

FCCat 3 in Ronce-les-Bains: First Post-Covid catalytic gathering for the French Catalytic Community

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Abstract

we report here on the organization and proceedings of FCCat 3, the 3rd French Conference on Catalysis, and the first in person since GECat 2019 (the annual conference of the French catalysis community) and the covid pandemic, which took place in Ronce-les-Bains from 31 May to 3 June 2022. This international conference is held every 3 years since its first edition in 2016 and aims to bring together all catalysis communities, geographically or thematically.

Conference report

After two years of Covid pandemic issues and its consequences, which were the cancelation of the GECAT 2020 and a virtual edition of GECAT 2021, we were glad to organize the third edition of the French Conference on Catalysis (FCCAT) which took place at Ronce les Bains, Charente Maritime, from May 31th to June 3rd 2022. It was also a great success and the joyful occasion to gather people who haven't meet each other for two years. During these past two years, people have continued collaborations, meetings and conferences, but only...virtually and it was not easy to meet new people to establish collaborations or even just share a nice moment together.

This organization of this conference continues the long history of conferences of the very dynamic catalysis community in France.

Since decades, numerous French scientists from industrial and academic laboratories played a major role on Catalysis and in the development of Catalysis at national and international levels. To promote the communication and the collaborations between French scientists, the GeCat, (Groupe

d'Etude en Catalyse – Study group in Catalysis), was created in 1970, and has been since then in charge of organizing the national conference gathering every year the whole French Catalysis Community. After years of being a thematic group belonging to the SCF, The GECat has been now fully linked to the Catalysis Division of French Chemical Society (Groupe d'Etude en Catalyse – Study group in Catalysis) since 2020.

The French Catalysis Division (DivCat) was founded in 1983 and is the one of the scientific entities of the French Chemical Society (SCF). Its purpose is to promote excellence in the field of Catalysis at national, european (via the European Federation of Catalysis Societies, EFCATS) and international levels (via the International Association of Catalysis Societies, IACS). The DivCat also favors the exchanges between academia and industry in all fields of catalysis, and the opening toward the others scientific fields.

French conferences are thus annually organized by the French catalysis community to exchange ideas and scientific insights. Among its, the most recurrent are the GECAT and the FCCat. The meeting comprises invited plenary and keynote lectures and selected oral and posters communications.

Indeed, every year since 1970, the GECat executive board composed by 10 members of the main French laboratories in, mostly heterogeneous, catalysis, organizes a conference gathering the French-speaking catalysis community around three different specific themes (<https://new.societechimiquedefrance.fr/divisions/catalyse/gecat/>), where young researchers' contributions are highly encouraged and favored. A different and very convivial venue is chosen each year all around France which gathers around 100 participants.

In 2014, the DivCat together with the GECat executive board proposed to make a new scientific event, more ambitious, in the form of an international conference organized by the French catalysis community: the French Conference on Catalysis (FCCat). The Groupe Français des zéolithes (GFZ, French Groupe on Zeolites), as well as the Industrial Chemistry Division, the Coordination Chemistry Division and the Organic Chemistry Division of SCF were also part of the organization. The very first edition FCCat took place in Fréjus, French Riviera, in May 2016. FCCat1 addressed a large spectrum of topics, from homogeneous to heterogeneous catalysis, from fundamental to applied questions. About 240 participants joined, which appeared to be the ideal scale for very intense scientific discussions in a convivial atmosphere. 35 % of non-French participants were present, and the industrial participation was very strong (22 %), promoted by the “industry half-day” devoted to relationships between industry and young researcher.

After the success of the first edition, it has been decided to continue to organize this scientific event, on a 3-year periodicity, the FCCat replacing the GECat in these years. The second FCCAT edition took also place in Fréjus, in June 2019 and gathered more than 210 attendees. 30 % of

non-French participants were present, and the industrial participation was again very strong (20 %), promoted by another “industry half-day” devoted to relationships between industry and young researchers. As usual and as quickly became the tradition, heterogeneous, homogeneous, hybrid catalysis researches were presented at the second FCCAT edition.

The third edition took place this year in May-June 2022 and gathered 180 attendees in a wonderful place by the sea in Charente Maritime. The number of attendees was great, especially considering that the pandemic still prevented all foreign scientists to join. The FCCat3 conference started with an international panel of speakers : Professor Susannah Scott coming from Santa Barbara University (US) presented the catalytic valorization of renewables or recycled feedstocks for circular carbon economy. Her presentation was focused on bio-sourced molecules and plastic catalytic transformations with particular attention paid to the effects of solvents in these reactions. Just after that plenary conference, Professor Jeremy Luterbacher (keynote speaker) from EPFL (Lausanne, Switzerland) spoke about the simplification and the control of catalytic upgrading of lignocellulosic derivatives, thanks to chemical functionalization to prepare bio-sourced materials. The conference was marked from the very beginning by the need to use catalysis to improve our carbon footprint and valorize bio-resources!

