



MULTI-site organic-inorganic HYbrid CATalysts for MULTI-step chemical processes

Functional Organic-Inorganic Hybrids for Enhancing Catalytic Processes

-18th June 2021, 9:30-13:00 CET-

Session 1	Time	Agenda item	Speaker
9:30-11:30	9:30-9:40	Welcome by the organisers and Introduction to the Webinar	Prof. Leonardo Marchese (Università del Piemonte Orientale, ITALY)
	9:40-10:10	Spotlight on zeolites and MOFs as catalysts: similarities and differences; strengths and weakness	Prof. Silvia Bordiga (Università di Torino, ITALY)
	10:10-11:30	Synthetic strategies for the preparation of organic-inorganic hybrids for chemical processes of industrial interest	Dr. Urbano Díaz (Instituto de Tecnología Química of the Technical University of Valencia, SPAIN)
		Elucidating structure-properties relationship in hybrids by using physico-chemical characterization	Dr. Ivana Miletto & Prof. Maurizio Cossi (Università del Piemonte Orientale, ITALY)
		Optimisation and Validation of Hybrid Heterogeneous Catalysts for Industrial Exploitation	Prof. Robert Raja (University of Southampton, U.K.)
		Single-reactor tandem processes: An insight into to MULTI2HYCAT developments	Prof. Marc Pera Titus (Centre National De La Recherche Scientifique, FRANCE)

Coffee Break (10')

Session 2	Time (min)	Agenda item	Speaker
11:40-13:00	11:40-12:10	Metal-Organic Frameworks as Versatile Scaffolds for Tunable Multi-Site Catalysis	Prof. Hermenegildo Garcia (Instituto de Tecnología Química of the Technical University of Valencia, SPAIN)
	12:10-12:40	MULTY2HYCAT catalysts, a new road to increase efficiency and sustainability in the Pharmaceutical Industry	Dr. Jose Aiguade Bosch (ALMIRALL SRL, SPAIN)



MULTI2HYCAT is a project funded by the European Commission. This project has received funding from the European Union's Horizon 2020 Research and Innovation program under Grant Agreement n° 720783.

Industrial assessment of catalysts at Solvay / Application to MULTI2HYCAT cases Dr Bright Kusema (RHODIA/SOLVAY, BELGIUM)

12:40-12:50

Q&A

12:50-13:00

Conclusions and final remarks

Prof. Leonardo Marchese
(Università del Piemonte
Orientale, ITALY)

UPO's Contact person

Prof. Enrica Gianotti

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Speakers



Prof. Silvia Bordiga is Full Professor in Physical Chemistry at the Department of Chemistry of the University of Turin. Since 2012 she is also Prof. II at the Department of Chemistry of the University of Oslo. She is the President of the master course in Material Science at Turin University and member of trust in many National and International committees. In 2017, she received the Prize from the French Chemical Society (bilateral prize France – Italy). In 2019 the European Federation of catalysis Societies (EFCAT) awarded her the Francois Gault Lectureship Award. She was recognized as Chemistry European Fellow in 2018-2019. In December 2019 she received the Wilhelm Manchot Research Professorship of the Dep. of Chemistry at the TUM University, Germany. Her

scientific activity is mainly devoted to the characterization of the physical–chemical properties of high surface area nanostructured materials used as heterogeneous catalysts, materials for adsorption, separation and storage, through in situ spectroscopic studies. More recently, she is actively working to the development of the emerging field of Porous Metallorganic Frameworks, both contributing to the understanding of known materials and developing new ones for specific applications.



Prof. Hermenegildo Garcia is full Professor at the Instituto de Tecnologia Quimica of the Technical University of Valencia, a joint center of the Technical University of Valencia and the Spanish National Research Council. Prof. Garcia has been active in the field of heterogeneous catalysis and photocatalysis working with porous catalysts and nanoparticles, has published over 800 papers and has filed over 25 patents with an H index over 100. Prof. Garcia is Doctor Honoris Causa from the University of Buchares, Honorary Professor of King Abdulaziz University and the recipient of the 2016 Rey D. Jaime I award in New Technologies and 2011 Janssen-Cilag award given by the Spanish Royal Society of Chemistry.



Dr. Urbano Díaz has been working as a CSIC Scientific Researcher at the Institute of Chemical Technology (ITQ) since 2004. He studied Chemical Sciences at the University of Valencia and obtained his doctorate in 2002 in the field of delaminated zeolites in the Polytechnic University of Valencia. He obtained a Marie Curie post-doctoral fellowship developed at EniTecnologie (Eni SpA) in Milan, Italy, working on catalytic applications of hybrid porous materials. In 2004, he returned to ITQ as a Scientist (CSIC), where he continues today, working in the field of multi-functional hybrid materials, lamellar solids, nanocomposites and biomaterials with catalytic and nanotechnological applications. He is the author of more than 75 publications and 11 application patents

focused on different aspects of the chemistry of organic and inorganic materials. In addition, he has been principal investigator in regional, national and European projects (7thFP and H2020). In 2010, he was awarded the 6th Idea Prize in New Technologies by the Generalitat Valenciana.





