Plenary and Keynote Speaker Biographies/Abstracts

Suheil Abdo

Dr. Abdo is a Senior Research and Development Fellow at Honeywell-UOP based in Des Plaines, Illinois, USA. His career interests have spanned a wide range of fundamental and applied aspects of zeolite science and catalysis. His research has led to the commercialization of many products and technology offerings currently in wide use in the energy, refining and petrochemical industries including hydrotreating, hydrocracking, heavy oil upgrading, aromatics alkylation and hydrogen production for fuel cells. He has been granted well over 75 US and international patents and has authored or co-authored many publications in scientific and technical journals. He has been invited to present in major international conferences on catalysis and zeolite science. Due to his interests in zeolites and catalytic science he continues to be involved in many industry-academia scientific collaboration programs with strategic partners of UOP and with scientific institutes and universities in North America, Europe the Middle East, and Far East. He has also served as a Distinguished Visiting Professor in the department of Chemical Engineering at King Fahd University in Dhahran, Saudi Arabia and has been a visiting lecturer in the Indian Institute of Technology-Delhi among other engagements.

In addition, Dr. Abdo's current interests include development of new approaches for conversion of bio-renewables to fuels and petrochemicals supporting the UOP-ENI Ecofining process and recycling of plastics by the application thermal and catalytic processes.

Plenary and Keynote Speaker Biographies/Abstracts

Zeolite Based Technologies to Meet Evolving Societal Needs

Zeolite-based catalytic and separation technologies continue to play a critical role in meeting today's consumer demands and the evolving societal needs to develop approaches to fulfill these needs in an environmentally friendly and responsible manner. Many key conversion technologies in the refining and petrochemical space rely on the versatile properties of zeolites and other microporous materials which facilitate development of processes efficient consumption of natural resources and allow ever improving energy efficient production. Notable zeolite based processed have included fluidized catalytic cracking and hydrocracking to produce fuels and petrochemical feedstocks as well as environmental technologies for the clean-up of auto exhaust emissions. Zeolites are also critical in separation processes where precise control of their pore opening dimensions facilitates a critical role in, e.g., separation of xylene isomers for the production of PTA and derivative chemical products.

Key to past and future success in deployment of zeolites in industrial processes has been the understanding of the relationship between fundamental properties to performance attributes. To facilitate this understanding the industrial scientist increasingly relies on application of modern characterization tools to probe key properties and, especially, to exploit this knowledge in choosing secondary synthesis approaches to tailor porosity and framework composition in a suitable manner for directing chemical pathways to achieve high levels of activity and selectivity to desired products. More recently, zeolites have been extensively investigated in the development of novel approaches to use bio-renewable feeds to produce chemicals and fuels in an environmentally manner. This new demand will require development of suitable stabilization techniques to allow them to withstand the challenging processing environment.

Continued developments in the field require the enhanced ability to make a precise assessment of predominant reaction pathways prevailing at the various process conditions, and to understand and control the interplay between catalyst properties and process conditions to achieve product objectives. Such tools have helped guide catalyst and process design strategies and have enabled a molecular level approach to accelerate development. In fact, such fundamentals are key to the pivoting of established, zeolite-based, technologies towards a more precise molecular tailoring to make specific molecules for petrochemical feedstocks.

This overview will attempt to provide a survey of successful application of zeolites in traditional and forward looking processes. In addition, it will illustrate the great deal of benefit that has been derived from advance characterization tools to help better determine with great specificity the structural and compositional properties required for good performance.

Plenary and Keynote Speaker Biographies/Abstracts

Sharon Ashbrook

Sharon Ashbrook is a Professor of Physical Chemistry at the University of St Andrews. Her research concerns the application of NMR spectroscopy and first-principles calculations to investigate structure, disorder and dynamics in inorganic solids, and she has published over 175 papers in this area. She is an elected Fellow of the Royal Society of Edinburgh (FRSE), and holds a Royal Society Wolfson Merit Award. She has an interest in outreach (and is Chair of the Tayside RSC Local section) and in the promotion of women in STEM, co-authoring booklets entitled Academic Women Now (2016) and Academic Women Here (2018). She was awarded a Suffrage Science Award in 2017.

