



**“Membrane-assisted ethylene  
synthesis over nanostructured  
tandem catalysts”**

**Ed. 2- April, 2025**

**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



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**[www.memcatproject.eu](http://www.memcatproject.eu)**

# Welcome to the second Newsletter of the MemCat project

- **Welcome to the Second Newsletter!**

The present newsletter is the second release of the biannual letter that will be published by MemCat presenting the progress on the project and highlighting information related to it.

Hope you will find the info in this newsletter interesting!

On our website [www.memcatproject.eu](http://www.memcatproject.eu) you will find public presentations, all the public deliverables of the project and many other interesting news. Stay tuned!

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# Behind the Project

- **Discover who is behind our MemCat project**

Behind every impactful idea is a team of passionate individuals, and we want you to meet the people who are making it all happen.



**Mohammad Izadpanah Ostad** graduated with a B.Sc. (2013) and M.Sc. (2021) in Chemical Engineering from Quchan University of Technology, Iran. In 2024, Mohammad joined the MemCat project as a PhD student in Dr. Salonen's research group at University of Vigo (UVigo) to work on the development of nanomaterials for gas separation. In the project, he's working in collaboration with Eindhoven University of Technology (TU/e) and University of Calabria (UNICAL).



**Balkaran Singh Sran** is an Indian researcher specializing in chemistry and his Ph.D. research involved structural and opto-magnetic investigations of lanthanide coordination complexes. In 2024, Balkaran joined the MemCat project as a Postdoctoral Researcher at University of Vigo, under the supervision of Dr. Laura Salonen. He develops nanofillers for efficient ethylene purification membranes and collaborates on material challenges in membrane synthesis.

**Claudia Revilla Pacheco** is a Peruvian researcher with a background in Pharmaceutical Chemistry and Chemistry. In 2024, she joined the MemCat project as a PhD student at Eindhoven University of Technology, under the supervision Prof. Fausto Gallucci. Her research involves developing a membrane reactor for converting CO<sub>2</sub> to ethylene (C<sub>2</sub>H<sub>4</sub>) through intermediate methanol production.

She also collaborates with the University of Calabria to develop Carbon Molecular Sieving Membranes for efficient water and ethylene separation.



# A talk with Dr. Sergio Santoro from UNICAL

We had the pleasure of speaking with Dr. Sergio Santoro, a key researcher at the University of Calabria and his team is involved in our MEMCAT project.

- **Dr. Santoro, could you start by telling us your academic journey?**

Hello, thank you for this opportunity.



I'm a tenure-track researcher with a Master's degree with honours in Materials Science and PhD at Universidade Nova de Lisboa (Portugal), in cotutela with the University of Zaragoza (Spain) and the University of Calabria (Italy), as part of the Erasmus Mundus Doctorate in Membrane Engineering (EUDIME).

My research focuses on the development of nanostructured functional materials for advanced membrane processes in energy, catalysis, and environmental technologies.

- **What is the focus of the Laboratory of Chemical Fundamentals of Membrane Technologies and Nanostructured Materials at the University of Calabria?**

At the University of Calabria, the Laboratory of Chemical Fundamentals of Membrane Technologies and Nanostructured Materials brings extensive expertise and a long-standing tradition in membrane science to the MemCat project.

The lab is widely recognized for its research at the intersection of materials chemistry, membrane technology, and sustainable process development, covering everything from separation and catalysis to water treatment and nanostructured systems.

Its mission is rooted in the development of innovative, environmentally conscious technologies aligned with the principles of green chemistry and circular economy.



- **It's a very important laboratory; who are the key members your team working on the MemCat project?**

Ooh, I have a picture of our team: there is Prof. Efrem Curcio (on the left with the T-shirt in stripes), then Prof. Pietro Argurio, Prof. Salvatore Straface, and Dr. Marco Aquino (left), and coordinated by myself. Here, in the centre with the blue T-Shirt.



Everybody plays a central role in MemCat's membrane development.



