Draft Project plan for the CEN Workshop on “Preparation of nanocatalysts for non-oxidative dehydrogenation (nODH) of light alkanes” (BIZEOLCAT)

Requests to participate in the Workshop and/or comments on the project plan are to be submitted by 2022-10-01 to futrilla@une.org[1]

Recipients of this project plan are kindly requested to name all patent rights known to them to be relevant to the Workshop and to make available all supporting documents.

2022-08-26 (Version 0.4)

[1] Applications for participating in the Workshop and comments on the project plan that are not received by the deadline do not need to be taken into consideration. Once constituted, the Workshop will decide whether or not to consider the comments received in good time.

1 Status of the project plan

Draft project plan for public commenting before the kickoff meeting (Version 0.4).

This draft project plan is intended to inform the public of a new Workshop. Any interested party can take part in this Workshop and/or comment on this draft project plan. Please send any requests to participate or comments by e-mail to **futrilla@une.org**.

All those who have applied for participation or have commented on the project plan by the deadline will be invited to the kick-off meeting of the Workshop on **2022-10-05**.

2 Workshop proposer and Workshop participants

2.1 Workshop proposer

Person or organisation	Short description and interest in the subject
Dr. Isabel VICENTE EURECAT – Technology Centre of Catalonia Tel +34 932 381 400 info@eurecat.org www.eurecat.org	The Workshop is an initiative of the H2020 project BIZEOLCAT 'Bifunctional Zeolite based Catalysts and Innovative process for Sustainable Hydrocarbon Transformation'. EURECAT is coordinating the project and has developed the methodology in which this CWA will be based. EURECAT is the major Technology Centre of Catalonia, in Spain, providing the industrial and business sector with differential technology and advanced expertise, it offers solutions to their innovation needs and boosts their competitiveness in a fast-paced environment.

2.2 Other potential participants

This CWA will be developed in a CEN Workshop (temporary body) that is open to any interested party. The participation of other experts would be helpful and is desired. Participation is expected from the following organizations:

- UNIVERSITETET I OSLO.
- EINDHOVEN UNIVERSITY OF TECHNOLOGY.
- SINTEF AS.
- CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE (CNRS).
- KEMIJSKI INSTITUT.
- TURKIYE PETROL RAFINERILERI ANONIM SIRKETI.
- PERSTORP AB.
- STRANE INNOVATION SAS.
- EUROPEAN RESEARCH INSTITUTE OF CATALYSIS A.I.S.B.L.
- NEXTCHEM SPA
- COMPAÑÍA ESPAÑOLA DE PETRÓLEOS, S.A.U. (CEPSA).

2.3 Participants at the kick-off meeting

The following persons or organisations already signed up to the kick-off meeting prior to the publication of the draft project plan.

Person	Organisation
Workshop proposer	Workshop proposer
Workshop secretariat	Workshop secretariat

2.4 Registered Workshop participants

The following persons or organisations have registered as Workshop participants at the kick-off meeting and will actively participate in the development of the CWA.

Person	Organisation
Workshop Chair	Workshop Chair
Workshop secretariat	Workshop secretariat

3 Workshop objectives and scope

3.1 Background

Olefins, also commonly named alkenes, are hydrocarbons containing one or more carbon-carbon double bond. Light olefins, are strategic chemical building blocks that produce a broad range of extensively high-value-added products such as polymers, or other interesting chemical intermediates.

Propylene (C3H6), is a particularly interesting raw material due to its high versatility for the production of materials such as polypropylene (PP) for the production of plastic materials, acetone, isoprene for synthetic rubber, acrylonitrile, acrolein, acrylic acid and acrylates for the production of acrylic fibres, among others and propylene oxide.

The worldwide demand for propylene (C3H6) is expected to grow at an average annual rate around 2-3% between 2021-2035 (from 90.6 tons/year to 132.1 tons/year) that will exceed the current production capacity.

Traditionally, the production of alkenes with high use in industry, for example propene and butadiene, is carried out by cracking processes of fossil naphtha. These cracking processes produce large CO2 emissions due to its high-energy demanding nature (i.e., reaction temperatures 800-1200 ºC).

