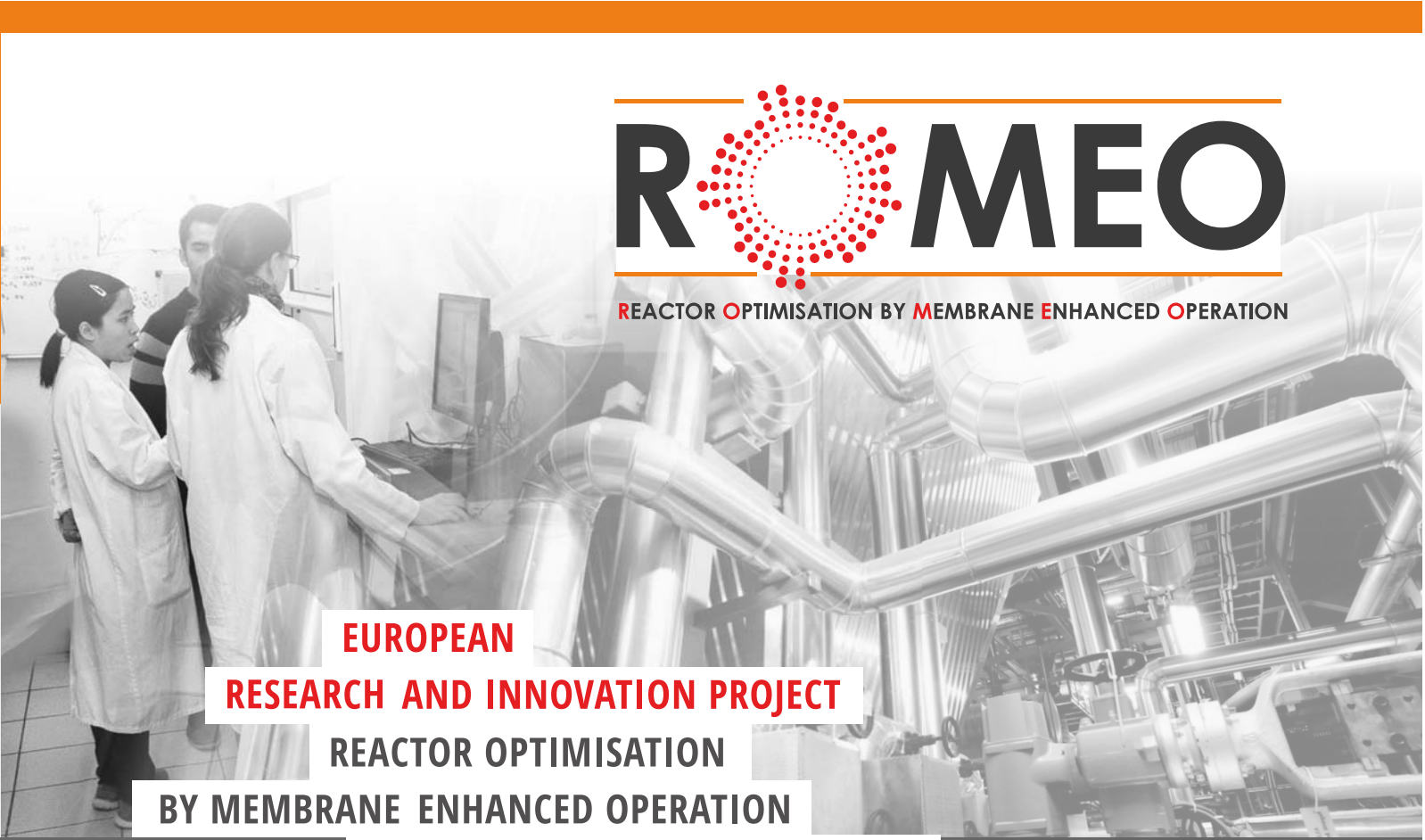


# ROMEO

REACTOR OPTIMISATION BY MEMBRANE ENHANCED OPERATION

EUROPEAN
RESEARCH AND INNOVATION PROJECT

## REACTOR OPTIMISATION
## BY MEMBRANE ENHANCED OPERATION

## REDUCING ENERGY CONSUMPTION
## IN PROCESS INDUSTRY

## CONTEXT

The immobilization of highly active and selective homogeneous catalysts by the supported ionic liquid phase (SILP) concept is extremely promising in the context of catalyst recycling and energy savings. By **merging the SILP technology with membrane reactor technology** for the first time, such homogeneous catalysts are applied for process intensification in an industrial setting.