Dr **Ivana Miletto** is Research Fellow at the Department of Science and Technological Innovation of the University of Eastern Piedmont since 2017. Her research experience and scientific interests are in the field of materials chemistry, focused on the design, preparation and characterization of organic-inorganic hybrid materials and nanomaterials for applications in heterogeneous catalysis and nanomedicine.



Prof. Maurizio Cossi graduated in Chemistry in 1991 at the University of Pisa, and then worked as Researcher and Professor at the Universities of Naples and Piemonte Orientale, where he's now Full Professor in Theoretical Chemistry. His research activity involved the development and implementation of quantum mechanical (and recently also classical) algorithms and procedures to simulate complex systems (molecules in solution, adsorption processes in porous solids, properties of hybrid interfaces; he's among the authors of some of the most popular codes for QM simulations, e.g. Gaussian16 and MOLCAS8. The most recent applications regard the

calculation of free energy of adsorption and reaction for molecular layers on inorganic surfaces. He published more than 120 articles in international journals, collecting more than 29,000 citations.



Prof. Robert Raja is Professor of Materials Chemistry and Catalysis at the University of Southampton and his Research Group have a proven international reputation, both in academia and industry, for developing sustainable chemical technologies. The focal theme of research within his Group entails the discovery, design and fabrication of novel catalytic materials, for application as single-site heterogeneous catalysts, in chemical, pharmaceutical and environmental sectors. The diversity of his research has also been pivotal in establishing a predictive design platform for expanding scope to the rational design of hybrid materials and photonic fibres for hydrogen generation and CO₂ storage and utilisation. His career includes appointments at the University of

Cambridge (1999-2006), Bayer Chemicals, Germany (2001-2003) and the 1851 Exhibition at the Royal Institution of Great Britain (1997-1999). Notable accolades include The 2020 Emerging Technologies Award in Energy and Environment, the Erskine Fellowship awarded by the University of Canterbury, New Zealand and the Barrer Award by the Royal Society of Chemistry 'in recognition of outstanding contributions to preparative materials chemistry and their application to industrial catalysis'. His research has been instrumental in licensing catalytic technology to the chemical and pharmaceutical industries and his IP portfolio in the sustainable manufacture of polymers and nylon is being developed for pilot studies. Author of over 225 research publications in peer-reviewed journals (h-index =46) and inventor on 50+ International Patents.





Prof. Marc Pera-Titus is professor and chair of sustainable catalytic chemistry at Cardiff University (UK). Marc received a double MSc degree in Chemical Engineering (2001) and Physical Chemistry (2002), and a PhD (2006) from University of Barcelona (Spain). In 2007, he joined IRCELYON/CNRS (France) as postdoc and was further appointed CNRS fellow in 2008. From 2011-2020, Marc was project leader, expert and deputy director at the E2P2L CNRS-Solvay (Shanghai, China). Marc is author of 125 papers and inventor of 16 patents in the fields of membranes, adsorption, catalysis and process eco-design. Marc has received numerous awards, including the Rhone-Alpes Foundation Award (2007), the Elsevier Award for highly cited author in Catalysis (2009), the Silver and Gold Medals from the Chinese Academy of Inventions (together with E2P2L team) (2016, 2017), the DivCat award from the French Society of Chemistry (2017) and a ERC consolidator grant (2018). Since 2021, he is elected fellow of the RSC.



Dr. Bright Kusema studied and received his M.Sc. degree in Chemical Engineering and Biotechnology at the D. I. Mendeleev University of Chemical Technology of Russia (2007). He obtained his Ph.D. in Chemical Engineering (industrial chemistry and reaction engineering) at the Åbo Akademi University in Finland (2011). He worked as postdoctoral researcher at Åbo Akademi University and ETH Zürich in advanced catalysis engineering (2014). He has been working as a Research Scientist in eco-efficient products and processes at Solvay since 2015. In 2020, he was awarded the title of

Docent in Industrial Catalysis by the Chancellor of Åbo Akademi University.



Dr Jose Aiguade Bosch got his Chemistry Degree in 1995 at the University of Barcelona and his Master's Degree in Organic Chemistry at the same university. Not having enough knowledge in the synthesis of organic compounds, Jose Aiguade Bosch decided to continue his training overseas and went to the University of Minnesota for a Ph.D. Degree. From Minnesota, Jose Aiguade Bosch moved back to Europe and spent almost two years at the University of Cambridge, working with Prof. Ian Patterson.

At Almirall, Jose Aiguade Bosch worked in the Drug Discovery division, particularly in the Medicinal Chemistry Department for about 12 years and then moved to Drug Development Division where became a Process Chemist. His current responsibilities deal with the management of API synthesis development to ensure proper drug substance delivery for the different clinical trials.