Recently, the dehydrogenation of light alkanes (C1-C8 alkanes) emerged as a more efficient and sustainable alternative to produce these alkenes. However, the non-oxidative dehydrogenation (nODH) process is up to now applied at industrial scale only with limited success due to:

- Technical limitations – The reaction is operated at high temperatures (550-700 °C) hindering the selectivity and favouring metal sintering and coke formation affecting catalyst stability. The reaction as well has thermodynamic limitations (maximum conversion 30-45%) depending on temperature.
- Economical limitations - i.e., high operational expenditures (OPEX) related with the need of regeneration cycles due to the quick catalyst deactivation.
- Sustainability limitations - i.e., large greenhouse gases emissions associated with poor catalyst performances and catalyst regeneration process.

Although good catalysts for nODH of alkanes have already been provided, there is still a need of additional ones with high catalytic conversion, activity and selectivity, and/or with a catalytic conversion. The selection of certain metals in combination with other elements, all of them stabilized with particular organic compounds and adsorbed on porous supports, gave rise to highly active catalytic surface areas that, in addition, not only are selective for propene selectivity in nODH, but also are highly stable and free from the main drawbacks of other catalysts for the same reaction (i.e. coke formation, by-side deactivating reactions, etc.).

The methodology on the scope of the proposed CWA describes a process for the preparation of a catalyst composition as defined above. By means of this one-pot synthesis method, these catalysts are highly active due to the small-variation of the surface areas caused by the homogeneous distribution of the elements on the supports, and due to the synthesis of well-dispersed nanoparticles (1-15 nm, more particularly 1-5 nm), controlled by the presence of an organic molecule. The one-pot reaction runs at relatively low temperatures (room temperature to 100 ºC), thus making the production process more affordable and reproducible than other methods for obtaining similar catalysts.

The use of this method for the preparation of the catalysts results in lower reaction temperature (≈100 °C), higher selectivity to propylene (>99%) and higher conversion and stability (up to 23% and maintained at 21% after 24 h on stream) The one-pot organometallic approach allows to explore new horizons in the preparation of other catalyst for propane dehydrogenation with a very easy one-step methodology.

This workshop is an initiative of the European research and innovation BIZEOLCAT project (*Bifunctional Zeolite based Catalysts and Innovative process for Sustainable Hydrocarbon Transformation*). This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 814671.

BIZEOLCAT's main objective is to obtain light olefins and aromatics using light hydrocarbons (C1, C3 and C4) by implementing new procedures, involving innovative catalysts synthesis methodologies and novel reactor design and processing, demonstrating their improvement in sustainability and economic scalability in existing industrial processes.

3.2 Scope

The planned CEN Workshop Agreement, entitled "Valorization of light hydrocarbons. One-pot method for the preparation of nanocatalysts for non-oxidative dehydrogenation (nODH) of light alkanes", defines characteristics, parameters, requirements and recommendations for a one-pot synthesis method to produce nanocatalysts composed of metallic nanoparticles adsorbed on the surface area of a porous support.

The intended nanocatalysts are used for the non-oxidative dehydrogenation of alkanes (saturated hydrocarbons) to obtain light alkenes (olefins) and aromatic hydrocarbons.

3.3 Related activities

The scope of the planned CWA is not at present the subject of a standard and/or other technical specifications, nor in the scope or work program of any technical committee.

The method described in the CWA is subject of international patent application PCT/EP2022/054574 (2022) Claiming priority of the European Patent application no.: EP21382154.9 (2021) held by EURECAT.

3.4 General

The kick-off meeting is planned to be held online on 2022-10-05.

After the kick-off meeting, the necessary number of Workshop meetings, preferably by web conferences, will be held, during which the content of the CWA will be discussed, agreed and approved.

Related European projects (ZEOLCAT-3D and C123) will be informed about the Workshop and invited to take part.

Working language of the Workshop and the resulting CWA will be English.

3.5 Workshop schedule

The following project schedule is for orientation only.

Table 1: Workshop schedule (preliminary)

CEN/CENELEC Workshop	Jul 22	Aug 22	Sep 22	Oct 22	Nov 22	Dec 22
Initiation						
1. Proposal form and Project plan submission						
2. Open commenting period on draft project plan and draft CWA						
Operation						
4. Kick-off meeting						
5. CWA development						
7. CWA finalised and approved by Workshop participants						
Publication						
8. CWA publication						
Dissemination						
Milestones				**K** **V**	**V** **A**	**P** **O**

K Kick-off
V Virtual Workshop meeting
A Adoption of CWA
P Publication of CWA
D Online distribution of CWA

4 Resource planning

This workshop is financed by the BIZEOLCAT '*Bifunctional Zeolite based Catalysts and Innovative process for Sustainable Hydrocarbon Transformation*' project. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 814671.

