ElectroVolt

Electrovoltaic materials for CO2 reduction

Timeline | 09/2023 to 08/2026

ICIQ People | Palomares Research Group

Budget | 332.500 €

Call | Proyectos I+D - Generación Conocimiento 2022

SUMMARY

ElectroVolt continues the research initiated in our group in 2019 (Integra2-PID2019-109389RB-I00) to study molecules and materials by analysing and understanding the photo-electro catalytic reduction of carbon dioxide (CO2) using solar cells as a current/voltage source and mixed oxides/molecular materials as electro active catalysts. The project targets to rationalize the products of the CO2 reduction, with the applied electrical bias and the mechanistic study of the catalysis reaction under dark and under light irradiation. **ElectroVolt** uses solar cells based on novel hybrid perovskites formulations and newly design organic semiconductor molecules as photoactive materials. We will use hybrid materials based on nanoparticulated oxides and molecules and/or polymers as electro active catalysts. To complete our objectives, the project involves an experienced multidisciplinary research team with previous track-record on the synthesis and characterisation of inorganic and organic semiconductors, the fabrication and characterization of photovoltaic devices and the measurements and analysis of photo-electrochemical devices for the reduction of CO2.

The challenges for the **ElectroVolt** project are:

(i) The design, synthesis and the characterization of novel molecules, polymers and/or hybrid materials based o nanoparticulated oxides (ii) the understanding of the material properties that favour the increase in solar-to-fuel conversion efficiency solar cells; (ii) the design and fabrication of molecular solar cells that deliver sufficient current and voltage (tandem devices) to promote the electrochemical reduction of CO2 (iii) the analysis of the catalyst stability/performance and the transformation of CO2 into valuable fuels and fine chemicals.

WORK PLAN

	3	6	9	12	15	18	21	24	27	30	33	36
WP1												
T1.1				MS1.1								
T1.2												
T1.3									MS1.2	D1		
WP2												
T2.1				MS2.1		MS2.2						
T2.2						D2.1				MS2.3		D2.2
WP3												
T3.1						MS3.1						
T3.2						MS3.1						M3.2
T3.3												D3.1
WP4												
T4.1				MS4								
T4.2				MS4								D4

Reference: PID2022-139866NB-I00