doped $BiVO_4$ photoanodes for efficient photoelectrochemical water splitting

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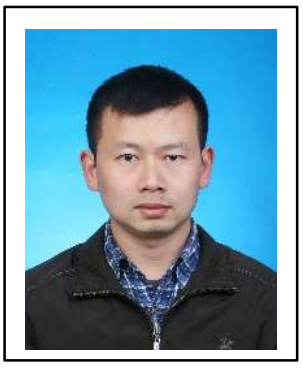
Abstract: Electrochemical treatment is a popular and efficient method to improve the PEC (photoelectrochemical) performance of water splitting photoelectrodes. Such electrochemical activation of photoelectrodes relies on different mechanisms. In our previous study, electrochemical activation of Mo-doped $BiVO_4$ electrodes was ascribed to the removal of MoO_x segregations, which are considered to act as surface recombination centers. However, this proposed mechanism cannot explain why the activated Mo-doped $BiVO_4$ electrode gradually losses its activity when storing in air. In this study, based on various characterizations it is suggested that electrochemical treatment not only removes part of MoO_x segregations, but also initiates the formation of surface H_yMoO_x defects which provide charge transfer channels for photogenerated holes. Via these charge transfer channels, the charge separation of Mo-doped $BiVO_4$ electrode is significantly enhanced. This study offers a new insight into the electrochemical activation of Mo-doped $BiVO_4$ photoanodes, and it will also deep the understanding on the mechanisms of electrochemical treatments for other water-splitting photoelectrodes.

References:

[1] W. Luo, Z. Li, T. Yu, Z. Zou, *J. Phys. Chem. C*, **2012**, *116*, 5076.

Biography:



Zhaosheng Li received his PhD in condensed matter physics from the Institute of Solid State Physics, Chinese Academy of Sciences, China, in 2003. After a two-year postdoctoral fellowship at Nanjing University, he became a lecturer at this university. In 2006, he was promoted to Associate Professor of Materials Science and Engineering at Nanjing University. Since December 2011, he has become a full Professor of Materials Science and Engineering at the College of Engineering and Applied Sciences, Nanjing University. His current research interests include photoelectrochemistry and photocatalysis.