AIMPLAS

Excelencia en Plásticos

2022

What is AIMPLAS?

A **technology centre** with 30 years' experience in the plastic sector.

Market Orientation

Packaging

Construction

Automotive and transport

Recycling

Printing

Aeronautics

Agriculture

Electrical and Electronics

Energy

Health

Navigation

Aerospace

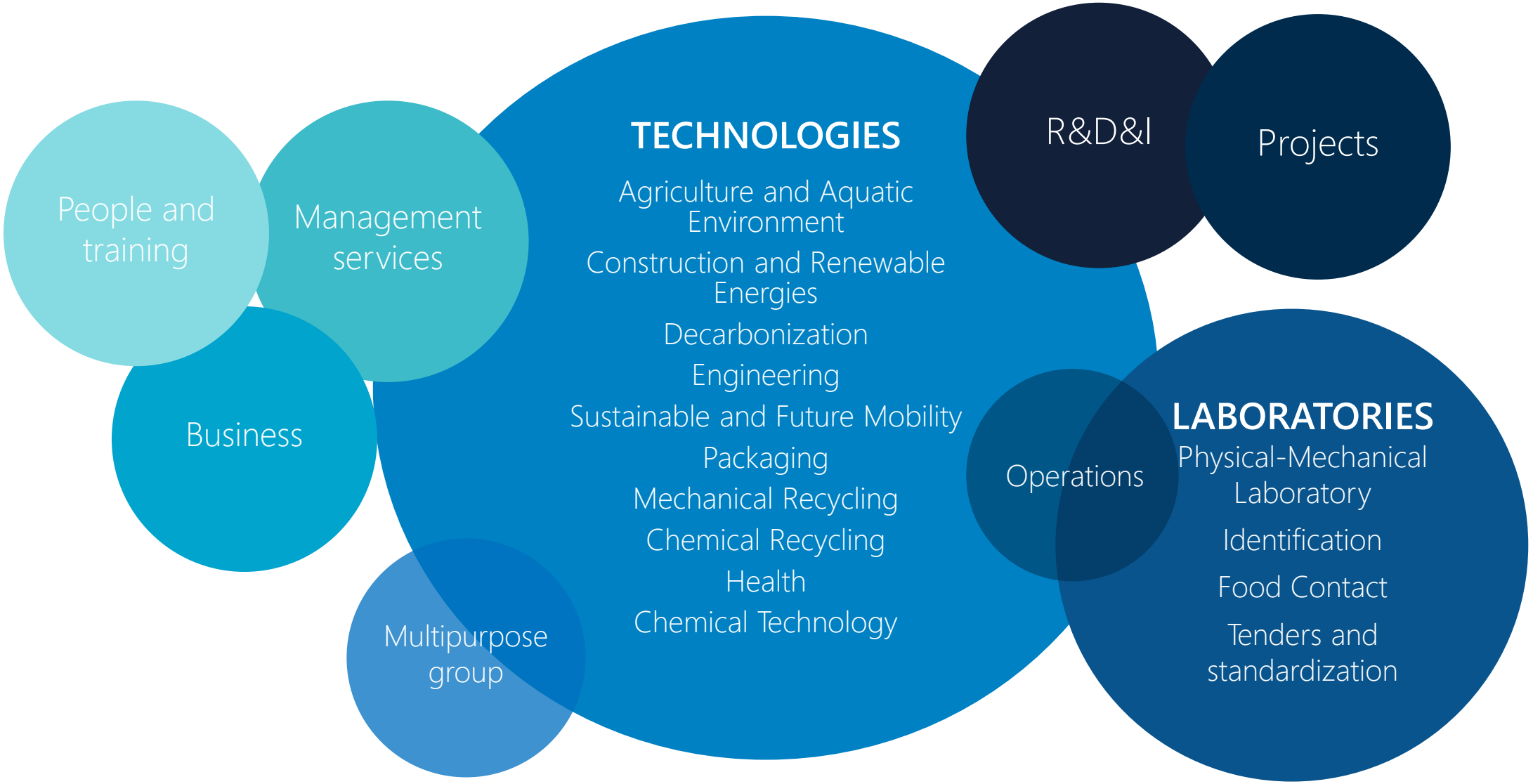
Furniture

Sports and Leisure

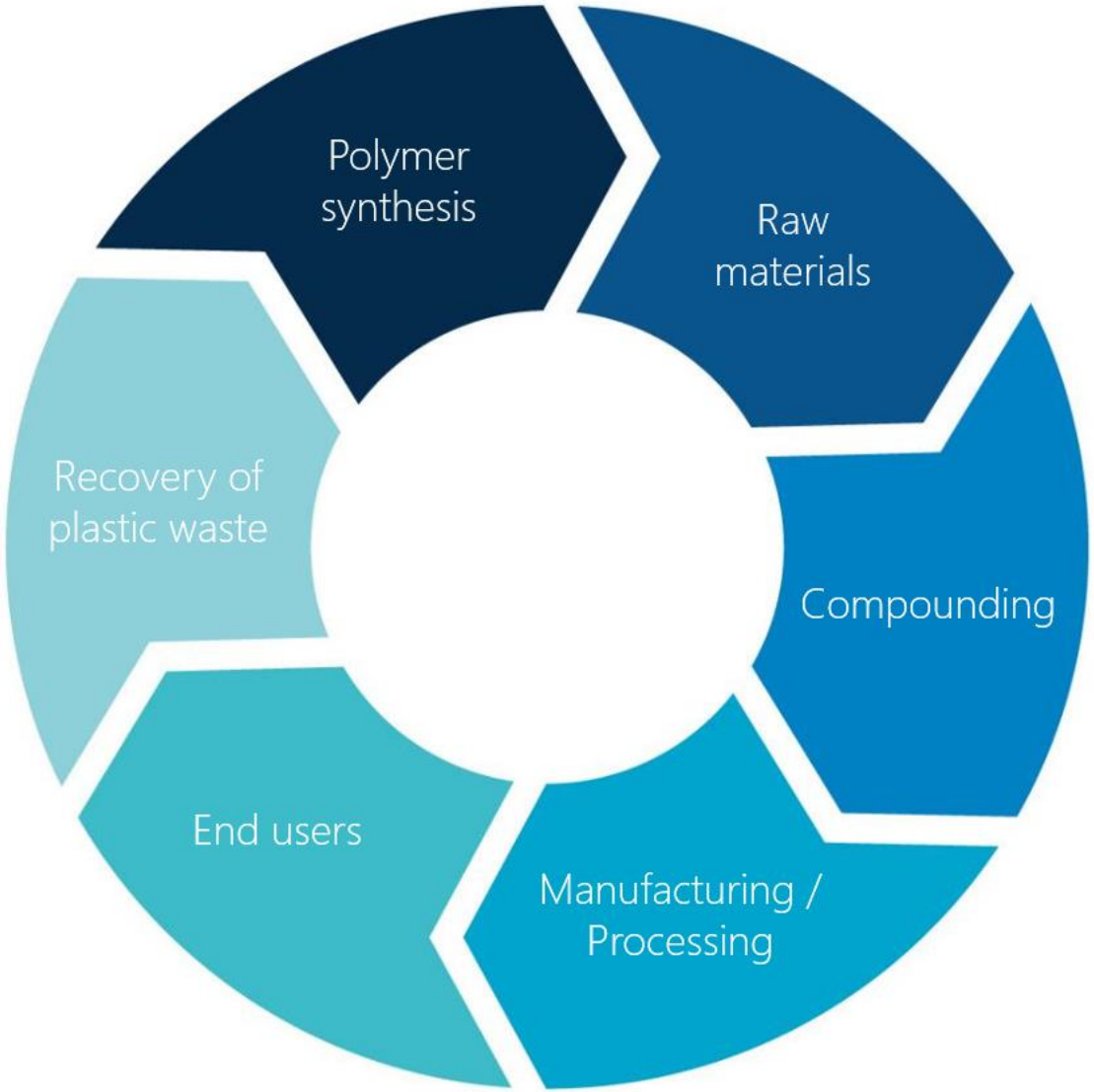
More than **10,500 m²** of cutting-edge facilities

- Pilot plants (6,000 m²)
- Laboratories (4,500 m²)