Website http://chemistry.st-and.ac.uk/staff/sa/group/Site/Home.html

Plenary and Keynote Speaker Biographies/Abstracts

Neil Champness

Neil Champness is the Professor of Chemical Nanoscience at the University of Nottingham, UK. His research focusses on molecular design and synthetic methods, employing self-assembly to create framework materials in the solid-state and on surfaces and for the creation of interlocked structures in solution. His research achievements have been recognised by the award of a number of Royal Society of Chemistry prizes and he is a Fellow of the Learned Society of Wales, the European Academy of Sciences and the Royal Society of Chemistry. In 2011 he was identified as one of the top 100 most cited chemists of the previous decade worldwide.

https://neilchampnessgroup.com.

Plenary and Keynote Speaker Biographies/Abstracts

Karena Chapman

Karena Chapman is Joseph Lauher and Frank W. Fowler Endowed Chair in Materials Chemistry in the Department of Chemistry at Stony Brook University. Before moving the Stony Brook University, she was a chemist at Argonne National Laboratory, building the dedicated Pair Distribution Function instrument at the Advanced Photon Source. She received her undergraduate and graduate degrees at the University of Sydney, Australia.

Her research focuses on understanding the coupling of structure and reactivity in energy-relevant materials using advanced synchrotron-based characterization tools. She is currently engaged in projects on battery electrodes and electrolytes, nanoporous framework materials for catalysis and new materials synthesis. Her work has been recognized as one of American Chemical Society's Talented 12 in 2016 and was awarded the 2015 MRS Outstanding Young Investigator Award. She is a main editor of the Journal of Applied Crystallography and Deputy Director of GENESIS A Next Generation Synthesis Center funded by the US Department of Energy.

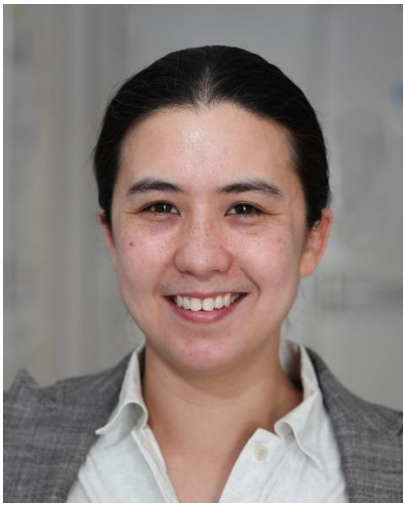
Confinement of nanoparticles in porous solids

Supported metal nanoparticles find important applications in catalysis. Controlling the size and distribution
of nanoparticles on the support is critically to optimizing their activity and selectivity. The extended pore network in
crystalline framework materials, such as metal-organic frameworks and zeolites, provide an ideal environment to confine
the growth of catalytic nanoparticles as well as controlling access to the active site. The distribution of nanoparticles
within the pores depends on the interplay between
1. the mobility of the metal species on the support surface,
2. the dimensions of the pores/channels in the support,
3. the dynamics of the porous framework, and
4. the growth habit of the nanoparticle phase itself.

By combining multiple complementary measurements sensitive to different aspects of the structure and chemistry, we
can decouple these effects to build a complete picture of the mechanisms for nanoparticle formation and confinement.
For example, we use pair distribution function (PDF) analysis to see the nanoparticles which are too small to be analysed

Plenary and Keynote Speaker Biographies/Abstracts

using diffraction methods. We use complementary powder diffraction data combined with differential envelope density
analysis to provide insight into the distribution of the nanoparticles within the pores. We use infrared spectroscopy to
probe how changes in the chemistry of the pore surface impact nanoparticle mobility.



Plenary and Keynote Speaker Biographies/Abstracts

Céline Chizallet

Céline Chizallet obtained a PhD in Inorganic Chemistry (Paris VI University) in 2006 and an Habilitation (ENS-Lyon) in 2017. She currently holds a Project leader position in the Catalysis, Biocatalysis and Separation Division of IFP Energies nouvelles in Solaize, France. Her research interest deals with computational heterogeneous catalysis, in particular reactions catalyzed by aluminosilicates (amorphous silica-alumina, zeolites) and supported metals. She is the co-author of more than 75 research articles and 2 patents. She was awarded the Edith Flanigen Award (2015), the young scientist awards of the Physical Chemistry (2016) and Catalysis (2018) divisions of the French Chemical Society.

