

عنوان مقاله:

A New Large Scale Photo-reactor for Solar Hydrogen Production

محل انتشار:

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خلاصه مقاله:

In this paper a photo-reactors for catalytic solar hydrogen production is introduced and analyzed. To be an economical environmentally-benign and sustainable pathway, hydrogen should be produced from a renewable energy source, i.e. solar energy. Solar driven water splitting combines several attractive features for sustainable energy utilization. The conversion of solar energy to a type of storable energy has crucial importance. In the first part of the entry, background information is presented regarding different photo-reactor configurations for water dissociation with light energy to generate hydrogen. The photo-electrochemistry of water splitting is discussed, as well as photocatalytic reaction mechanisms. The design and scale-up of photo-reactors for photo-catalytic water splitting are explained by classification of light-based hydrogen production systems. At the end, a new photo-catalytic energy conversion system is introduced analyzed for continuous production of hydrogen at a pilot-plant scale. The exergy efficiency and exergy destruction of this system are investigated for these systems. The light intensity is found to be one of the key parameters in design optimization of the photo-reactors, in conjunction with the flow rate of catalyst suspension.

کلمات کلیدی:

Photo-reactor, Hydrogen, Solar, Water, Scale-up

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