PHOTOCATALYTIC ORGANIC CONVERSION ON SEMICONDUCTOR SURFACES

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The generation of fuels from abundant inexpensive materials using light as the energy source has attracted considerable attention. With the discovery of the water splitting reaction on TiO_2 initiated by sunlight, a large number of photo-catalyzed reactions on semiconductor surfaces have been investigated. Some examples include the water gas shift reaction, photooxidation of organic materials, Photo-Kolbe reaction, Photohydrogenation of unsaturated hydrocarbons and Photosynthesis of amino acids.

At a semiconductor surface, upon band gap illumination, electron hole pairs are generated. The electrons in the conduction band can effect reductions while the holes can participate in oxida-tions. However, rapid recombination of photogenerated electron-hole pairs and the insensitivity of most stable wide-gap semiconductors to solar radiation, photocorrosion of low-band gap materials are some of the practical limitations in organic photocatalysis. The use of metal coated and doped catalysts, dye sensitization, use of colloidal particles are some

of the approaches used for increasing quantum efficiency. Organic photocastalysis also offers selectivity and a wide variety of reaction pathways possible for a given reaction.