

Solar Photocatalytic Water Splitting

Abstract

Energy and environmental issues at a global level are important topics. Solar photocatalytic water splitting has attracted much attention regarding its application to produce clean and renewable hydrogen which will be utilized as the future fuel to replace the fossil fuel.

The fundamentals of solar photocatalytic water splitting are:

- (i) Absorption of photons by catalyst particles to form electron hole pairs.
- (ii) Photo excited electron hole pairs separate and migrate to the catalyst surface.
- (iii) Redox reactions at the catalyst surface to produce H₂ and O₂.

Based on these steps we can define the characteristics of the photocatalyst suitable for this application. An ideal photocatalyst should have the following properties:

- Band gap with suitable width to absorb the solar energy.
- High crystallinity to facilitate migration of electron hole pairs to the surface.
- Active sites and large surface area for redox reactions which take place on the catalyst surface.

In this presentation heterogeneous photocatalytic material for water splitting will be discussed.

References:

- (1) Chemical Society Review, 2009, 38, 253-278
- (2) Journal of Physical Chemistry, 2008, 112, 9872-9879
- (3) Journal of Physical Chemistry, 2007, 111, 7851-7861
- (4) Catalysis Surveys from Asia, Vol. 7, No. 1, April 2003