

About the Talk:

Scalable Solar Hydrogen Generation with Quasi Artificial Leaf Approach

Chinnakonda S. Gopinath

Catalysis Division, National Chemical Laboratory, Pune, India.

E-mail: cs.gopinath@ncl.res.in

Solar hydrogen production by water splitting is one of the “holy grail” of chemistry (long-standing problems) listed in a special issue published by the Accounts of Chemical Research¹ on 1995 by Allan Bard et al. Water splitting to hydrogen is yet to be exploited, in spite of large amount of research work in the past five decade, after the first report published by Fujishima and Honda.²



A wireless device based on quasi-artificial leaf concept, comprising Au on TiO₂ electrode sensitized by PbS and CdS quantum dots (QD), was demonstrated to show solar hydrogen.³ Under one sun conditions, 4.3 mA/cm² photocurrent generation, 5.6 % power conversion efficiency, and spontaneous H₂ generation were observed at no applied potential.. There is a very good possibility that this device can be scaled to bigger sizes to produce large amount of hydrogen. However, many more challenges are ahead and some of them will be discussed.

References

1. A. J. Bard, G. M. Whitesides, R. N. Zare, F. W. McLafferty, *Acc. Chem. Res.* **1995**, 28, Issue 3.
2. A. Fujishima, K. Honda, *Nature* **1972**, 238, 37
3. K. K. Patra, B. D. Bhuskute, C. S. Gopinath, *Sci. Rep.* **2017**, 7, 6516.