Comprehensive management to provide global solutions



Expertise across the entire plastics value chain



Solutions for Plastics

1. R&D&I

2. Technology services

3. Training and events

Decarbonisation Group

descarbonizacion@aimplas.es

eConomía CIRCULAR
AIMPLAS

Aim of the group

To turn **CO_2 into a competitive raw material**, produce it efficiently using emissions, and ensure that it is **valorise into chemicals, fuels or materials** using environmentally friendly technologies

To make a significant contribution to the goal of having a **climate neutral Europe** in 2050 through the reduction of net CO_2 emissions from 4 crucial sectors of our economy: energy, process industry, transport and construction

We believe that together we can better address key issues faced by the CCU industry

Research lines

CO_2 capture (CCS)

CO_2 –based materials (CCU):

Monomers and polymers
Building blocks
High value chemicals

Membranes for separation and purification

Catalysts design:

Synthetic processes
Biomass valorization
Water treatment
Recycling

laurelin

PROJECT PRESENTATION

Selective CO_2 conversion to renewable methanol through innovative heterogeneous catalyst systems optimized for advanced hydrogenation technologies (microwave, plasma and magnetic induction)

The LAURELIN project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement n. 101022507. It reflects only the author's view. The Agency is not responsible for any use that may be made of the information it contains.

This research is supported by the Japan Science and Technology Agency (JST) under the SICORP program (grant no. JPMJSC2101).

JST 科学技術振興機構

In a nutshell

OBJECTIVE: optimisation and improvement of CO_2 hydrogenation process, to obtain methanol as renewable fuel by innovative methodologies.

4-year Project
5M€ budget

Partners: 10 partners from **EU** (Belgium, Germany, Netherlands, Spain and United Kingdom) and **Japan** with a solid scientific presence based in Research Organisations and SMEs participation.

Why methanol?

Methanol advantages as fuel:

- **Methanol** is used in gasoline blends at low (3-5%), mid (15-30%) and high (50-100%) volume percentages, as a diesel substitute for use in heavy-duty vehicles, passenger cars, and as marine bunker fuel.
- **Direct methanol fuel cells (MNFCs)** can convert chemical energy to electrical power at ambient temperature.
- **Important attributes:** excellent spark-ignition engine fuel, high octane contribution, easy distillation, lower boiling temperature (efficiency in vaporization), not produce soot, fumes or odour.
- **Liquid methanol** avoids the storage and transfer hydrogen safely under extreme pressures (350-700 bar).

Geely M100 truck (2019) in China and M100 truck in Israel (2020)

Ocean-going vessel powered by methanol

What is LAURELIN?

The main objective of LAURELIN project is to **reduce CO_2 hydrogenation requirements** introducing a **new generation of heterogeneous catalysts** perfectly adapted to advanced reaction processes: microwave, magnetic induction and non-thermal plasma.

