Targets

CO_2 conversion and utilization: from conventional multi-stage processes to single stage process.

Selection of the synthesis routes for optimal jet fuel production.

Design of multi-functional shape-selective catalysts.

Engineering electrochemical membrane reactors with tailored high co-ionic transport.

CALL	H2020-LC-SC3-2018-NZE-CC
Duration	May 2019 – April 2023
EC funding	3.9 M€
Consortium	12 partners from 8 countries led by CSIC
Advisory board	Prof. Ed Rubin (CMU), SENER, ERRIN and EURADA

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e$COCO_2$

Direct electrocatalytic conversion of CO_2 into chemical energy carriers in a co-ionic membrane reactor

https://ecocoo.eu

twitter.com/eCOCOO2/

linkedin.com/company/ecoco2/

This project has received European Union's Horizon 2020 research and innovation funding under grant agreement Nº 838077.

SPIRE Sustainable Process Industry through Resource and Energy Efficiency

Closing the loop: from CO_2 to fuel

The aim is to set up a technology for conversion of CO_2, using renewable electricity and steam, to carbon-neutral synthetic liquid fuels for use as transport fuel, and in particular as jet fuel.

The technology is based on an innovative electrocatalytic co-ionic membrane reactor to conduct the conversion at high energy efficiency, very high CO_2 conversion rate and moderate-to-low cost.

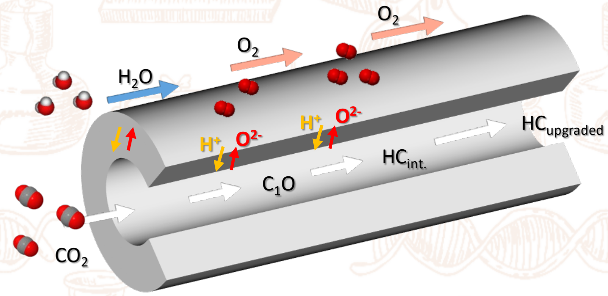
Single step	Product: Jet fuel	↑ Energy Efficiency: >85 %
↑ CO_2 conversion & product yield	Full integration: compact sized reactor	Final TRL: 5

Activities

Co-ionic electrolyte
Design a dense electrolyte with adequate co-ionic H^+/O^{2-} **conductivity.**

Electrodes design and optimisation by adjusting **composition and microstructure.**

Multi-functional catalysts based on **metal oxides/carbides** coupled with **zeolites**, for CO_2 to jet fuel reduction.



Multi-tube membrane reactor: design, modelling & validation
Bench-testing targets a **500 W multi-tubular system**, under operating conditions (**T = 350-450°C and P > 25 bar**).

Manufacturing protocols
Adapt **existing protocols** to the new materials developed.

Analyse industrial processes most suitable for **$eCOCO_2$ integration.**

Societal perception & acceptance of the technology and the synthetic fuels.

Consortium

CSIC — Consejo Superior de Investigaciones Científicas
Universitas Osloensis MDCCCXI
ArcelorMittal
Shell
CoorsTek Membrane Sciences
SINTEF
Universitas Amoiensis
ITQ Instituto de Tecnología Química
RWTH Aachen University
HERA
Universitat Politècnica de València
CEMEX
九州大学 Kyushu University