All costs related to the participation of interested parties in the Workshop's activities have to be borne by themselves. The meetings will be held by teleconference, so no major expenses are expected.

5 Workshop structure and rules of cooperation

5.1 Participation in the Workshop

The Workshop will be constituted during the course of the kick-off meeting. By approving this project plan, the interested parties declare their willingness to participate in the Workshop and will be formally named as Workshop participants, with the associated rights and duties. Participants at the kick-off meeting who do not approve the project plan are not given the status of a Workshop participant and are thus excluded from further decisions made during the kick-off meeting and from any other decisions regarding the Workshop.

As a rule, the request to participate in the Workshop is closed once it is constituted. The current Workshop participants shall decide whether any additional members will be accepted or not.

Any new participant in the Workshop at a later date is decided on by the participants making up the Workshop at that time. It is particularly important to consider these aspects:

a. expansion would be conducive to shortening the duration of the Workshop or to avoiding or averting an impending delay in the planned duration of the Workshop;
b. the expansion would not result in the Workshop taking longer to complete;
c. the new Workshop participant would not address any new or complementary issues beyond the scope defined and approved in the project plan;
d. the new Workshop participant would bring complementary expertise into the Workshop in order to incorporate the latest scientific findings and state-of-the-art knowledge;
e. the new Workshop participant would actively participate in the drafting of the manuscript by submitting concrete, not abstract, proposals and contributions;
f. the new Workshop participant would ensure wider application of the CWA.

All Workshop participants who voted for the publication of the CWA or its draft will be named as authors in the European Foreword, including the organisations which they represent. All Workshop participants who voted against the publication of the CWA, or who have abstained, will not be named in the European Foreword.

5.2 Workshop responsibilities

The Workshop Chair is responsible for content management and any decision-making and voting procedures. The Workshop Chair is supported by the Workshop Vice-Chair and the responsible Workshop secretariat, whereby the Workshop secretariat will always remain neutral regarding the content of the CWA(s). Furthermore, the Workshop secretariat shall ensure that CEN-CENELEC's rules of procedure, rules of presentation, and the principles governing the publication of CWA(s) have been observed. Should a Workshop Chair no longer be able to carry out her/his duties, the Workshop secretariat shall initiate the election of a new Workshop Chair. The list below covers the main tasks of the Workshop Chair. It is not intended to be exhaustive.

- Content related contact point for the Workshop
- Presides at Workshop meetings
- Ensures that the development of the CWA respects the principles and content of the adopted project plan
- Manages the consensus building process, decides when the Workshop participants have reached agreement on the final CWA, on the basis of the comments received
- Ensures due information exchange with the Workshop secretariat
- Represents the Workshop and its results to exterior

The Workshop secretariat, provided by a CEN/CENELEC national member, is responsible for organising and leading the kick-off meeting, in consultation with the Workshop proposer. Further Workshop meetings and/or web conferences shall be organised by the Workshop secretariat in consultation with the Workshop Chair. The list below covers the main tasks of the Workshop secretariat. It is not intended to be exhaustive.

- Administrative and organisational contact point for the Workshop
- Ensures that the development of the CWA respects the principles and content of the adopted project plan and of the requirements of the CEN-CENELEC Guide 29
- Formally registers Workshop participants and maintains record of participating organisations and individuals
- Offers infrastructure and manage documents and their distribution through an electronic platform
- Prepares agenda and distribute information on meetings and meeting minutes as well as follow-up actions of the Workshop
- Initiates and manage CWA approval process upon decision by the Workshop Chair
- Interface with CEN-CENELEC Management Centre (CCMC) and Workshop Chair regarding strategic directions, problems arising, and external relationships
- Advises on CEN-CENELEC rules and bring any major problems encountered (if any) in the development of the CWA to the attention of CEN-CENELEC Management Centre (CCMC)
- Administrates the connection with relevant CEN or CENELEC/TCs

5.3 Decision making process

Each Workshop participant is entitled to vote and has one vote. If an organisation sends several experts to the Workshop, that organisation has only one vote, regardless of how many Workshop participants it sends. Transferring voting rights to other Workshop participants is not permitted. During voting procedures, decisions are passed by simple majority; abstentions do not count.

If Workshop participants cannot be present in the meetings when the CWA or its draft is adopted, an alternative means of including them in the voting procedure shall be used.

6 Contacts

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- Workshop Secretariat:

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- Workshop proposer

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