SOLARCO

Solar Energy Driven Catalytic CO2 Reduction

Timeline | 12/20222 to 11/2024

ICIQ People | Palomares Research Group

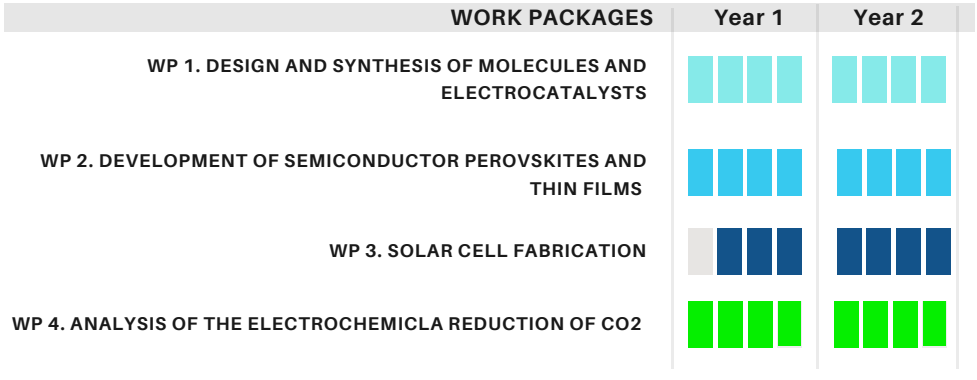
Overall Budget | 464485 €
ICIQ Budget | 234.485 €

Call | Proyectos estratégicos orientados a la Transición Ecológica y a la Transición Digital 2021

SUMMARY

SOLARCO aims to couple efficiently solar cells in tandem configuration (**subproject 1**) with the catalytic reduction of carbon dioxide (CO2RR) using active metal sites embedded in doped graphitic carbon-based materials as electro active catalysts (**subproject 2**) in order to achieve self-sufficient devices able to produce carbonaceous materials of interest in locations not connected to the electrical grid. Moreover, the project targets to rationalize the products of the CO2 reduction, with the applied electrical bias, the nature of the catalyst and the reactor design in a solar-powered system. **SOLARCO** will use solar cells based on hybrid perovskites and organic semiconductor molecules as photoactive material and semiconductor nanoparticles with preferential orientation to one of the crystal facets as electrocatalysts. To achieve our objectives, the project has enrolled a multidisciplinary research team placed in two different Institutions (ICIQ, Tarragona (leading subproject 1) and ITQ-UPV-CSIC, Valencia (leading subproject 2) with previous experience on the fabrication of photovoltaic devices, the measurements and analysis of electrochemical devices and the synthesis and characterisation of electrocatalysts. This project represents a challenge with a great deal of fundamental and applied research that implies: (i) The design and fabrication of perovskite-based solar cells that, forming part of a multijunction device, deliver sufficient current and voltage (tandem devices) for the reduction of CO2. (ii) The design, synthesis and the characterization of active metal/bi- and multimetallic sites decorating doped graphitic carbon matrix with preferential orientation to one facet (iii) the understanding of the material properties that favour the increase in solar-to-fuel conversion efficiency in CO2 electrochemical reactors; (iv) the design and fabrication of solar powered CO2 electrolizers for application in remote places and (v) the analysis of the catalyst stability and its degradation products.

WORK PLAN



CONSORTIA

ICIQ

Subproject 1 coordinator

INSTITUTO DE TECNOLOGÍA QUÍMICA

CSIC

UNIVERSITAT POLITÈCNICA DE VALÈNCIA

Subproject 2 coordinator

MINISTERIO DE CIENCIA E INNOVACIÓN
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