

MichiganTech



Chemical Engineering Grain Processing Corporation 2009-2010 Lecture Series presents

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10:00 a.m.

Chem. Sci.
& Engineering
Room 102

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American Chemical Society

Current Issues in Efficient Photocatalysts

The best source of clean energy is believed to be the sun. Solar hydrogen energy is potentially among the most promising energy solution for our planet. However, harvesting useful energy from the sun often requires a catalyst material. The most serious problem with the currently known catalyst materials (photocatalyst: PC) is the efficiency, i.e., how much of the photons irradiated are actually converted to drive the intended photo-chemical reaction. Many factors affecting the efficiency have been identified, which include crystal morphology and structure, lattice and surface defects, band structure, band gap size, electron-hole diffusion lengths, etc.

In this presentation, two major issues currently being tackled actively for enhancing the efficiency will be discussed. One is absorption of more abundant visible light (VL) to exhibit high visible light activity (VLA). For photocatalytic activity (PCA) of a material to be high, the photo-excited electrons and holes should not recombine. The electron-hole pairs need to be efficiently separated quickly before they are recombined. In this talk, several notable ideas which are currently actively studied will be presented and discussed using examples from decomposition of organic species and solar hydrogen generation from water. VL photocatalytic water splitting to generate hydrogen is particularly difficult since the band structure of the PC has to be right for water reduction and oxidation potential in addition to the optimum band gap size that corresponds to VL energy.

The remaining time of this talk will be devoted to introducing Petroleum Research Fund and the Office of Research Grants at American Chemical Society.

Refreshments will be
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