In order to achieve the catalytic conversion of bio-resources and small molecules, new catalytic performant systems are always required. In this spirit, the next day, Professor Damien Debecker (Univ. Louvain, Belgium) further presented, in a very inspiring plenary lecture, the preparation of supported nanocatalysts with innovative techniques with applications for CO₂ and glycerol transformation.

The second day, oral flash presentations were presented on various topics, and, then, we divided in 2 parallel sessions: one parallel session was dedicated to porous catalytic materials, while the second one was focused on catalytic sugars and cellulose conversion.

This 31st of may morning finished with a keynote of Professor Stéphane Baudron (Univ. Strasbourg) who presented deep eutectic solvents effect on MOF preparation and materials properties. In the same afternoon, we had again parallel sessions with one devoted on atom economy in synthetic chemistry and one about H₂ production. Professor Moniek Tromp (Groningen Univ., The Netherlands), who had to cancel her venue due to flight cancellation but was keen to present by visio conference her keynote on insights in dynamic structures and electronics for catalysis. Then, before the poster session that led us to diner, we had a short lecture of Charlotte Gers Panther from Chemistry Europe, who invited all of us to submit a communication to this ChemCatChem special collection.

The second day was also rich, beginning with a plenary lecture from Doctor Thibault Cantat (LCMCE, CEA Univ. Paris Saclay) on the catalytic strategies for the reduction of C-O bonds with applications towards CO₂ and other small molecules, like formic acid or CO, valorization. Then the full assistance attended the second flash session of the conference before dividing into the two parallel sessions on CO₂ valorization and metal sulfide catalysts/(hydro)desulfurization. The morning ended with the keynote of Professor Juan Ramon Gonzalez Velasco (Univ. Basque Country, Spain) who spoke about multifunctional materials for CO₂ capture and conversion towards synthetic natural gas. The afternoon was dedicated to social activities: we privatized the "train des mouettes" which included a guided pedestrian visit of Mornac sur Seudre, labelled "most beautiful village of France" and the guided visit of the salt marshes. The second poster session took place in the evening with a



wonderful tasting of Oysters of Mornac before diner.

Figure 1. "Train des mouettes" used by the participants during the recreational afternoon

At this stage we can already see that the FCCAT conference was deeply marked by the need of catalysis development and innovative materials for biomass and CO₂ valorization.

Thursday, 2nd of June, began by a very didactic and stimulating plenary talk by Doctor Florence Epron (IC2MP University of Poitiers). She showed all her expertise on bimetallic catalysts synthesis, especially by innovative methods developed in her group, like redox reduction-oxidation reactions, which allow the deposition of a second metal at the surface of monometallic supported nanoparticles. This method leads to a better control of metals deposition and particle size. These catalysts have wide fields of application in gas and liquid-phase catalysis.

As we wanted to mix all the communities interested in catalysis and ensure a wide audience, we then programmed a keynote lecture by Doctor Alessandro Fortunelli (CNR, University of Parma), a theoretical chemist, who gave us an exciting lecture on combined theoretical/experimental approaches to understand the parameters affecting the performances of Pt-based catalytic systems for Oxygen Reduction Reactions. It is a nice example of the interest of mixing theoretical and experimental data to understand how a catalyst work and help design new catalysts.

We then organized a very successful industrial session and round table destined to young (and less young!) people, who might have to look for an employment in the near future. We are very grateful to Benjamin Faure (Solvay), Patrick N'Guyen (Saint-Gobain), Fabien Grasset (MANE), Xavier Baucherel (Jonhson Matthey), Stefan Schunk (BASF/HTE), Hélori Salambier (Arkema) and Juliana Aparicio (Dielix/Sarpi Veolia), who came to participate to this industrial session. They all exposed the specific activity of their company and shared their views on the job market and opportunities in their company. Students from the assembly could then ask questions which led to a lively and enriching debate. We hope that it gave many students good tips and ideas for the continuation of their career. The two parallel sessions of this day were devoted to metals and carbides catalysts on one side and to Hydrodeoxygenation and CO₂ and CH₄ transformation on the other side, and both sessions led to stimulating discussions and insights into the research projects carried out in French or European laboratories.

As is traditional at the French Catalysis conference every year (GECat or FCCat), we invited the three DivCat prizes winner to give a lecture about their work. The first lecturer, Gabriel Durin, winner of the best PhD Award, sponsored by BASF, gave an enlightening talk about his PhD project supervised by Thibault Cantat (CEA) on the catalytic hydrogenolysis of halosilanes to give hydrosilanes. The Young Researcher award, sponsored by IFPEN, was awarded to Prince Amaniampong, a young CNRS researcher, newly recruited at IC2MP, who explained his nice projects on catalysis under ultrasound irradiations, mainly applied to the transformation of biomass. The third prize, which was newly created this year by the DivCat, is the Innovation award, and it was awarded to Bertrand Guichard, Engineer and researcher at IFPEN. He talked about the development over the years of new classes of catalysts for hydroprocessing and hydrocracking.

