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BiZeolCat 

Bifunctional Zeolite based Catalysts and
Innovative process for Sustainable
Hydrocarbon Transformation GRANT
AGREEMENT N°: 814671

NEWSLETTER Nr. 2

19th December 2019

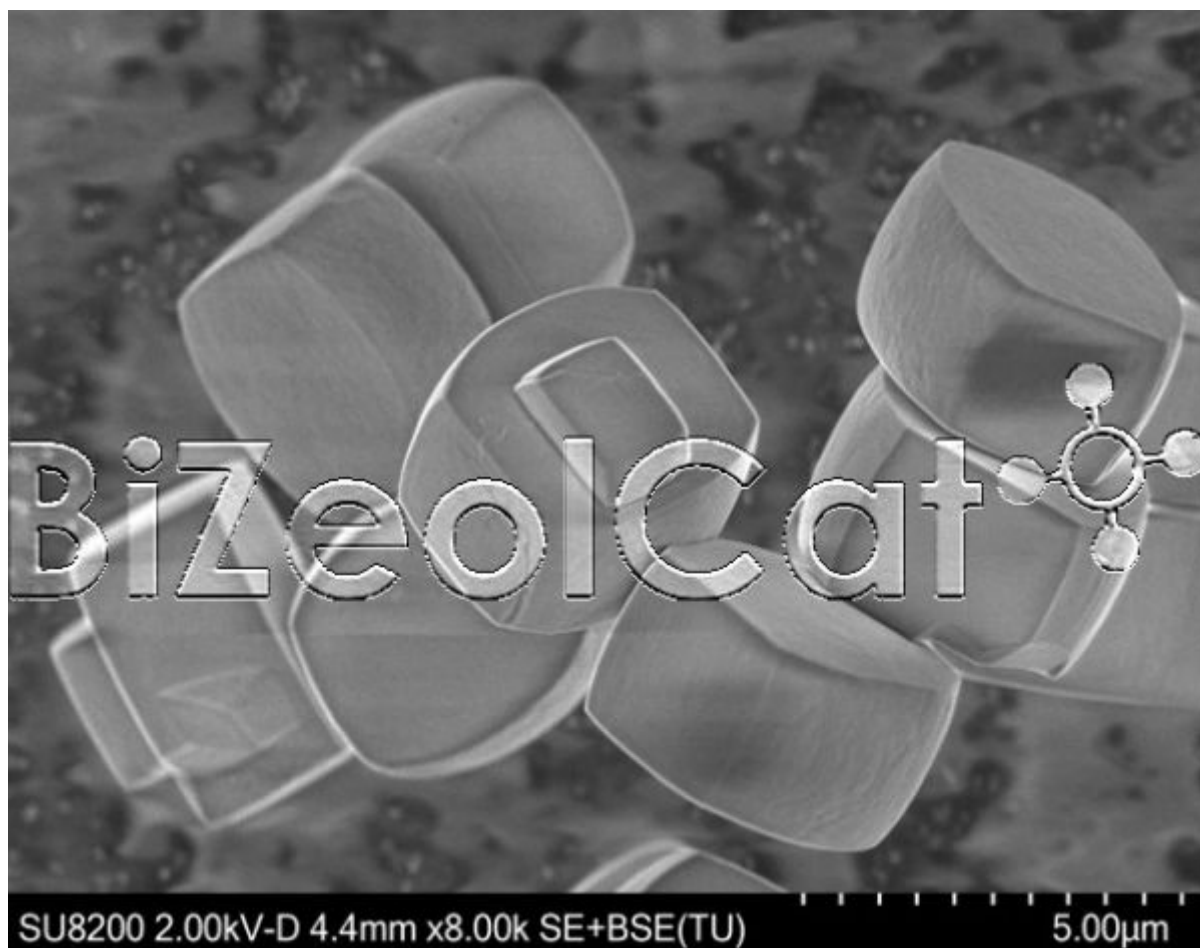


RESULTS: WHAT'S NEW?

Innovative zeolite catalysts synthesis methodologies, novel reactors' design and processing allow for efficiently convert the light alkanes as methane, propane and butane (constituting the major fraction of gas flaring) into light olefins, like propylene and butadiene, and into aromatics, like benzene and toluene. The obtained products are destinate as raw material for the chemical industry.

With the present newsletter, BiZeolCat project is glad to inform you about the main results achieved and the activities exploited during the first year of work.

