

Development of efficient photocatalysts systems for solar hydrogen production

A/P Xu Rong in School of Chemical & Biomedical Engineering is working on development of nanostructured or molecular photocatalysts for water splitting under visible light for renewable hydrogen production. One of their focuses is to replace the expensive noble metal catalysts with earth-abundant metals, metal oxides or metal sulfides. To date, her group has successfully developed several new and highly active hydrogen production systems. In particular, the NiS/CdS system exhibited over 50% of quantum efficiencies at 420 nm which is among the highest over the photocatalysts without noble metals. Recently, they developed a simple complex assembled from Ni(II) salt and 2-mecaptoethanol in one step in water as the efficient catalyst in molecular hydrogen system which can be sensitized by a low-cost xanthene dye, Erythrosin B. An excellent quantum efficiency of 24.5% is attained at 460 nm. These noble metal free systems have suggested great potentials for future large-scale production of solar hydrogen by properly designed nanomaterials and chemical structures.

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