Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Licensing Opportunity

Novel Method for Solar Hydrogen Generation:

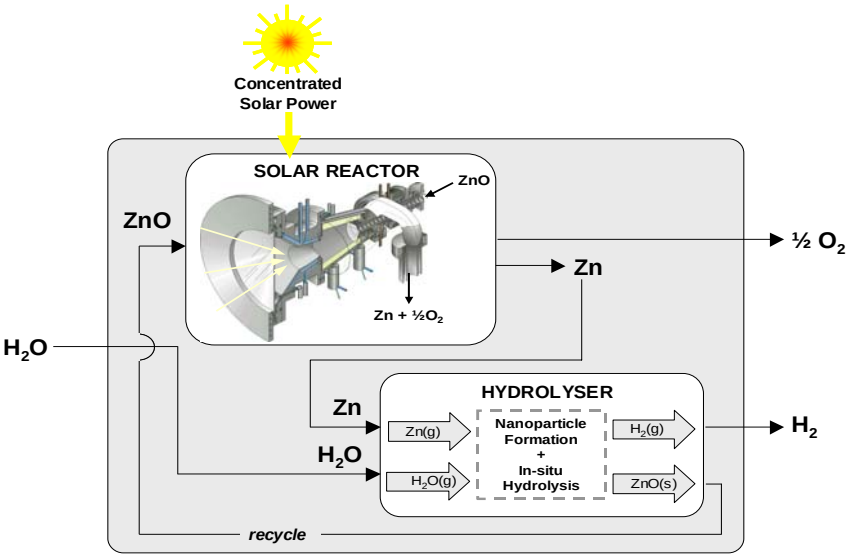
Achieves high energy conversion efficiency via Zinc/ZnO water splitting thermochemical cycle

Invention

Hydrogen when produced from water using renewable energy sources is considered among the most promising fuels for sustainable energy utilization.

Its solar production via the Zn/ZnO water splitting thermochemical cycle, consisting of a 1st-step solar endothermic dissociation of ZnO and a 2nd-step non-solar exothermic hydrolysis of Zn, offers the potential of reaching energy conversion efficiencies exceeding 40%, and consequently, the potential of economic competitiveness.

This year, a major breakthrough was accomplished at ETH: the development of a novel combined process that encompasses the formation of Zn nanoparticles followed by their in-situ hydrolysis for H_2 generation. Since zinc nanoparticles have inherently high specific surface area, the reaction kinetics and heat/mass transfer are significantly augmented. Recently, this patented process has been experimentally demonstrated using a tubular aerosol flow reactor, resulting in high degree of chemical conversion in very short (less than 1 second) residence times.



Competitive Advantages

Integrity:

- Simple, controllable and scalable reactor technology
- Inherent properties of Zinc nanoparticles offer significant augmentation in heat/mass transfer and reaction kinetics
- High degree of chemical conversion in very short (less than 1 second) residence time.

Applications

- Economically competitive hydrogen production with potential energy conversion efficiencies exceeding 40%

Additional Information:

http://www.pre.ethz.ch/

Keywords

Hydrogen Production
Solar Reactor

Patent Status:

PCT Provisional

Contact

ETH Zurich
ETH transfer, HG E 48.2
Raemistrasse 101
8092 Zurich, Switzerland
Phone: +41 44 632 23 82
Fax: +41 44 632 11 84
transfer@sl.ethz.ch
http://www.transfer.ethz.ch/

Ref. No. T-04-014