ocmöl

Taking advantage of resources

Oxidative Coupling of Methane followed by Oligomerization to Liquids: Towards sustainable production of high quality fuels and petrochemicals

A European Large-Scale Project supported through the Seventh Framework Programme for Research and Technological Development

Today's challenges

As the global energy demand and crude oil price rise, alternative production routes for the same hydrocarbon products are becoming more and more economically attractive. In this respect, synthetic fuels created from natural gas offer now an alternative to the traditional fuel supply mix.

Unfortunately, approximately **one third of the world's natural gas reserves are considered stranded and, hence, remain unexploited so far.** Today, the established processes for natural gas transformation into synthetic fuels, i.e., natural gas liquefaction and Fischer-Tropsch synthesis, require large investments which are prohibitive for the exploitation of small natural gas reservoirs.

Photo: Haldor Topsoe (HTAS)

The OCMOL project aims at developing an innovative chemical route adapted to the exploitation of small gas reservoirs from both a technical and an economic point of view. The corresponding process is, among others, based on oxidative coupling of methane followed by its subsequent oligomerization to liquids.

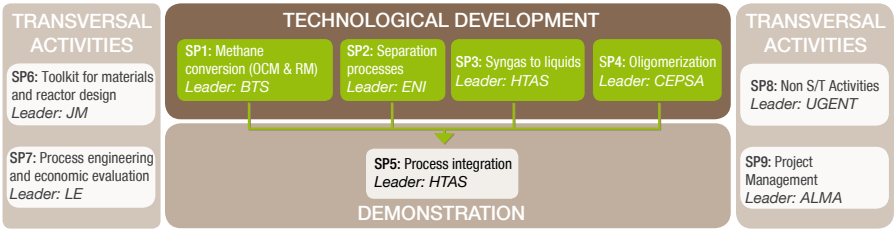
Objectives

The general objectives of OCMOL are twofold

1. Process intensification via cutting-edge micro reactor technologies. This will enable to skip the expensive scale-up stage to provide a proof of concept of the OCMOL liquefaction route and allow companies to make go/no go decisions

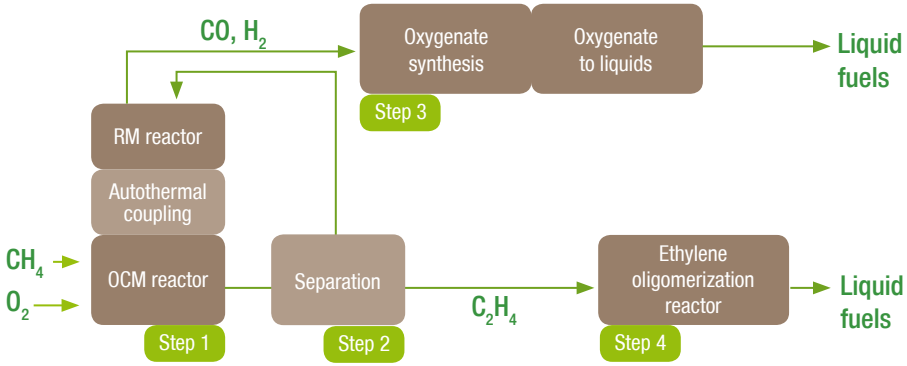
2. To develop a fully integrated process, which will be self-sufficient through the re-use and the recycling of by-products, in particular CO_2

Methodology and workplan



OCMOL process

Major technological challenges are addressed in the fields of methane oxidative coupling, ethylene oligomerization, membrane/PSA separation, methane dry reforming, oxygenate synthesis and oxygenate to liquids conversion.



OCM (Oxidative Coupling of Methane) and RM (Reforming of Methane)

The OCMOL route will be designed to offer 4 main advantages:

- An economic operation at capacities of 100kT/year
- An operation at more uniform pressure levels
- The flexibility of product streams: linear α-olefins, fuels from gasoline to diesel range
- Low if not zero CO_2 emission thus contributing to face global warming

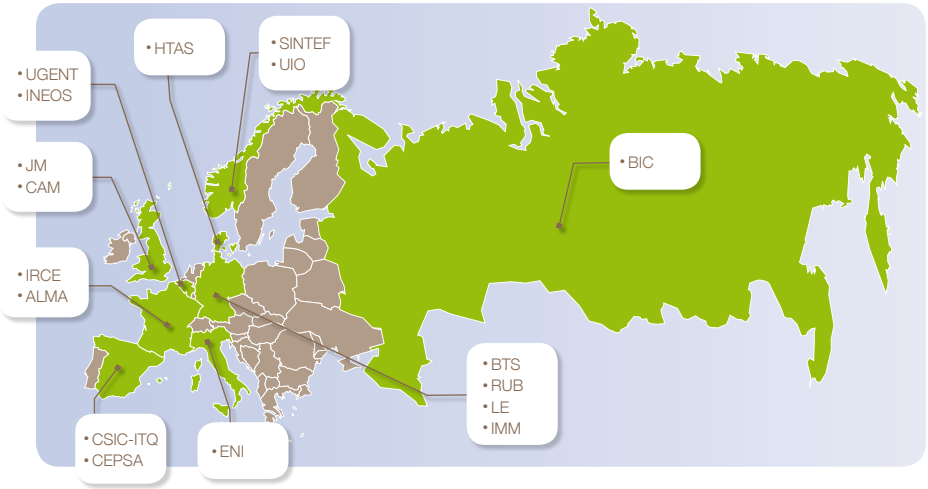
Perspectives

The innovative OCMOL process will allow the conversion of natural gas into

- Energy market (gasoline, kerosene, diesel, heating oil, additives…)
- Petrochemical/polymer market (ethylene and linear α-olefins)
- Environmental market (sulphur free fuels)

Photo: Haldor Topsoe (HTAS)

Consortium



The OCMOL partnership gathers 17 entities coming from 8 European countries and 1 non-European country. 7 OCMOL partners are companies, i.e., Bayer Technology Services GmbH, Johnson Matthey plc, LINDE AG, Compañía Española de Petróleos S.A., Haldor Topsoe A/S, INEOS N.V. and ENI S.p.A., with recognized expertise in the field of material development and process engineering. This pool of industrials is supported by 4 academic partners (Ghent University, Ruhr-Universität Bochum, Universitetet i Oslo and University of Cambridge) and 5 experienced research organizations (CNRS - Institut de Recherches sur la Catalyse et l'Environnement, STIFTELSEN SINTEF, CSIC - Instituto de Tecnologia Quimica, Institut für Mikrotechnik Mainz GmbH and Boreskov Institute of Catalysis), which will bring their extensive knowledge on the various topics encompassed within the S&T scope of the project.

Acknowledgment

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