Bias-free high-performance solar NH3 production by perovskite-based photocathode and in-situ valorisation of glycerol

Fact Sheet

Project Information

PECSolFuel
Grant agreement ID: 101107294

Funded under
Marie Skłodowska-Curie Actions (MSCA)

Total cost
€ 0,00

EU contribution
€ 181 152,96

Start date
1 April 2024

End date
31 March 2026

Coordinated by
UNIVERSIDAD DE SANTIAGO DE COMPOSTELA
Spain

Objective

PECSolFuel aims to develop an environmentally benign bias-free photoelectrochemical device for energy-efficient NH3 production to replace the energy-intensive and fossil-fuel-driven Haber-Bosch process. To achieve this, PECSolFuel has been tailored to overcome the current limitations of the solar-driven NH3 production alternative schemes involving: 1) the lack of selective and stable catalyst for efficient N2 reduction; 2) the dependence of sluggish and energy demanding reactions; 3) the requirement of a high photovoltage and 4) the catalyst degradation during long-term operation. By choosing appropriate redox reactions
(such as glycerol oxidation coupled with nitrate reduction) and the rational catalysts design (involving the stabilization of small metal nanoparticles on the step-edges of photocatalytic inorganic supports), as well as the efficient integration of photoelectrodes using perovskite-based photocathodes, the photoelectrochemical device produced in PECSolFuel will not require external energy input. The synthesis of value-added products via glycerol oxidation reaction coupled with nitrate reduction reaction will be studied for the first time within this project. PECSolFuel will deliver: i) New catalysts that are not only highly-selective and active, but also highly-durable for both the nitrate reduction and the electrocatalytic oxidation of glycerol; ii) High-performance integrated perovskite photocathodes; iii) A two compartments photoelectrochemical device enabling a 20 % of solar-to-NH3 conversion efficiency by in situ valorisation of glycerol. Joining Dr. Gimenez group will allow me to establish myself as independent researcher and leading expert in solar fuel production in a group with key expertise, resources and links with academia and industry for the success of this action. PECSolFuel will provide me with hands-on experience and training in scientific competences and strengthen my transferable skills, while expanding my professional network.

Fields of science

natural sciences > chemical sciences > electrochemistry > electrolysis
natural sciences > biological sciences > biochemistry > biomolecules > lipids
natural sciences > chemical sciences > catalysis
engineering and technology > nanotechnology > nano-materials
engineering and technology > environmental engineering > energy and fuels

Keywords

Photoelectrochemical system  Electrocatalysis  Metal nanoparticles
Perovskite-based photocathode  Solar fuel production

Programme(s)

HORIZON.1.2 - Marie Skłodowska-Curie Actions (MSCA)  MAIN PROGRAMME

Topic(s)
Call for proposal

HORIZON-MSCA-2022-PF-01

See other projects for this call

Funding Scheme

HORIZON-TMA-MSCA-PF-EF - HORIZON TMA MSCA Postdoctoral Fellowships - European Fellowships

Coordinator

UNIVERSIDAD DE SANTIAGO DE COMPOSTELA

Net EU contribution
€ 181 152,96

Address
Colexio de san xerome praza do obradoiro s/n
15782 Santiago de compostela
Spain

Region
Noroeste > Galicia > A Coruña

Activity type
Higher or Secondary Education Establishments

Links
Contact the organisation
Website
Participation in EU R&I programmes
HORIZON collaboration network

Other funding
€ 0,00

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