Innovative Photoelectrochemical Cells for Solar Hydrogen Production

FOTOH2

CONSORTIUM

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Motivation and Objectives

The solar splitting of water is an artificial version of natural photosynthesis, which sustains all life on Earth. The idea of directly using solar energy for splitting water into gaseous H_2 and O_2 has therefore captured the imagination of electrochemists as a biologically-inspired means of producing clean-burning and sustainable H_2 fuel for powering society.

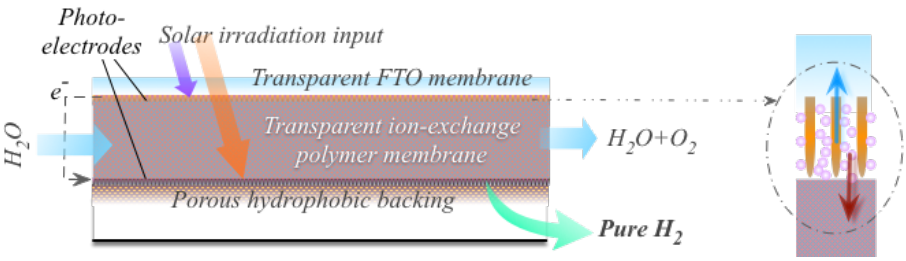
Scientific Approach

The overall goal is to develop a highly efficient tandem photoelectrolysis cell for solar H_2 production based on durable and cost-effective advanced materials and interfaces. Applying the consortium partners' experience with innovative solar technologies, the main target of FotoH2 is the prototyping and validation of a mass-deployable solar H_2 production technology, in the form of easily integrable flat panels. The input H_2O and output H_2 are carried by tubing at the two edges of the panels, comprising a self-powered flow-through system which can be simply connected to a water source. The semiconductor tandem architecture is expected to yield higher efficiency and allow more flexible deployment than externally biased architectures.

Expected Results

FotoH2 is aiming to develop a long-lasting, cost–effective, and highly efficient solar-driven tandem photoelectrolysis technology. The following specific breakthroughs are targeted:

- Achieving long-lasting cells for solar H_2 production
- Production of pure H_2 in the output stream
- Developing cost-effective advanced photoelectrode materials
- Simple flow-cell design
- High Solar-to-Hydrogen conversion efficiency
- Record-setting electric-to-chemical energy conversion



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