**Preliminary results on New Catalysts based on Moderinite
Framework Inverted (MFI) Zeolites**



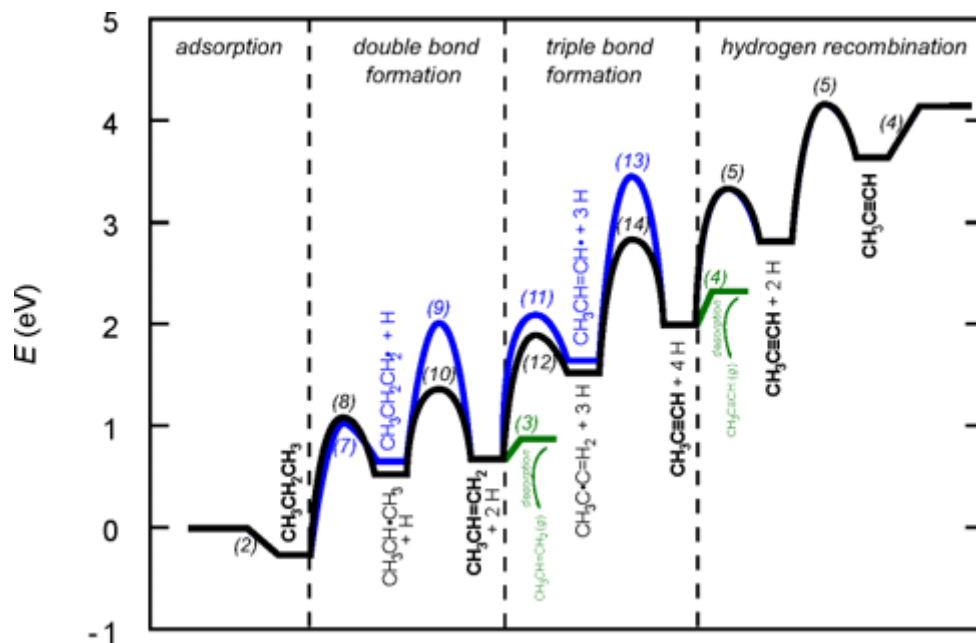
The BiZeolCat partner University of Oslo (www.uio.no) developed new catalysts based on ZSM-5 MFI-type zeolites, that are characterized by a high density of anchoring points for the grafting of active metals as catalysts.

These catalysts will allow for improving the propane and butane dehydrogenation as well as their aromatization reactions' yields, contributing to increasing the sustainability of those processes lowering also the associated energy consumption.

The figure reports an example of the MFI topology synthesized with Si/Al ratio 1:100 and crystal size approximately 1-3 microns

Reaction Network for propane dehydrogenation

New advancements are ongoing also on the study of the dehydrogenation reaction path: the BiZeolCat 's partners from the Kemijski Inštitut - National Institute of Chemistry (www.ki.si) have recently calculated and modelled (using kinetic Monte Carlo methodology) the entire reaction network for the propane dehydrogenation over chromium oxide catalysts.



They discovered the entire reaction network consists of 15 (in the figure) elementary reactions. The novelty is that the reactions occur – at normal operating conditions of 850 K in Temperature, 1.5 atm in pressure and in the non-oxidative environment - through the formation of intermediate compounds such as $\text{CH}_3\text{CH}_2\text{CH}_3$, CH_3CHCH_3 , CH_3CHCH_2 and does not proceed to propyne formation. Moreover, Hydrogen is formed as a side-product that can be designated to other uses.

BIZEOLCAT in practice: Techno-economic feasibility and monitoring. A chat with Annarita Salladini and Emma Palo



Do you want to know more about the techno-economic feasibility of BiZeolCat?

STAY TUNED!

On 28th November, BiZeolCat partner ERIC (www.eric-aisbl.eu/) responsible for the project's communication tasks, recorded a brief interview with Emma Palo and Annarita Salladini from the BiZeolCat partner Nextchem Srl (www.nextchem.it).

Emma and Annarita are in charge to perform the assessment of the feasibility of all new processes developed in BiZeolCat. The interview will be available on the project website very soon!