For the past few years, all the French catalysis community has been also involved in the preparation of the next International Conference on Catalysis (ICC Lyon 2024). Céline Chizallet (IFPEN) presented us the latest steps of the organization to keep the community informed and motivate everyone's implication to make this event dynamic. Effectively, for the first time, the worldwide catalysis community will have a participatory and interactive opportunity to contribute with its ideas and energy to the preparation of an ICC. So have a look to build your ICC and ICC2024 web sites (<https://www.icc-lyon2024.fr/> & <https://build-your-icc.org/>)

After a nice gala dinner and musical evening, the last plenary lecture was given by Guylène Costentin, who showed us very nice examples of the synthesis and use of hydroxyapatites for heterogeneous catalysis. The last two parallel sessions of the conference were devoted to bifunctional and acid-base catalysis, as well as catalysis for depollution.

During the conference, several juries awarded oral and poster prizes to PhD and post-docs. Two best oral presentations, sponsored by IFPEN and NJC, were awarded, 2 best flash presentations

(sponsored by NJC and IFPEN) were also awarded. And finally, 3 best posters presentation awards were given by Chemistry Europe.

During the whole conference, we had a wonderful experience with the "NanoRêVe" device thanks to Pascal Roland and Professor Arnaud Travert from LCS (Caen). "NanoRêVe" is an immersive virtual reality platform that allows people to explore objects on a molecular scale and proposed us an immersive experience with some of our favorite catalysts (<https://nanoreve.cnrs.fr/>)! Many instrument companies (Vinci Technologies, Anton Paar, Thermoscientific, Equilabo, Ablatom, Top Industrie, Magritek, Micromeritics and CAS) were also present to show us their new products and discuss with participants during all coffee breaks and more. We warmly thank them for their



presence.

Figure 2. A participant testing the "NanorêVe" VR platform by walking inside a zeolite pore

Of course, this conference wouldn't have happened without the financial support of our sponsors, that we also want to thank warmly: Total, IFPEN, BASF, IRCELYON, NJC, Chemistry Europe, Interscience, Arkema, Saint-Gobain, Eurecat, Axens, Micromeritics, LRS, ICGM, UCCS, MUSE, IC2MP. Finally, our thanks go to the whole organizing committee who worked hard for this conference to happen, and to all the participants who came to present results, discuss science, eat, drink, socialize, and made this conference a success.



Figure 3. Picture of all the happy participants!

See you all in 2025 for the next FCCat edition!!

Keywords: Catalysis / Catalysis Division / French Chemical Society / International Conference /

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FCCat 3
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Authors Biography

Dr. Malika Boualleg



Dr. Dorothée Laurenti

Dorothée Laurenti obtained a PhD from University of Aix-Marseille in 1999 under the guidance of Pr M. Santelli in Organic Synthesis and homogeneous catalysis. Then she moved to York University (UK) and work in collaboration with Pr J.H. Clark (Green Chemistry Center) and Rhodia company on industrial process with supported homogeneous catalysts. Afterwards, she developed more expertise in catalysis focusing on plastic transformation with catalysts prepared by surface organometallic chemistry under the supervision of Dr J.-M. Basset and E. Kuntz in Lyon. In 2002, she joined the Institute of Research on Catalysis and Environment in Lyon (IRCELYON) as CNRS Researcher to work with M. Vrinat and C. Geantet on heterogeneous catalysis for hydrotreatment of fossil fuels. Her main research interest focuses now on biomass and wastes valorization by heterogeneous catalysis towards biofuels and bio-chemicals. She leads the group CATREN at IRCELYON and is the director of the French group of research on Thermochemical Conversion of Biomass and Wastes (GDR Thermobio). She served as GECAT board member (2010-2012), DivCat board as secretary (from 2019) and is one of the executive organizers of the next ICC2024 conference that will take place in Lyon next July.

Web site: <https://www.ircelyon.univ-lyon1.fr/syrce/cel/card/DLA/>



Dr. Nathalie Tanchoux

Nathalie Tanchoux obtained her PhD at the University Claude Bernard Lyon in 1999 under the supervision of Dr Claude de Bellefon and Dr Daniel Schweich. She then joined the Max Planck Institute for Coal Research (Mülheim-an-der-Ruhr, Germany) to work with Prof. Walter Leitner on homogeneous catalysis in supercritical CO₂. In October 2000, she joined the French CNRS (National Centre of Scientific Research) at the Institut Charles Gerhardt in Montpellier, France. Since 2021, she heads the thematic axis "Catalysis and Surface Reactivity" within the scientific department "Porous and Hybrid Materials". She has expertise in heterogeneous catalysis, materials synthesis and characterization. Her current research interests focus on catalytic biomass valorization, in particular the use of aerogels synthesized from marine polysaccharides for catalytic applications. She has been a member of the Catalysis Division of the French Society of Chemistry since 2016, and is president of the French Catalysis Division for the period 2019-2022. She was a member of the GECat Board (2007-2012) and is part of the Executive Committee organizing the next ICC2024 conference in Lyon. She is also a member of the National Scientific Committee of the CNRS (2021-2026).

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