SERGIO: “SUSTAINABLE PHOTOELECTROCHEMICAL HYDROGEN EVOLUTION”

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Solar energy utilization for photoelectrochemical water splitting into hydrogen and oxygen has been extensively studied for sustainable hydrogen fuel production. However, this technology has yet to be commercialized. Key obstacles to commercialization include low solar-to-hydrogen efficiency (2-3% in PEC cells with active areas up to 10-15 cm^2), reliance on expensive and critical raw materials (e.g., BiVO4), and energy losses in separating H2 from O2 and water vapor in the output stream.

The SERGIO project partners have developed an innovative method for fabricating photoelectrode materials, alongside a novel scientific approach, to achieve cost-effective solar-driven hydrogen production in a tandem photoelectrochemical cell.

This project aims to reach Technology Readiness Level (TRL) 4 by validating the technology in a laboratory setting, using a cell with an active area of up to 10 cm^2, achieving a solar-to-hydrogen efficiency of 5%, and ensuring hydrogen purity of 99.99%.

Our objectives include achieving significant advancements in cost efficiency, conversion efficiency, and hydrogen purity.

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