CO_2 to chemicals: From bench to pilot scale

Project Idea	Expertise offered: catalyst and process development for **converting CO_2 and waste carbon into chemicals and fuels**, validated **from bench to pilot scale**
Organization name, town and country	University of Sheffield (School of Chemical, Materials and Biological Engineering), Sheffield, United Kingdom
Addressed topic(s)	**HORIZON-CL4-2027-01-MAT-PROD-62** Fast Track: Chemical Industry Action Plan Also: **MAT-PROD-61** (Fast Track, industrial technologies) and **MAT-PROD-32** (renewable energy in process industries)

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- Lead, Sustainable Catalytic Engineering Group: heterogeneous catalysis for CO_2 utilisation, green chemistry and waste/biomass valorisation.

- **Facilities:** bench-scale reactors (gas/solid, gas/liquid/solid); operando DRIFTS FTIR; **pilot-scale GTL rig with recycle and on-line analytics**
- Track record: industry-funded projects with **multinational automotive and chemicals partners**; strong European and international collaborations
- EU-funded projects: Previous member of successful consortium



The project idea

- **Challenge:** the chemical industry needs non-fossil carbon, but scaling-up lab-scale **CO_2 hydrogenation** catalysts and processes remains a bottleneck
- **Idea:** Novel, scalable, catalysts for converting CO_2 + green H_2 to platform chemicals and C5+ hydrocarbons, designed for scale-up and Safe and Sustainable by Design
- **Approach: operando DRIFTS** to identify active phases → scaled catalyst production → **validation on our pilot GTL** rig with partners' real CO_2 streams
- **Why it will succeed:** active industry collaborations on-going in this area; pilot infrastructure already in place

Competences / type of partners sought

Industrial lead / end user: chemical producer or energy-intensive site with a CO_2 stream

Catalyst / materials manufacturer: either a new partner or scope to involve current/previous collaborators

Engineering SME / technology provider: process integration and demonstration

LCA, TEA and SSbD expertise

Our role: work-package lead for **catalyst development, mechanistic insight and pilot validation**. Happy to join an existing consortium or co-develop a new one

Contact details

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