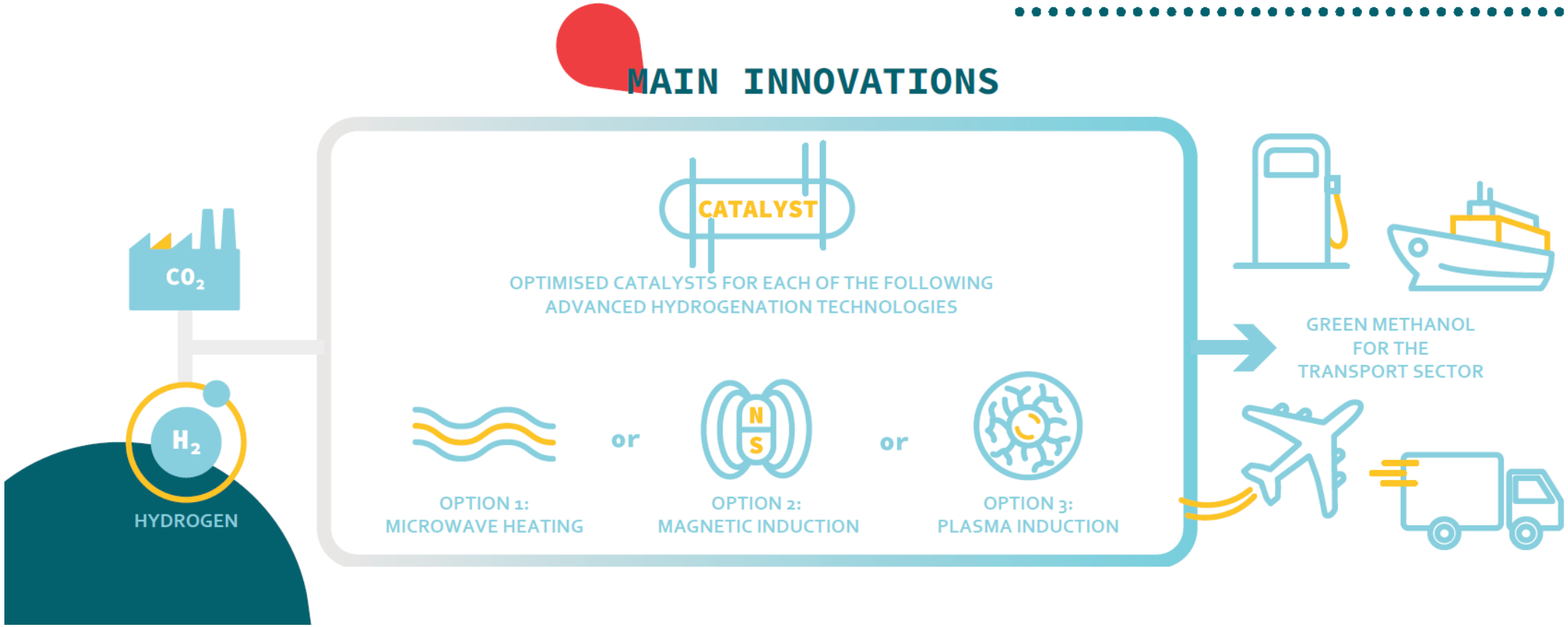
The strategies adopted by LAURELIN project to achieve the planned objectives are the following:

a) ***Research and development in disruptive multifunctional catalyst systems.***

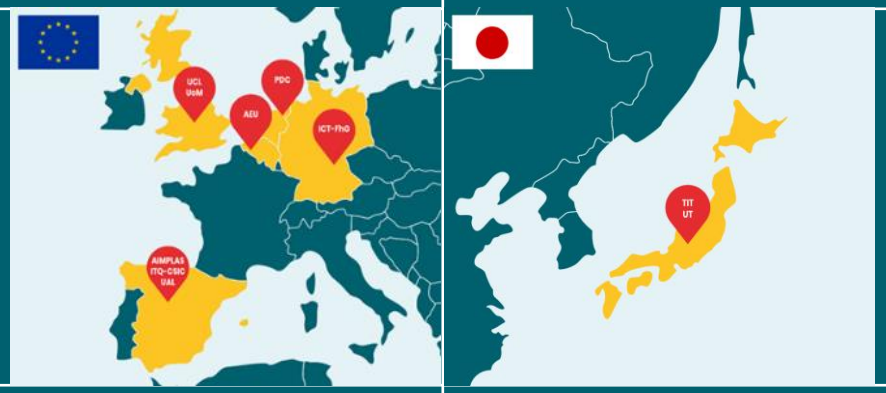
b) ***New technologies for CO_2 hydrogenation.***

What is LAURELIN?

MAIN INNOVATIONS



Who are the partners?

1. AIMPLAS (Spain) Project Coordination. Catalyst synthesis and conventional reactor.	**2. ITQ-CSIC (Spain)** Catalyst and magnetic induction reactor.	**3. UAL (Spain)** Catalyst and downstream processes.	**4. UoM (UK)** Non-thermal plasma reactor.
5. UCL (UK) Advanced characterisation.			**6. ICT-FhG (Germany)** Microwave reactor.
7. PDC (Netherlands) Conceptual design, LCA and economic analysis.	**8. AEU (Belgium)** IPR management. Dissemination.	**9. TITECH (Japan)** Catalyst and conventional reactor.	**10. UT (Japan)** Catalyst and conventional reactor.

Communication and Dissemination Plan

Objectives:

- To characterise the **market**, future **trends** and market and target **potential**.
- To implement **a Communication plan to raise awareness and promote project results** in target groups.
- To prepare a exploitation plan and an IP strategy to guarantee the **sustainability of results** and its scalability to market.
- To **mobilise key stakeholders**:
  - **Transport** sectors.
  - **Fuel** producers.
  - Indirect impact: Energy – intensive process industries (cement and lime, steel and energy).