- **Nice picture! Going back to the MemCat project, what was your focus in this first year?**

During this first year of MemCat, we have focused on the early design and preparation of carbon molecular sieve membranes (CMSMs), a crucial step toward the integration of membrane separation within catalytic reactors.

The initial phase involved the synthesis of precursors, which were subsequently carbonized to obtain the active CMSM layers. These were applied as coatings on tubular supports, marking the first generation of membrane prototypes developed in the project.

- **Are you working alone on this topic or other companies or institutions are involved in your research?**

Indeed our group is working in parallel with Eindhoven University of Technology (TU/e) to explore how various synthesis parameters influence membrane structure and performance.

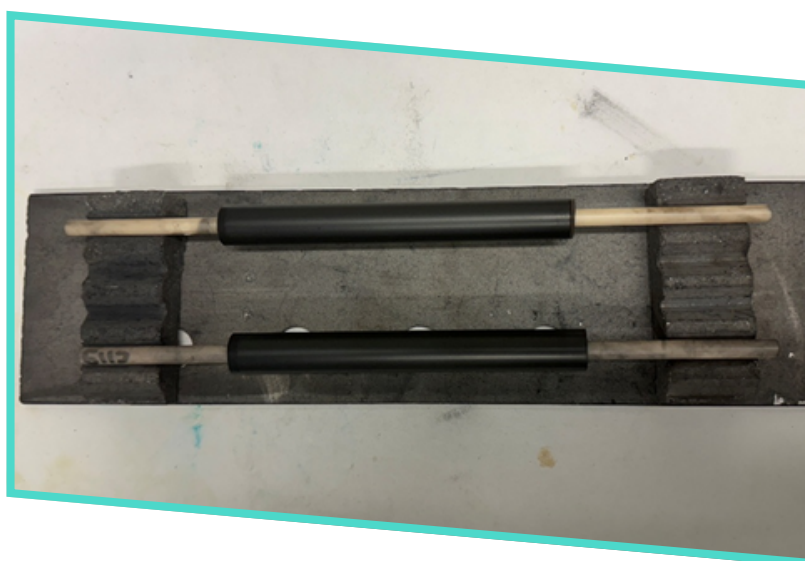
Additionally, the team has started to investigate the impact of incorporating metal-organic frameworks (MOFs) synthesized by the University of Vigo, with the goal of enhancing membrane selectivity, particularly toward ethylene.

I can show a practical example of our work.

- **Yes, please. It will be great to see it.**



This is one of our first membranes realized by Marco and Prof. Fausto Gallucci from TU/e.



These first steps are laying a solid foundation for the membrane systems that will ultimately help boost olefin yields and enable cleaner, more efficient ethylene purification.

The work reflects the spirit of the MemCat project itself: innovative, collaborative, and firmly focused on creating sustainable technologies for the chemical industry of tomorrow.

- **Thanks very much, Dr. Santoro. It was a very interesting talk.**

Thanks to you.

Let's meet again in the next years when we have more results!



# M6 Consortium Meeting



M6 meeting marked a significant milestone in the project's progress!

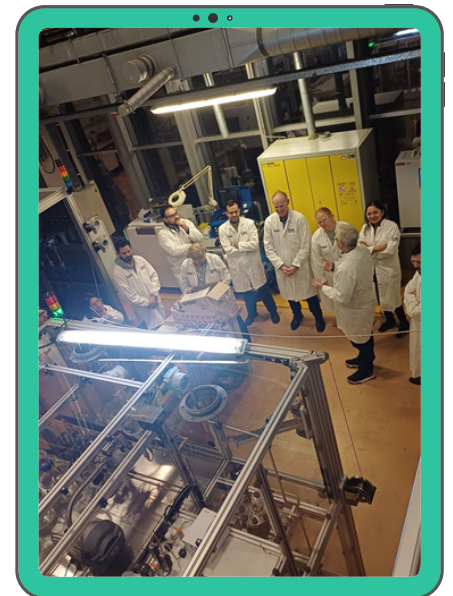
The gathering took place at the new office of 1CUBE, one of the key partners of the consortium, providing a dynamic and inspiring environment for collaboration.

