

PHOTOCATALYTIC CO₂ REDUCTIONS BY GREEN HYDROGEN



Timeline | 11/2021 to 10/2024



ICIQ People | [Palomares Research Group](#)



Overall Budget | 665,686.75 €

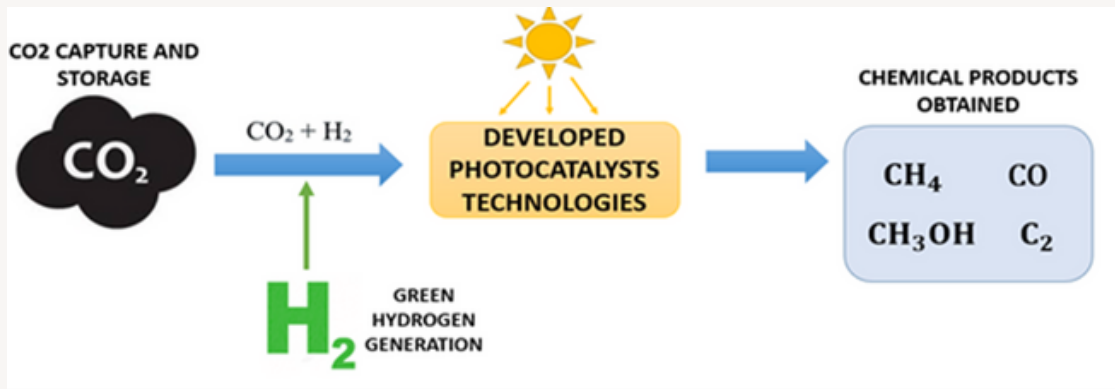


ICIQ's Budget | 198,500.00 €

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SUMMARY

PHOTORED aims at developing materials to promote selective CO₂ hydrogenation with solar light. Four types of photocatalysts will be prepared and evaluated that will lead selectively to CH₄ (photocatalytic Sabatier methanation), CO (photocatalytic reverse water gas shift), CH₃OH or C₂+ products. These hydrogenation processes can be promoted thermally using Ni (Sabatier), Co, Fe (CO and C₂+) or Cu (methanol) catalysts, but the thermal reactions require high temperatures (close to 500°C in several cases) and high pressures (up to 100 bars in the case of methanol synthesis) due to the high activation energy values required to activate CO₂. Photocatalytically these reactions will be promoted by solar light as the sole or primary energy source using appropriate photocatalysts of which the partners have obtained the proof of concept (selective photocatalytic methanol synthesis) or have reported recently appropriate photocatalysts (selective photocatalytic methanation, reverse water gas shift and C₂+). The photocatalytic CO₂ hydrogenations will be carried out under continuous flow. The green hydrogen required in the process will be obtained by water electrolysis that is a mature technology, but it could be equally adapted to H₂ obtained through photocatalytic overall water splitting.



PLANNING

WORK PACKAGES	Year 1	Year 2	Year 3
WP0. COORDINATION, TRANSFER AND DISSEMINATION	█	█	█
WP1. GREEN DEAL TARGET MOLECULES	█	█	
WP2. SYNTHESIS AND CHARACTERIZATION OF PHOTOCATALYSTS FOR CO ₂ HYDROGENATION		█	█
WP3. ANALYSIS AND EVALUATION OF THE DEVELOPED PHOTOCATALYSTS FOR CO ₂ HYDROGENATION			█
WP4. PILOT PLANT. PORTABLE PHOTOCATALYTICS PROTOTYPE		█	█

CONSORTIA



Project coordinator



INSTITUTO DE TECNOLOGÍA QUÍMICA



Depuración de Aguas del Mediterráneo

