**Scaling up BiVO4 Photoanode for PEC Water Splitting: issues and potential solutions**

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**Abstract**

The monoclinic Scheelite-type BiVO4 is one of the promising candidate photoanode materials for photoelectrochemical (PEC) water splitting (9.1% theoretical efficiency for half-cell solar-to-hydrogen conversion). Although significant research efforts have been devoted to improving the performance of the PEC performance of this material and other promising candidate materials, demonstration has been mainly made in a small photoanode area (typically no more than 2 cm2), with a possible overestimation of the efficiency in many past reports due to light scattering. In an effort towards practical demonstration with reasonable amount of H2 generation, we used a facile metal-organic decomposition synthesis method to produce large sized Mo-doped BiVO4 photoanodes. Multiple modifications have been explored and incorporated to enhance the performance. A large-area (25 cm2) photoanode was successfully prepared with the modifications, the resulting photoanode produced an initial photocurrent density of 2.2 mA/cm2 at 1.23 V versus reversible hydrogen electrode, under AM 1.5G illumination. Mechanisms of the degradation of this material are explored, and strategies to enhance its photocatalytic stability have been proposed.

**Brief Biodata – Chen Zhong**

Dr. Chen obtained his PhD in 1997 at the University of Reading, U.K. After completing the study, he joined the newly established Institute of Materials Research and Engineering, a national research institute funded by Singapore government. In March 2000, he moved to Nanyang Technological University (NTU) as an Assistant Professor, and has since been promoted to Associate Professor and Professor in the School of Materials Science and Engineering. Prof. Chen’s research interests include 1) Surface Engineering, Thin Films & Nanostructured Materials, and 2) Mechanical Behaviour of Materials. He is an author of over 350 peer-reviewed journal papers, 5 book chapters and 5 granted patents. According to Google Scholar, his journal articles have received over 13,000 citations with the h-index of 58. Since joining NTU, Prof. Chen has graduated 30 PhD and 5 MEng students. Prof. Chen has served as an editor / editorial board member for 8 academic journals. He has also served as a reviewer for more than 70 academic journals and a number of research funding agencies including the European Research Council.