Optimised Halide Perovskite nanocrystalline based PhotoElectrolyser for clean, Robust, efficient and decentrAlised H2 production

Timeline | 10/2022 to 03/2026

Overall Budget | 3.229.932,25 €

ICIQ's Budget | 450.312,61 €

ICIQ People | N. López Research Group

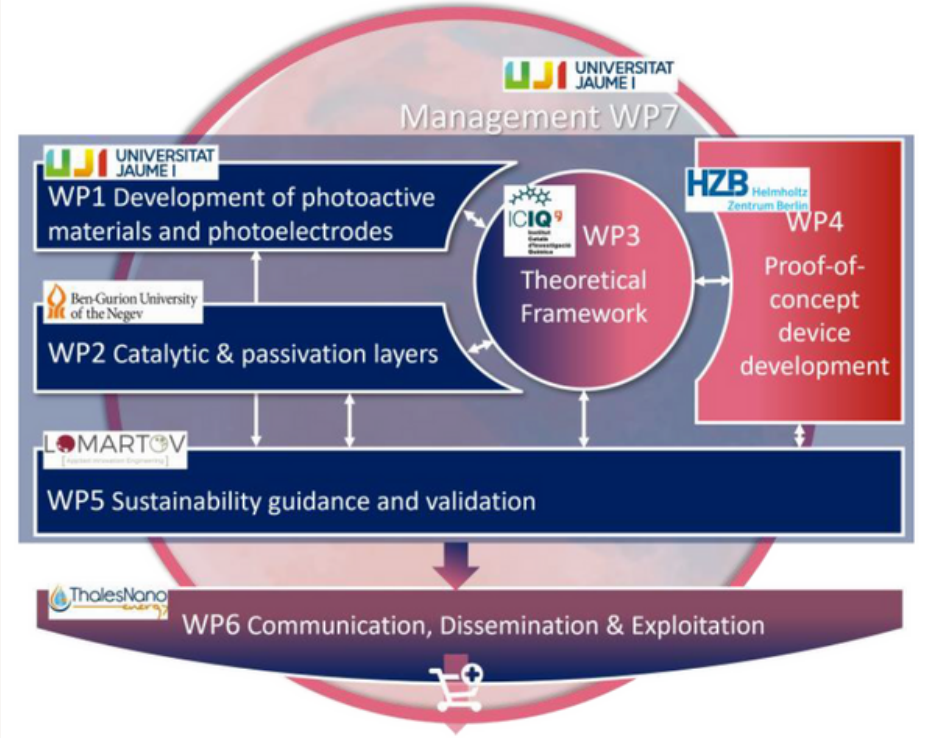
Website | https://ohpera.eu

Call | HORIZON-EIC-2021-PATHFINDERCHALLENGES-01

SUMMARY

Photoelectrochemical (PEC) H2 generation, using water as proton and electron source, is considered the most impactful solar-driven processes to tackle the energy, environment, and climate crisis, providing a circular economy strategy to supply green energy vectors (H2) with zero carbon footprint. Aligning with this view, **OHPERA** will develop a proof-of-concept unbiased tandem PEC cell to simultaneously achieve efficient solar-driven H2 production at the cathode and high added-value chemicals from valorization of industrial waste (glycerol) at the anode, being sunlight the only energy input. Thus, **OHPERA** will demonstrate the viability of producing chemicals with economic benefits starting from industrial waste, using a renewable source of energy. For this purpose, **OHPERA** will integrate highly efficient and stable photoelectrodes based on halide lead-free perovskite nanocrystals (PNCs) and tailored catalytic/passivation layers, avoiding the use of critical raw materials (CRM), in a proof-of-concept eco-design PEC device. Theoretical modelling both at an atomistic and device scales will assist the materials development and mechanistic understanding of the processes, and all materials and components will be integrated in a proof-of-concept device, targeting standalone operation at 10 mA·cm-2 for 100 hours, 90% Faradaic efficiency to H2, and including a clearly defined roadmap for upscaling and exploitation. Therefore, **OPHERA** will offer a dual process to produce green H2 concomitant to the treatment of industrial waste generating addedvalue chemicals with high economic and industrial interest, thus offering a competitive LCOH.

WORK PLAN



CONSORTIA

UNIVERSITAT JAUME I

inam

Project coordinator

ICIQ

eChemicles

HZB Helmholtz Zentrum Berlin

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