Plenary and Keynote Speaker Biographies/Abstracts

Kim Jelfs

Kim Jelfs is a Senior Lecturer and Royal Society University Research Fellow and specialises in the use of computer simulations to assist in the discovery of supramolecular materials, including porous molecular materials and polymer membranes. After a PhD modelling the crystal growth of zeolites at UCL, she worked as a post-doc across the experimental groups at the University of Liverpool, before beginning her independent research at Imperial College in 2013. She was awarded a Royal Society of Chemistry Harrison-Meldola Memorial Prize in 2018. Her group website is jelfs-group.org.

Plenary and Keynote Speaker Biographies/Abstracts

Christopher W. Jones

Professor Jones is the William R. McLain Chair and Professor of Chemical & Biomolecular Engineering at Georgia Tech. He previously served as Associate Vice President for Research from 2013-2019, including a period as Interim Executive Vice-President for Research in 2018.

Dr. Jones leads a research group that works in the broad areas of materials, catalysis and adsorption. He is known for his extensive and pioneering work on materials that extract CO_2 from ultra-dilute mixtures such as ambient air, which are key components of direct air capture (DAC) technologies. For the past decade, he has worked closely with the start-up Global Thermostat LLC on DAC technology development.

He also has produced extensive body of work in catalysis, including heterogeneous and homogeneous catalysis, spanning from asymmetric catalysis in organic synthesis to conversion of syngas into hydrocarbons and alcohols. Dr. Jones is the founding Editor-in-Chief of the journal, *ACS Catalysis*, and is Vice-President of the North American Catalysis Society.

Jones has published 300 peer-reviewed scholarly papers on catalysis and separations, and has mentored 100 MS, PhD and post-doctoral students over the past 20 years.

Plenary and Keynote Speaker Biographies/Abstracts

The Critical Role of Porous Materials in Carbon Dioxide Capture from Air, Negative Emissions Technologies and Climate Stabilization

Christopher W. Jones

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In parallel with sharp reductions in emissions from fossil energy use, climate models suggest that substantial negative emissions technologies must be developed and deployed to stabilize the climate at <1.5-2°C average warming. Chemical processes that remove CO_2 from the air by adsorption with porous materials, so called direct air capture (DAC) technologies, represent one such approach. Design of effective adsorbent materials requires tailoring of the porosity and binding sites in porous materials, with the ultra-dilute nature of CO_2 in air providing significant materials and process design challenges. The hurdles facing the porous materials designer will be elaborated in this talk, along with insights into the state-of-the art of representative DAC processes today.

Plenary and Keynote Speaker Biographies/Abstracts

Stefan Kaskel

Organization: TU Dresden and Fraunhofer IWS Dresden

Profile Weblink: www.chm.tu-dresden.de/ac1/index_engl.shtml

https://scholar.google.de/citations?user=71hSSp8AAAAJ&hl=de&oi=ao

orcid.org/0000-0003-4572-0303

Stefan Kaskel studied chemistry at Eberhard Karls University, Tübingen (Germany), and received his Ph.D. degree in 1997 from the same University. He was a group leader at the Max-Planck-Institut für Kohlenforschung in Mülheim a.d. Ruhr (2000-2004) in the group of F. Schüth. In 2004 he became full professor for Inorganic Chemistry at Technical University Dresden and 2008 also business field manager Chemical Surface Technology at Fraunhofer IWS, Dresden.

His research interests are focused on porous and nanostructured materials (MOFs, COFs, carbons, zeolites) for applications in energy storage, catalysis, batteries and separation technologies. Stefan Kaskel has authored more than 440 publications with > 27000 citations (google scholar h-index 90) and has contributed as inventor to more than 50 patent applications. In 2016, 2017, 2018, and 2019 he was recognized as a Highly Cited Researcher by Thomson Reuters and Clarivate Analytics. S. Kaskel is the Chair of the IZA MOF commission and chair of the international MOF conference MOF2020 in Dresden.

Plenary and Keynote Speaker Biographies/Abstracts

Yi Li

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Prof. Yi Li is a full professor in the College of Chemistry and the deputy director of International Center of Future Science at Jilin University. His research focuses on computational chemistry and materials genomics of nanoporous functional materials. He has coauthored over 100 peer-reviewed papers in high-profile journals, and developed several computer programs and databases for zeolite structures. He received the National Natural Science Award (Second Prize; the 4th awardee) in 2012 and the Excellent Young Scientists Fund (NSFC) in 2016. Currently, he is a member of the Structure Commission of International Zeolite Association, and an Advisory Board member of *Chemical Science* (RSC)

Plenary and Keynote Speaker Biographies/Abstracts

Svetlana Mintova

Svetlana Mintova is Director of Research in CNRS, Laboratory of Catalysis and Spectroscopy, Normandy University, France and Invited Professor in China University of Petroleum, Qingdao, China.

