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CHEMCATCHEM Editorial

Meet the *Women of Catalysis*

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ChemCatChem celebrates the achievements of female-led research groups in the field of catalysis. With this initiative, we seek to highlight the breadth and depth of the best research developed by women, and to increase its visibility in the wider catalysis community. *Women of Catalysis* offers a resource to aid in improving the representation of female scientific talent on invited speaker lists, conference and editorial boards, and as leaders in research consortia.

As we approach the end of another summer conference season, your Guest Editors look back over many presentations describing exciting new advances in catalysis science. An added pleasure was the high proportion of outstanding contributions from female-led research groups from around the world. Nevertheless, a gap remains between the depth of the female talent pool, and the gender representation on invited speaker lists. This gap becomes increasingly apparent at the keynote and plenary level. Related to this issue is the low proportion of females on conference and editorial boards, and as leaders in research consortia. Scientific studies show that excellent female scientists are still much more likely to be underrated and/or overlooked compared to male scientists. *Women of Catalysis* therefore seeks to promote a more balanced female representation in these contexts.

This Special Issue was conceived as a venue to celebrate the achievements of female researchers in the field of catalysis and highlight some of the best research led by women. Our explicit intent is to provide a highly visible resource for the broader catalysis community. Please read on and learn more about the *Women of Catalysis*.

Lucia Gorenstin Appel graduated in Chemical Engineering and received her doctorate degree in 1995 at COPPE/UFRJ, Rio de Janeiro, studying the CeO_2 behavior in redox reactions. One of her first works was aimed at describing the mechanism of the dimethyl ether generation from synthesis gas. After that, her research has been focused on the development of multifunctional catalysts for the generation of chemicals from ethanol in one-step processes. Many different compounds have been studied, for instance: butanol, isobutene, propene, butadiene, ethyl acetate and acetic acid. Most of these works were conducted in collaboration with the chemical industry. Physical mixtures, mixed oxides, nanoparticles and single atoms on oxides have been employed as catalysts. Another research line is related to the use of CO_2 for the generation of chemicals and fuels, as for example, the methane synthesis for energy storage. All these research activities have been developed at the National Institute of Technology (INT) located in Rio de Janeiro, where she was also responsible for the design and implementation of the Catalysis Laboratory, which nowadays is one of the most important in this field in Brazil.[1]

● catalysis ● carbon dioxide ● ethanol ● methane

Polly L. Arnold holds the Crum Brown Chair of Chemistry at the University of Edinburgh, and has recently been appointed Chemical Sciences Division Director within the Energy Sciences Area at the Department of Energy's Lawrence Berkeley National Laboratory. Concurrent with her role at Berkeley Lab, she will also join the Chemistry Department faculty at UC Berkeley. She obtained degrees from Oxford and Sussex and was a Fulbright postdoctoral fellow at MIT before returning to the UK to a lectureship in 1999. Her research is focused on the design and synthesis of highly reactive f-block complexes that can activate inert small molecules such as carbon oxides, dinitrogen, and hydrocarbons, and that can provide fundamental information on structure and bonding at the bottom of the periodic table.

Polly has received a variety of awards and prizes including the RSC Wilkinson prize in 2018, the Lord Kelvin Medal 2017, which is the senior prize for the physical sciences awarded by the Royal Society of Edinburgh, the Seaborg Lectureship 2015 (UC Berkeley, USA), and the Royal Society's Rosalind Franklin

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award in 2012. She made the film 'A Chemical Imbalance', a call to action for simple changes to achieve equality of opportunity in science, and was awarded an OBE in the Queen's birthday honors in 2017 for her contributions to chemistry and women in STEM.[2]

● actinides ● f-elements ● homogeneous catalysis ● organometallics ● small-molecule activation

Irina P. Beletskaya received her PhD degree in 1958, and her Doctor of Chemistry degree in 1963 from Moscow State University. She became a Full Professor at Moscow State University in 1970, and in 1974 she became a Corresponding Member of the Academy of Sciences (USSR), of which she became a full member (Academician) in 1992. She is currently Head of the Laboratory of Organoelement Compounds, Department of Chemistry, Moscow State University. She is Chief Editor of the *Russian Journal of Organic Chemistry*. She was President of the Organic Chemistry Division of IUPAC from 1989 to 1991. She has been awarded the Mendeleev, Lomonosov, Nesmeyanov, Arbuzov, Balandin and Demidov Prizes, the State Prize, the Kapitza Award Fellowship (UK) and Women in the Engineering Science Award (Sweden) for creativity and achievements in chemistry. In 2018 she has been awarded the Golden Butlerov Medal of the Russian Academy of Science. Her publications list contains more than 1000 papers, cited more than 23,000 times and her *h*-index is 60.[3]

● asymmetric catalysis ● catalysis for organic synthesis ● enantioselectivity

Gloria Berlier received her PhD in Chemical Sciences in 2001, and was a postdoc for 4 years at Torino University (Italy) and 1 year at the DRFL - Royal Institution of GB (London, UK). She was appointed Faculty Researcher in 2006 and became Associate Professor at the Department of Chemistry (Torino University) in 2016, working in the physical chemistry group. She is Vicepresident of the Master Course in Environmental Chemistry.