Activities:

- Project website.
- Logo and visual identity of the project (document templates).
- Printed materials (Leaflet, Poster, …).
- **Industrial and scientific events in EU and Japan**
- Scientific and technical publications.
- **Clustering activities with EU – Japan projects in CCUS and in the context of other EU programmes.**
- Periodic Newsletters.
- Videos.
- Press releases.
- Online communication (Linkedin, Twitter).

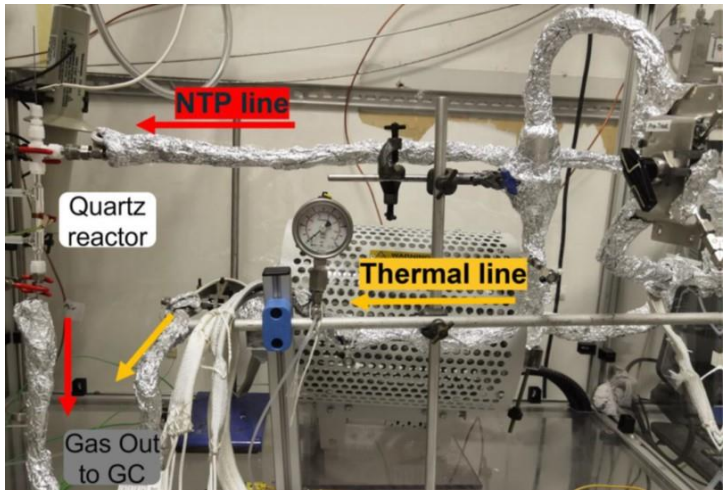
Targets: stakeholders, supply and value chain of energy, transport and biofuel sectors, policy makers, research community and general public.

Results of the project

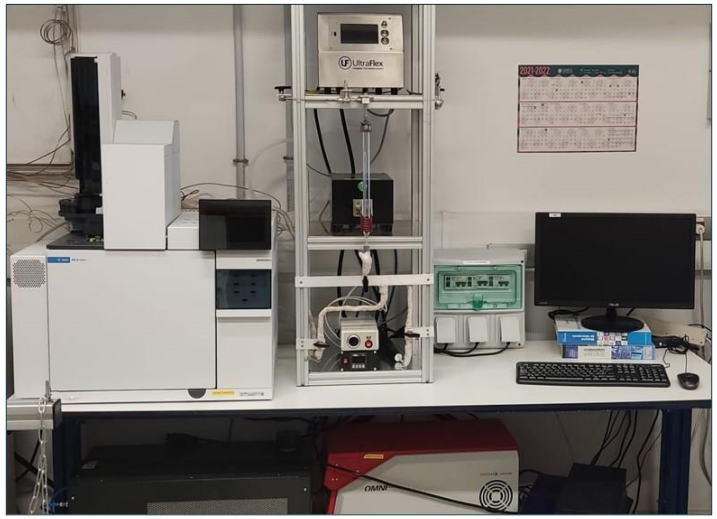
- ✓ New catalyst are being developed and improved in terms of efficiency (Conversion, selectivity and yield)
- ✓ A benchmarking with the results from commercial catalysts from the bibliography is letting envisage the opportunities of those catalysts.
- ✓ New hydrogenation reactors for the synthesis of methanol have been developed (Microwave, Plasma and Magnetic Induction)
- ✓ The efficiency on the conversion of these new catalyst in the new reactors it is being improved with promising results

Results of the project

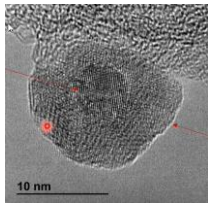
MICROWAVE



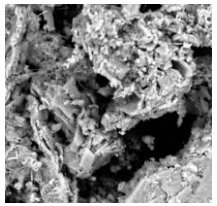
NON-THERMAL PLASMA



MAGNETIC INDUCTION



Dual Phase catalyst



Decorated 2D catalyst

CONVENTIONAL THERMAL (Benchmark)

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https://laurelin.eu/

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