Mintova is the receiver of the Baron Axel Cronstedt award from FEZA 2014, the Donald Breck award from the IZA 2016, the “Le Prix La Recherche Chimie” 2016, and Shandong international science and technology cooperation award 2019.

Mintova is the Council member of the IZA, FEZA and GFZ, and the Chair of the “Synthesis Commission” of the IZA.

Her scientific interests include preparation of porous materials, nanosized zeolites, films, coatings, composites and related applications.

Plenary and Keynote Speaker Biographies/Abstracts

Manuel Moliner

Manuel Moliner completed his Ph.D. at the Polytechnic University of Valencia (UPV) under the guidance of Prof. Avelino Corma in 2008, working on the synthesis of new zeolitic structures for their application as catalysts in industrially-relevant chemical processes by using high-throughput methodologies. Afterward, he completed a two-year postdoc (2008-2010) with Prof. Mark Davis at the California Institute of Technology (Caltech), working on the design and synthesis of functional materials with application in different catalytic processes, mainly in biomass transformations. He joined the ITQ as a "Ramón y Cajal" researcher in 2011, and he is a Tenured Scientist of the Spanish National Research Council (CSIC) since 2014. His research lies at the interface of heterogeneous catalysis and materials design.

Plenary and Keynote Speaker Biographies/Abstracts

Unni Olsbye

Unni Olsbye (born 1964) is Professor and leader of the Catalysis Section at the Chemistry Department of the University of Oslo (UiO).

She is author of 180 scientific papers (H-index 50) and holds several patents.

Olsbye graduated as a Chemical Engineer at NTNU in 1987, and proceeded to work with Elf Aquitaine (1988-90) on a project leading to a Ph.D. degree in Chemistry at UiO in 1991. During 1991-2000, she was a scientist, then senior scientist and group leader in the Department of Hydrocarbon Process Chemistry at SINTEF, and in 2000-2001 an R&D manager at NORDOX, before joining UiO in 2001. Olsbye is full Professor in Chemistry at UiO since 2002. During 2007-2015, she was Managing Director of inGAP (Innovative Natural Gas Processes and Products) – a Norwegian Centre of Excellence for Research-Based Innovation. She is founding advisor of ProfMOF A/S.

Olsbye is an elected member of the Norwegian Academy of Science and Letters, and of the Norwegian Academy of Technical Sciences. She received the University of Oslo Innovation Award in 2017, and the Award of Excellence in Natural Gas Conversion in 2019.

Personal homepage: http://www.mn.uio.no/kjemi/english/people/aca/unniol/index.html

Plenary and Keynote Speaker Biographies/Abstracts

Wilhelm Schwieger

Research career

Wilhelm Schwieger (W.S.) studied Chemistry in Halle/Saale at the Martin-Luther-University from 1970 to 1774. In 1974 he joined the group of Prof. F. Wolf at the Institute of Technical Chemistry at the same University. After his PhD he joined the inorganic research division at the "Chemiekombinat Bitterfeld" and became the responsible head of the 'Molecular-Sieve-Group', a joined working group of the university and the industry. After about ten years in the industrial research he went back to the university in Halle in 1989 where he became the head of the research group "Crystalline Silicates". After two research internships, at the institute for Chemical Engineering at the Universität Karlsruhe in the workgroup of Prof. Dr. L. Riekert in 1992/1993 and as a research fellow in the Department of Chemistry at the University of British Columbia, Canada, Group of Prof. Dr. C. A. Fyfe in 10/1993 to 12/1994 he moved back to Halle, finished his habilitation in 1994 und was appointed as an assistant professor at the Institute for Technical Chemistry. In 1998 he moved to Erlangen where he overtook the professor ship for 'Technical Chemistry' at the department of 'Chemical und Bioengineering' of the University Erlangen-Nuremberg.

The research interests are widespread in the field of heterogenous catalysis and porous materials in general. W.S. focused is the structure formation and the application of porous systems. In particular: (i) Surface chemistry on and in crystalline porous materials (layered silicates, zeolites or zeolite-like materials, aluminum phosphates); (ii) structure-working relationships of porous materials in respect to their of different applications; (iii) development of new porous inorganic materials; (iv) reaction on and in porous materials and development of composite materials with hierarchical pore structures for the development of new reactor concepts with the special focus on new interior for structured reactors.