**INDUSTRY & ACADEMIA TEAMING UP AROUND A NEW CONCEPT OF "TWO-IN-ONE" MEMBRANE REACTORS TO REDUCE ENERGY CONSUMPTION AND EMISSIONS IN PROCESS INDUSTRY**

## ROMEO'S AIM

The project gathers 9 European partners from industry and academia to **implement an efficient platform for the optimal design of new integrated reactors.** Applied to large volume industrial processes, the innovative ROMEO approach will:

- **improve selectivity and productivity** of industrial reactions, including raw material savings
- **reduce energy consumption** by up to 80% in industrial catalytic gas-phase reactions
- **reduce related emissions** by up to 90%

ROMEO's "two-in-one" reactors combine optimized membrane modules and the immobilization of homogeneous catalysts to carry out chemical synthesis and downstream processing in a single step.

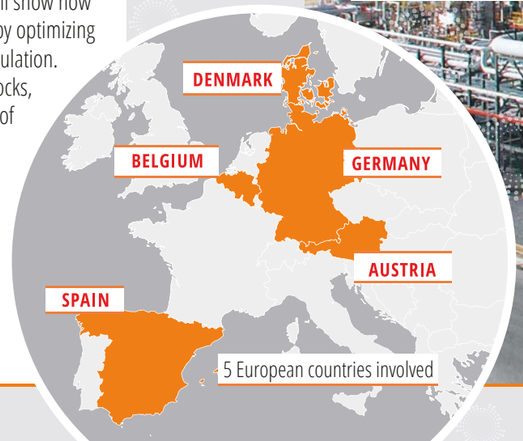
## WHAT'S NEW WITH ROMEO?

ROMEO intends to get detailed understanding of the processes involved in the well-argued design of new reactors, **from nano to macro-scale**. Two important reactions are chosen as demonstration cases:

1. **Hydroformylation**, to convert olefins and syngas to aldehydes (precursors for plasticizer alcohols).
2. **Water-gas shift reaction** which uses CO-containing syngas derived from biomass to generate hydrogen.

For both reactions, the project will show how to set up **adapted toolboxes** by optimizing choice via modelling and simulation. Based on the use of building blocks, it aims to facilitate the conception of apparatus for a large set of applications.

**A NEW AND ESSENTIAL STEP TOWARDS THE CHEMICAL PLANT OF THE FUTURE : SAFER, WITH A REDUCED ENVIRONMENTAL FOOTPRINT AND HIGHER PRODUCT QUALITY**







## EUROPEAN PARTNERS

**Evonik** - Germany
Evonik Performance Materials GmbH // Evonik Technology & Infrastructure GmbH

**FAU** - Germany
Friedrich-Alexander-Universität Erlangen-Nürnberg

**RWTH** - Germany
Rheinisch Westfälische Technische Hochschule Aachen

**DTU** - Denmark
Technical University of Denmark

**BioEnergy2020+ GmbH** - Austria

**LiqTech** - Denmark
LiqTech International A/S

**EMH** - Belgium
European Membrane House

**CSIC** - Spain
Agencia Estatal Consejo Superior de Investigaciones Científicas

**Linde AG** - Germany

# www.romeo-h2020.eu

# @Romeo123EU

## ROMEO IN A NUTSHELL

EC Call: **H2020-SPIRE-2015**
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Duration: **48 months**
EC funding: **6 millions €**

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SPIRE
Sustainable Process Industry through Resource and Energy Efficiency