The meeting brought together all consortium

partners to review achievements from the past six months and align on priorities for the next phase of the initiative.

Each partner shared updates on their contributions, showcasing advancements in research, technology development, and project implementation.

A guided tour of research laboratories at Eindhoven University of Technology was organized by Prof. Fausto Gallucci and his team members G. Anello and C. Pacheco in the afternoon.





# Highlight Activities

## What if you missed it!

Don't worry you can find more in our MemCat website at <https://www.memcatproject.eu/events/>

- **Researcher's Night at UNICAL on 27<sup>th</sup> September 2024 at UNICAL (IT)**

Thanks to our partner UNICAL in person of S. Santoro and P. Argurio, our MemCat project had a great success during the Researcher's Night.



- **2<sup>nd</sup> Edition Winter School on Membrane and Membrane Reactors, January 27<sup>th</sup> and 28<sup>th</sup> 2025 at 1CUBE, Eindhoven (NL)**




We are grateful to the APOLO, ANDREA, and MEASURED projects for giving the opportunity to our MemCat project to showcase the project through our brochures and rollup.



# Highlight Activities

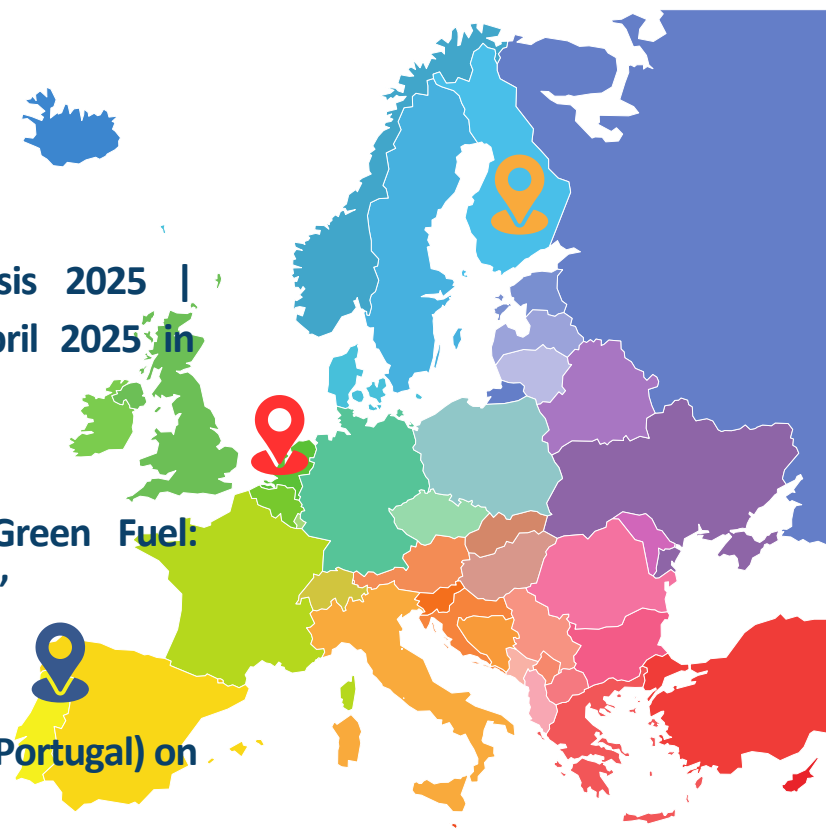
## What's next?

 Young Scientist Forum in Catalysis 2025 | University of Jyväskylä on 4th April 2025 in Jyväskylä (Finland)

 Virtual Forum on “Catalysts & Green Fuel: Advancing Research and Innovation”

 M12 Consortium Meeting in Braga (Portugal) on May 7<sup>th</sup> and 8<sup>th</sup>

 SEPTech Conference from 21st to 23rd October 2025 in Eindhoven (The Netherlands)





For more information about our MemCat project...

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