MEET OUR PARTNERS

The MemCat Consortium involves various partners, including universities, research organizations, and a SME, working together in different work packages (WPs).

Key interactions focus on nanomaterial synthesis, catalytic investigations, computational modelling, and membrane development.

GET IN TOUCH!

For more information about our MemCat project...

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MEMCAT

Membrane-assisted ethylene synthesis over nanostructured tandem catalysts

CALL: HORIZON-EIC-2023-PATHFINDEROPEN-01
PROJECT NUMBER: 101130047
EU FUNDING: € 3.867 841,25
STARTING DATE: 01.05.2024
DURATION: 48 MONTHS

European Innovation Council — Funded by the European Union

About us

MemCat aims to create a proof-of-concept for converting CO_2 directly to ethylene using tandem catalysts. These catalysts will enable consecutive CO_2-to-methanol and methanol-to-ethylene conversions within the same operational framework.

By conducting detailed experimental studies and theoretical calculations, the project will shed light on the reaction mechanisms, allowing for improved catalysts to achieve industry-relevant performance.

The project will leverage the consortium's expertise to deploy catalysts in a membrane reactor with tailored nanocomposite membranes, achieving selective and high-yield ethylene production for the first time.

MemCat's breakthrough will result from combining synthesis, catalysis, and theory to develop novel nanostructured tandem catalysts and nanocomposite membranes, replacing current multi-step processes.

MEMCAT

Objectives

The MemCat project aims at a breakthrough in chemical conversion to revolutionize the chemical industry by converting CO_2 into valuable chemicals like ethylene (ET) using specialized catalysts and membranes in a membrane reactor (MR). Key objectives include:

1. Developing nanostructured catalysts for efficient CO_2-to-ET conversion.
2. Understanding the catalytic processes through computational and experimental methods.
3. Creating temperature-resistant membranes to improve ET production and purification.
4. Building a prototype MR with optimized catalysts and membranes.
5. Maximize the impact of the project by promoting open science practices, protecting intellectual property, and fostering inclusive outreach efforts.

Expected Results

MemCat targets a technology for sustainable ethylene (ET) production using captured CO_2, offering a green alternative to fossil-based methods.

With the ET market expected to grow significantly, MemCat can assist in positioning the EU as a leader in green chemical production and create jobs. It supports the shift to renewable e-Plastic production, reducing CO_2 emissions and avoiding food resource competition.

Long-Term Impact

MemCat aims to revolutionize plastic production by creating carbon-negative plastic precursors using captured CO_2 and renewable hydrogen.

We focus on ethylene (ET), a key industrial chemical currently produced with high CO_2 emissions. MemCat plans to develop innovative tandem catalysts and nanocomposite membranes for a novel membrane reactor. This system aims to achieve high CO_2 conversion rates with exceptional ET selectivity.

The long-term vision of MemCat is to extend this technology to other important monomers, promoting sustainability and reducing global CO_2 emissions in the chemical industry.

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