Auto4Fuel

Towards Automatized Development of Electrocatalysts for CO2-to-Fuels

Timeline | 12/20222 to 11/2024

ICIQ People | J. Lloret Research Group

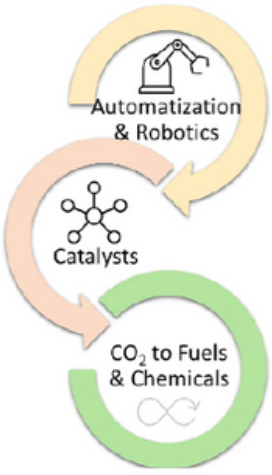
Budget | 302.450 €

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

SUMMARY

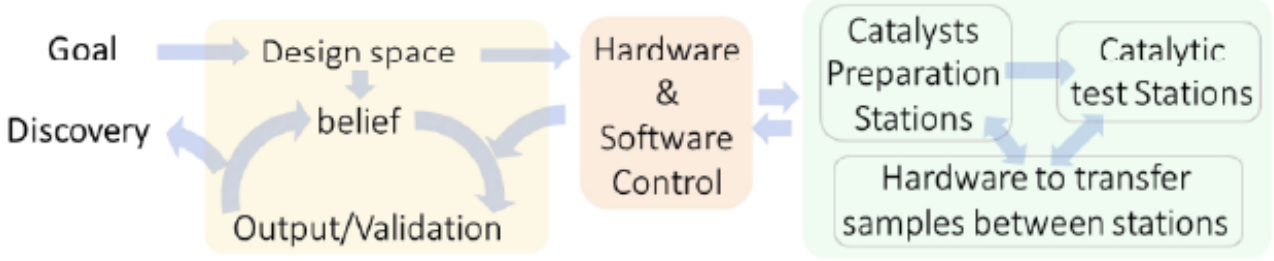
The development of greener production methods is critical to ensure a future sustainable society. On this ground, photo and electrochemical sustainable processes can be powered by renewal energy sources (sunlight, wind, etc..) for the transformation of abundant molecules (water, CO2, etc..) to produce synthetic fuels and chemicals.

The electrocatalytic CO2 reduction reaction (CO2RR) plays a central role and holds the promise to ultimately deliver sustainable and economically viable industrial processes to produce renewable CO2 neutral fuels mitigating (or replacing) the use of fossil fuels. However, one of the bottlenecks to produce fuels and chemicals from CO2 is that current electrocatalysts still lack the requirements for the industrial development. In this regard, In **Auto4Fuel**, we will develop new highly active, selective, and robust catalysts for the electrocatalytic CO2RR by two approaches: i) molecular catalysts to learn basic principles of the mechanisms and ii) by nanoparticles obtained by solution combustion.



However, the discovery of new catalysts is demanding, tedious, and time-consuming task that requires decades of research and development. The time and cost for bringing advanced catalysts to market can be reduced by embracing autonomous labs, digitalization, and artificial intelligence. Automatization of research laboratory is the first and a key step towards this goal. Addressing the automatic electrocatalytic CO2RR requires detailed analysis of reaction samples to reach detection limits.

With **Auto4Fuel** we envision acceleration of the catalyst discovery by the autonomous study of electrocatalytic reactions for CO2RR and by the digitalization of the chemistry research related to electrochemistry. **Auto4fuel** plans to construction of an automatic platform towards high-throughput experimentation in CO2 reduction research. The platform will be built to be open and replicable. Data will be stored and available for machine learning.



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