

Innovative photocatalysts integrated in flow photoreactor systems for direct CO₂ and H₂O conversion into solar fuels

Timeline | 07/2021 to 06/2025

ICIQ People | [Palomares Research Group](#)

Overall Budget | 4,569,127 €

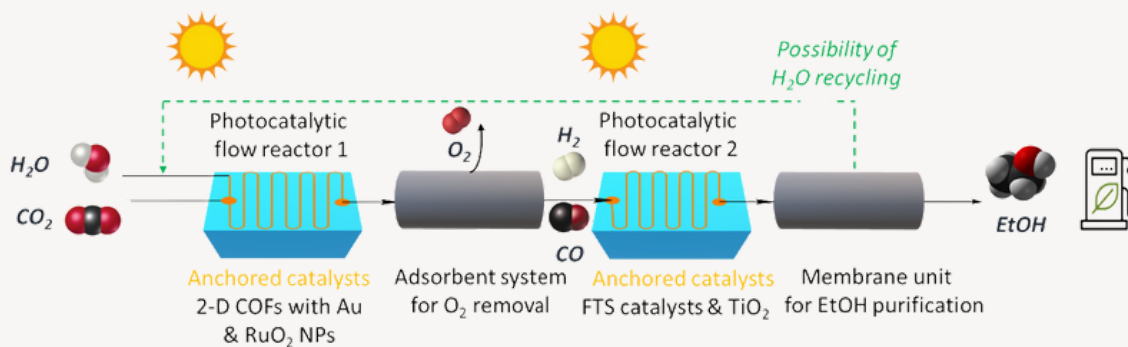
Website | Under development

ICIQ's Budget | 363,750 €

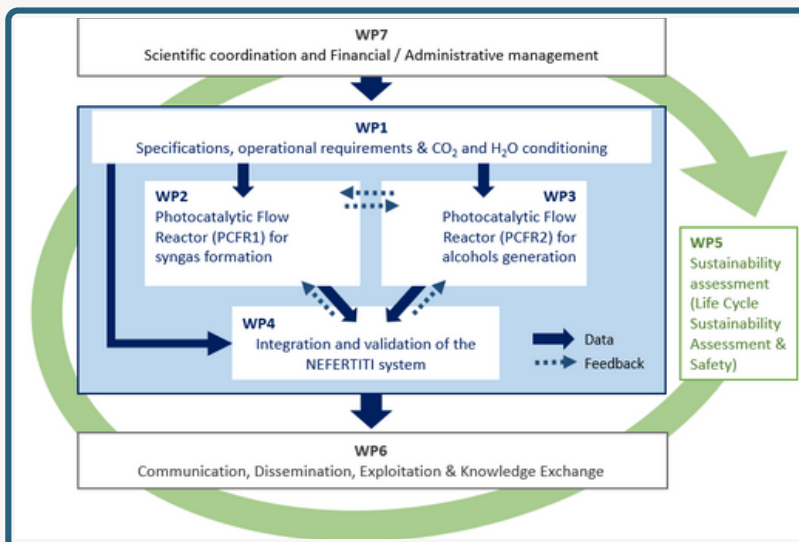
Call | H2020-LC-SC3-2020-NZE-RES-CC

SUMMARY

NEFERTITI will develop an innovative highly efficient photocatalytic system enabling a simultaneous conversion of CO₂ and H₂O into solar fuels (ethanol and alcohols with longer chain such as (iso)propanol) and thus provide a breakthrough alternative to transform CO₂ into valuable products for energy and transport. **NEFERTITI** aims to integrate novel heterogeneous catalysts (Covalent organic frameworks and metal oxides combined with metallic nanoparticles) and luminescent solar concentrators into two Photocatalytic flow reactors sourced by sunlight energy. The reaction mechanisms for the photocatalytic CO₂/H₂O conversion and C-C bond formation will be defined and optimised. As this has never been done before, **NEFERTITI** will develop a completely new way of producing such compounds in a continuous manner having a significant impact on the scientific understating of this technology. Modelling of C-C bond formation from activated intermediates will then determinate the reaction pathways, barriers and selectivity for C-C, C-O and C-H bonds. By increasing the sunlight conversion efficiency and improving light-harvesting and charge separation, **NEFERTITI** will overcome the remaining technological challenges, improve the competitiveness of the photocatalytic technologies and enable a carbon-neutral production of solar fuels in a single-step process as an alternative to traditional multi-step processes.



WORK PLAN



CONSORTIA

LEITAT
Project coordinator



CHEMTRIX

FUNDITEC

SOCAR



Stratagem
Research · Innovation