BIZEOLCAT EVENTS

2nd GENERAL ASSEMBLY in OSLO



The 6th Month BiZeolCat meeting has been held on 1st -3rd July in Oslo at SINTEF (www.sintef.no), one of Europe's largest independent research institutes with approximately 2100 employees and annual revenue of about 310 M€, mainly originating from bilateral industrial research contracts and participation in publicly-funded European and Norwegian research projects.

BiZeolCat partners attended the General Assembly and participated in the meetings with presentations on project activities and discussions on how to achieve the best outcomes and project results. Additionally, all partners contributed to future project developments and decisions in order to complete successfully foreseen activities and tasks.

In addition to the discussion of scientific and research topics, BiZeolCat partner Eurecat (<https://eurecat.org/>) organized – on 3rd July - a workshop to explain the importance of **Intellectual Property rights (IPR)** for the project. Paving the route to successful exploitation, intellectual property management was highlighted as an essential role in the entire life cycle of Bizeolcat project. In this regards, the session was used to start reflecting and exploring potential agreements since the very beginning of the project on IPR management directives for the foreseen project results.

A fundamental part of the Bizeolcat project is also played by **Standardization** which allows for facilitating the acceptance and utilisation of the solutions developed in the project in the market. Standardization also provides to ensure compatibility and interoperability of BiZeolcat outcomes with what already exists in the market as well as for the dissemination of the project results at the potential stakeholders.

BIZEOLCAT PARTICIPATION in CIS2019



BiZeolCat project participated at the International Conference “Chemistry meets Industry and Society” (CIS2019) held in Salerno (Italy) on 28th August 2019.

During the Brokerage event, BiZeolCat has been presented by ERIC partner (www.erci-aisbl.eu) in front of an audience of over 300 delegates, from Industries, Academia and Research centres.

The brokerage event allowed just for the project presentation, while the discussion and questions from the audience were postponed during the evening poster session. Most of the poster’s visitors coming from Academia mainly asked about the innovative catalysis processes developed in the project and the challenging approach the project assumes to upscale the laboratory dimension toward the industry implementation; this step can be overcome thanks to the collaboration with the two oil industries – CEPSA from Spain (www.cepsa.com) TUPRAS from Turkey (www.tupras.com) - industrial partners of the project Consortium. The visitors from Industry sectors were instead more oriented to ask for news on the upscaling implementations costs.

More than 100 participants expressed their interest in BiZeolCat outcomes, leaving their contacts to ERIC to be kept updated and informed about the project advancements. To know more, please visit the project website: www.bizeolcat.eu.

BIZEOLCAT PARTICIPATION IN NPS16 - 2019



Indeed, direct dehydrogenation and aromatization processes require high operating temperatures (550-600 °C) and low pressures (0.5-2 bar) to reach a quite high yield of conversion. Nevertheless, existing industrial processes are characterized by very low performance, mainly due to the presence in the reaction chamber of coproducts that deactivate the catalysts.

An optimization possibility is represented by the membrane reactor technology, which deals with the combination of reaction and separation in a single reactor unit: here, the dehydrogenation reactions are performed continuously removing hydrogen as a by-product. This allows for both shifting the thermodynamic equilibrium towards the desired products and for lowering the catalyst deactivation rate, resulting in a less energy-intensive process than the traditional ones. Within the BiZeolCat the TU/e is designing a **fluidized bed membrane reactor**, with Palladium-based membranes, interconnected with a unit for the catalyst regeneration, used to be the main source of heat for the reaction itself. The features of this new reactor substantially contribute to the achievement of all the sustainability objectives of the BiZeolCat project.

To know more, please visit the project website: www.bizeolcat.eu presentations section.

UPCOMING EVENTS

3rd GENERAL ASSEMBLY in LYON



Venue: École Supérieure de Chimie Physique Électronique de Lyon - Campus de La Doua

Date: 29th– 31st January 2020

The main objectives of the meeting will be the assessment of the project's achievements (milestones and deliverables) and a plan for the next year. The meeting will also provide a friendly atmosphere for informal activities and

strengthening of the relationships among the institutions, industries and universities involved. Social media will cover the event.

All the details of the event will be reported in the project website just after the meeting closing. STAY TUNED!



Visit the BIZEOLCAT project at the address – www.bizeolcat.eu and follow the project on LinkedIn, Twitter and YouTube.

Let us have your comments!

The next issue of the Newsletter will be released in June 2020

Bizeolcat H2020 Project GRANT AGREEMENT N°: 814671
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Bizeolcat 2019

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