

Pushing the Boundaries of CO₂ electrocatalysis to fuels using Automated Catalyst Development

 **Timeline** | 04/2023 to 03/2026

 **ICIQ People** | [J. Lloret-Fillol Research Group](#)

 **Budget** | 128.000 €

 **Call** | Ayudas a la Investigación Fundación Ramón Areces

SUMMARY

The development of greener production methods is essential for a future sustainable society. In this respect, electrochemical processes powered by renewable energy sources (sun, wind, etc.) can transform abundant molecules (water, CO₂, etc.) into synthetic fuels and chemicals in a sustainable way.

In particular, electrocatalytic CO₂ reduction (CO₂RR) promises to offer sustainable and economically viable industrial production of CO₂-neutral renewable fuels. However, current electrocatalysts still lack the requirements for industrial development. ElectroFuel will develop new highly active, selective and robust catalysts based on covalent organic frameworks (COF) for electrocatalytic CO₂RR and advance their rational design.

Discovering new catalysts is a demanding, tedious and time-consuming task that requires decades of research and development. The time and cost of bringing advanced catalysts to market can be reduced by adopting high throughput experimentation (HTE), autonomous laboratory, digitisation and artificial intelligence. Automating laboratory research is the first key step towards this goal.

At **ElectroFuel**, we plan to accelerate the discovery of catalysts by HTE and the autonomous study of electrocatalytic reactions for CO₂RR, and to digitise chemical research related to electrochemistry. **ElectroFuel** plans to build an automated platform for high throughput experimentation in CO₂ reduction research that is open and replicable. Data will be stored and made available for machine learning.