Plenary and Keynote Speaker Biographies/Abstracts

'Hierarchically-ordered zeolites: preparation concepts and potential applications'

Wilhelm Schwieger

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In recent years advances have been made in the synthesis and structural characterization of so-called hierarchically ordered zeolites, which combine porosity features of different scale lengths, micro-, meso- and/or (sometimes) macropores in one zeolitic material.

This contribution will give an overview about the ongoing research activities in the field hierarchically organized zeolites covering both, the synthesis strategies and the potential application, mainly in the field of catalysis. A special focus will be laid on the design options of such hierarchical zeolitic systems which offer both, the possibility to overcome the mass transfer limitations of a reaction and allow the catalytic conversion of large molecules on zeolites. However, the extra porosity in hierarchical zeolites often leads to a loss of selectivity of the products. Thus, introducing additional pores with an optimal size has to be combined with the tailoring of their surface properties at the different pore scales in such hierarchical systems. Therefore, novel synthesis routes are required to prepare hierarchical zeolites. In the talk, such preparation pathways will be described and classified. Special preparation routes to two catalytically important and hierarchically zeolites, zeolites of the MFI and FAU type, will be highlighted. This includes in particular pathways to layered like zeolites assemblies and a new zeolite material with a direct combination of micro and macropores network. Finally, the results of some catalytically reactions to characterize the effect of the hierarchy in the system will be discussed.

Plenary and Keynote Speaker Biographies/Abstracts

Alessandro Turrina

Principal Research Scientist at Johnson Matthey Technology Centre, Billingham, United Kingdom

Alessandro Turrina received his B.S. and M.S degrees in Photochemistry and Molecular Materials at University of Bologna in 2011. The same year he started a Johnson Matthey CASE PhD at St Andrews University under the supervision of Professor Paul Wright on synthesis and characterisation of zeolites. He received his PhD in July 2015. Afterward, Alessandro joined Johnson Matthey as research scientist. His areas of expertise spreads from synthesis, optimisation and scale-up of zeolites primarily for emission control applications, to advanced characterisation and molecular modelling. He is co-author of 20 research articles and co-inventor of 15 patent applications.

Plenary and Keynote Speaker Biographies/Abstracts

Veronique Van Speybroeck

Veronique Van Speybroeck is full professor at the Ghent University within the Faculty of Engineering and Architecture and head of the Center for Molecular modeling (http://molmod.ugent.be), a multidisciplinary research center composed of about 40 researchers. She obtained her PhD in 2001 from the Ghent University. She is recipient of two flagship grants from the European Research Council: a Starting and Consolidator grant. Her expertise lies in first principle kinetics and molecular dynamics simulations of complex chemical transformations in nanoporous materials. She is also an elected member of the Royal (Flemish) Academy for Science and the Arts of Belgium (KVAB, www.kvab.be).

Plenary and Keynote Speaker Biographies/Abstracts

Simon Weston

Senior Research Associate in Corporate Strategic Research at ExxonMobil Research and Engineering

Dr. Weston's research interests are focused on the discovery and fundamentals of synthesis of porous materials (zeolites, MOFs, ZIFs, carbons) for application in catalysis, separations and storage technologies with a primary focus on CO_2 capture.

Plenary and Keynote Speaker Biographies/Abstracts

Xiaodong Zou

Xiaodong Zou is a full professor and deputy head of the Department of Materials and Environmental Chemistry, Stockholm University. She received her B.Sc. in Physics at Peking University in 1984, and Ph.D. in structural chemistry at Stockholm University in 1995. She joined the faculty at Stockholm University in 1996 and became professor 2005. Xiaodong Zou has made important contributions in the development of electron crystallographic methods. Her group has developed several image and diffraction-based methods and software for accurate atomic structure determination of unknown crystals, and solved many complex structures, especially porous materials such as zeolites and metal-organic frameworks. She is the founder of the Berzelii Center EXSELENT on Porous Materials. She is a council member of the International Zeolite Association and a member of the Structure Commission of International Zeolite Association. She has co-authored over 300 peer-reviewed publications, and given 182 invited talks. She received several prestigious awards given by the Royal Swedish Academy of Sciences, and is an elected member of the Royal Swedish Academy of Sciences (KVA), the Royal Swedish Academy of Engineering Sciences (IVA), a fellow of the Royal Chemistry Society (FRCS), UK.

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