

The Role of Co-catalysts and Surface Junctions Played in Photocatalytic Hydrogen Production

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In this lecture, we present our recent study on photocatalytic hydrogen production by spectroscopy, such as UV Raman, time-resolved FT-IR and Fluorescence spectroscopy. The activity of photocatalytic H₂ production can be significantly enhanced when small amount of MoS₂ is loaded on CdS as co-catalyst. The junction formed between MoS₂ and CdS and the excellent H₂ activation property of MoS₂ are supposed to be responsible for the enhanced photocatalytic activity of MoS₂/CdS. In addition, Pt-PdS/CdS catalyst demonstrates the possibility of realizing visible-light-responsive photocatalytic hydrogen production with a QE approaching the level of natural photosynthesis.^[1] The strategy to achieve high QE by co-loading suitable dual cocatalysts, especially those functioning as oxidation and reduction cocatalysts, respectively, will be of considerable importance in the design and preparation of highly active photocatalysts for solar energy conversion.

[1] H. J. Yan, J. H. Yang, G. J. Ma, G. P. Wu, X. Zong, Z. B. Lei, J. Y. Shi and C. Li, *J. Catal.*, 266 (2009)165.