GLAMOUR

GLycerol to Aviation and Marine prOducts with sUstainable Recycling

PROJECT

GLAMOUR (GLycerol to Aviation and Marine prOducts with sUstainable Recycling) is a H2020 research project to demonstrate the conversion of bio-waste feedstock such as glycerol into jetfuel and marine diesel oil by combining two technologies: Syngas generation using gas solid reactions and compact Fischer-Trospsch process with 3D printed catalyst.

OBJECTIVES

- To develop, test and scale-up new catalyst formulations for chemical and calcium looping reforming
- To select, test and scale-up a new 3D-printed structured catalyst for FT synthesis
- To integrate and demonstrate the glycerol-to-syngas conversion and fuel synthesis in a single process prototype at TRL5 after 1000 hrs of operation
- To perform the overall techno-economic analysis and optimisation of the process for full scale applications
- To assess the overall economics of the process
- To implement the business plan of the GLAMOUR process of the entire value chain
- To improve the social sustainability of bio-fuels and inform policy makers

PROJECT PROGRESSES & UPDATES

The GLAMOUR project celebrates its second year of implementation during which the consortium has reached interesting results.

Technical improvements on the GLAMOUR technology:
Argent Energy, in collaboration with the University of Manchester has developed a process for the purification of crude glycerol – the feedstock of the GLAMOUR process - through physio-chemical treatment, while other purification routes will be also investigated in the next months. For the for chemical looping reforming (CLR) of glycerol different catalyst systems were developed and examined on their surface, structural and mechanical properties as well as on their catalytic performance. The University of Manchester has started the testing of the glycerol CLR process at TRL4 using a benchmark oxygen carrier material as well as a small materials batch developed by the GLAMOUR partners. The gas-solid reactor modelling for the chemical looping reactor has been verified and the model is ready for validation after the experimental campaign will be completed. For the Fischer-Tropsch (FT) process, VITO has been evaluating the impact of the impregnation method on the physico-chemical and catalytic properties of the 3D-structured catalyst and multiple 3D-printed catalysts have been successfully developed and thoroughly screened at TNO's facilities, enabling partners to verify that the reactor conditions are on course to reach TRL5 at the next stage. In addition, INERATEC has also performed catalysts screening to better understand the influence of the FT reaction parameters and composition of the feed gas on the FT-products composition. Following all these screening results, pilot FT experiments are being conducted by TNO.

GLAMOUR process design:
A full design of the GLAMOUR process prototype at a TRL5 scale has been completed at TU/e, which defines the operating conditions of setups such as temperature, pressure, gas composition for each step/cycle, and equipment.

Environmental assessment, project exploitation and dissemination:
The University of Manchester has also worked on the techno-economic assessment of the process at industrial scale and on the Life Cycle Assessment of the different parts of the plant to determine the main sources and more impacting steps for manufacturing new and conventional components and operating the overall process in terms of environmental performance. CIAOTECH has finalised the market and stakeholders' analysis, gathering strategic information on the technology and market trends relevant for the project exploitation and stakeholders' engagement. The project has been presented at different national and international events including IFIB, the International Forum on Industrial Biotechnology and Bioeconomy (Italy), ECOMONDO, the benchmark event in Europe for technological and industrial innovation in the field of green and circular economy (Italy), and the 5th H2020 Biofuels Workshop organized by CINEA.

CONTACT US

PROJECT COORDINATOR

Vincenzo Spallina,

- Lecturer in Chemical Engineering Department of Chemical Engineering and Analytical Science
- School of Engineering
- The University of Manchester

vincenzo.spallina@manchester.ac.uk

linkedin.com/company/glamour-horizon-2020

twitter.com/GlamourH2020

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