Solar Energy Conversion to Hydrogen via Photocatalysis

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Hydrogen production from water using solar energy is one of the most attractive candidates to provide clean and recyclable energy carrier in future. To accomplish the reaction at around room temperature, there are several approaches. One of the most practical methods at present stage is to use the combination of solar cells and electrolysis. Another way that has already been proved to be effective is to construct a tandem type photoelectrochemical cell to directly photolyze water into H_2 and O_2. Comparing to these methods, photocatalytic overall water splitting, which is more similar to the photosynthetic reaction system, is still at the stage of rather fundamental research work. Nevertheless, it has some advantages from the view point of large scale application comparing to the former two approaches based on device-type structures. It will be discussed on the recent progress of visible-light driven photocatalysts for overall water splitting.