FAST CARD Newsletter

FASTCARD - FAST industrialisation by CAtalysts Research and Development

No. 5 – November 2016

FASTCARD Project Meetings and ENMIX Workshop

A Joint Workshop with BIOGO, cascatbel and FASTCARD, 19 - 21 January 2016 in Stuttgart, Germany

The EU FP7-funded project FASTCARD had its fifth meeting with 40 participants from 9 different countries in Stuttgart on 19 January 2016 (Fig. 1). In this meeting, further results were reported and discussed on the first day in different working group sessions.

In the evening, there was a museum tour and a dinner in the Mercedes-Benz museum in Stuttgart (Fig. 2). On the second day, an excursion to the bioliq® process in Karlsruhe took place (Fig. 3).

Figure 1: Group photos of the FASTCARD Project Meeting in Stuttgart.

The bioliq® pilot plant (see www.bioliq.de) covers the complete process chain required for producing fuels from residual biomass like straw. For energy densification of the biomass, fast pyrolysis is applied. The liquid pyrolysis oil and solid char obtained can be processed into intermediate fuels of high energy density. Fuel and chemicals production from synthesis gas requires high pressures. Therefore, synthesis gas production is already performed at pressures up to 80 bar by entrained flow gasification. The purified synthesis gas is converted into dimethyl ether and then further to gasoline.

After the excursion in the afternoon of January 20, the 5th ENMIX (European Nanoporous Materials Institute of Excellence) Workshop started as a joint workshop with the three European projects BIOGO, cascatbel and FASTCARD, which continued for the whole day on January 21 (Fig. 4). 59 participants from 13 countries attended the workshop. The two invited lectures of the workshop were on “Two-Dimensional Zeolites: Current Status and Perspectives” by Jiri Cejka, Heyrovsky Institute, Czech Republic, and on “Green Refineries: Past, Present, Future” by Paolo Pollesel, ENI, Milano, Italy. The other 13 oral presentations and 15 posters were evenly contributed from ENMIX, BIOGO, castcatbel and FASTCARD participants. The workshop was an excellent opportunity to get to know the topics of other projects and provided ample time for interesting discussions.

Figure 2: Museum tour and dinner in the Mercedes-Benz Museum Stuttgart.

Figure 3: Excursion to the bioliq® process in Karlsruhe.

Figure 4 (left): 5th ENMIX Workshop with participants from ENMIX, BIOGO, castcatbel and FASTCARD.

FASTCARD M30 Project Meeting, 28 - 29 June 2016 in Novara, Italy

The sixth meeting of the FASTCARD project was held in Novara, Italy. 43 participants from all the partners had interesting discussions about results, deviations and future prospects of the project (Figure 5). On the first day special emphasis was on interaction between the different WPs to manage the final goals of the project. In the evening, we had an interesting walk through the city of Novara learning a lot about local history (Figure 6). The tour ended with a fabulous dinner at a local restaurant (Figure 6).

The morning of the second day, the general assembly took place. After lunch there was an interesting tour around the ENI facility looking at their renewable energy research.

Figure 5: FASTCARD Project Meeting in Novara.

Figure 6: City tour and dinner in Novara.

The following pages introduce 2 more FASTCARD partners in greater detail.

Norwegian University of Science and Technology (NTNU)

Brief description of the organisation and of the department contributing to the execution of the project

The Norwegian University of Science and Technology (NTNU) in Trondheim is the largest university in Norway. NTNU has the main national responsibility for higher education in engineering and technology. The university consists of 70 depart-ments and has more than 46 000 students and about 380 PhD degrees awarded yearly. The Catalysis Group at the Depart-ment of Chemical Engineering is an integrated NTNU/SINTEF research laboratory (KinCat), and is heading a national centre of industrial Catalysis Science and Innovation (iCSI). The NTNU group has more than 20 years of experience in Fischer-Tropsch synthesis research and in situ characterisation of heterogeneous catalysts using synchrotron-based techniques.

Role in project and previous experience relevant to the task

In situ characterisation of Fischer-Tropsch synthesis catalysts at relevant reaction conditions using synchrotron x-ray and spectroscopic techniques. The Catalysis Group at NTNU has been involved in several projects on in situ characterisation of Fischer-Tropsch catalysts. The group has access to in-house (in situ) characterisation techniques such as FTIR, Raman, UV-vis, XRD, XPS, SSITKA, TGA-DSC. The Group possess a large number of catalyst testing facilities for kinetic measurements.

Person assigned to the project

Principal investigator: Professor Magnus Rønning

Experience and background: PhD in Chemical Engineering in 2000 from NTNU. He is since 2007 Professor at the Department of Chemical Engineering, NTNU. Rønning has experience as project leader in several national and international cooperation projects, such as EU-FP7 projects and the inGAP and iCSI centres. His research work is mainly covering aspects of heterogeneous catalysis applied to natural gas conversion, renewable energy production and synthesis and characterisation of new catalytic materials and nanomaterials in general. Previous participation in EU-FP7 projects : MONACAT, FREECATS (coordinator)

Previous participation in other projects related to this project

The Catalysis Group at NTNU has been involved in related projects on in situ characterisation of catalysts such as studying the role of promoters and deactivation mechanisms in Co-FT catalysts, core-shell structured nanoparticles for fuel cells, 3D imaging of working catalysts, and several projects in the national innovation centre for advanced processes of natural gas conversion (InGAP). NTNU is also partner in several industry funded projects on Fischer-Tropsch synthesis technology.

Special Equipment available for the project

We have a multifunctional in situ set-up for combined synchrotron XRD, EXAFS, XANES, Raman studies with a gas feeding system and on-line gas analysis (MS) able to operate up to 20 bar pressure and high temperatures. A similar in situ set-up is available in our home laboratory for FT-IR, Raman and UV-vis studies and catalytic testing.

References (publications) and patents related to the project

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