Her research focuses on the application of adsorption and in situ/operando spectroscopic techniques (vibrational and electronic) for the characterization of porous materials. The main interest is on the structure of active sites in heterogeneous catalysts (zeolites, oxides, supported nanoparticles), with particular attention to redox (transition metal ions) and Brønsted sites. The aim is to define structure-reactivity correlations for a rational design of materials, often with the support of modeling and in collaboration with industry. Important fields of study are partial oxidation reactions, including the selective catalytic reduction of NO_x (SCR) and the direct methane to methanol conversion.[4]

● Cu-zeolites ● diffuse reflectance ● in-situ spectroscopy ● NH_3-SCR ● porous materials

Maria Besora received her PhD from the Universitat Autònoma de Barcelona under the supervision of Prof. Agustí Lledós and Prof. Feliu Maseras. After a period as post-doctoral researcher at the University of Bristol (UK) with Prof. Jeremy Harvey, she received a Juan de la Cierva grant and moved to the Institute of Chemical Research of Catalonia (ICIQ) to work in the group of Prof. Feliu Maseras. Recently she has moved at the Universitat Rovira i Virgili (Tarragona) to work in the quantum chemistry group. Her research interests include the study of reaction mechanisms using computational chemistry tools and the application of statistical techniques to chemically relevant problems.[5]

● computational chemistry ● organocatalysis ● organometallics ● statistical techniques ● supramolecular catalysis

Donna G. Blackmond received her PhD in Chemical Engineering in 1984. She has held professorships in Chemistry and in Chemical Engineering in the USA, Germany, and the UK, and she has worked at Merck & Co., Inc. She is Professor of Chemistry and Department Chair at Scripps Research in La Jolla, California. She holds joint US/UK citizenship. Her international recognition includes awards from the Royal Society, the Max-Planck-Gesellschaft and the American Chemical Society. She is an elected member of the US National Academy of Engineering and the American Academy of Arts and Sciences. She has been a Woodward Visiting Scholar at Harvard, a Miller Institute Research Fellow at Berkeley, an NSF Visiting Professor at Princeton, the Givaudan-Karrer Lecturer at University of Zürich, and the Gordon Lecturer at the University of Toronto. She is an Associate Editor of the *Journal of Organic Chemistry* and serves on several Editorial Boards. Her research focuses on mechanistic studies of catalytic organic reactions, including asymmetric catalysis. She is Simons Foundation Collaboration on the Origins of Life Investigator, where she studies prebiotic chemistry and the origin of biological homochirality.[6]

● catalysis ● reaction kinetics ● reaction mechanisms

Sophie Carenco graduated from École Polytechnique, Palaiseau, in 2008. She obtained her PhD in 2011 from Sorbonne Université, Paris, for her work on the synthesis and applications of metal phosphide nanoparticles, under the co-supervision of Professor Clément Sanchez and Dr. Nicolas Mézailles. From 2012 to 2013, she was a post-doctoral fellow at Lawrence Berkeley

National Lab, Berkeley, California, in the group of Prof. Miquel Salmeron, where she used synchrotron-based in-situ spectroscopies (ambient-pressure XPS, high pressure XAS) to monitor the surface state of (bi)metallic nanoparticles during catalytic reactions.

In 2014, she joined CNRS as a researcher in the Laboratoire de Chimie de la Matière Condensée de Paris (LCMCP), associated with Sorbonne Université and Collège de France. She works on novel synthetic routes of unconventional nanomaterials for energy-relevant challenges such as CO_2 valorization. In 2017, she was awarded an ERC starting grant to work on small molecules activation at the surface of nanoparticles.

She was awarded the European Young Chemist Award from EuCheMS in 2010 and the C'Nano National Award in 2012 for her PhD work. More recently, she was awarded the Bronze Medal of CNRS, the Jean Rist Medal of SF2M and the Young Chemist Award of SCF-DCP. She is also involved in science public outreach and published in 2012 a short book about nanomaterials and chemistry.[7]

● metal nanoparticles ● metal oxysulfides ● metal phosphides ● surface reactivity

Ping Chen is a Professor and Division Head of Hydrogen Energy and Advanced Materials at the Dalian Institute of Chemical Physics. She received her BS, MS, and PhD degrees in 1991, 1994, and 1997, respectively, from the Department of Chemistry of Xiamen University. Her primary research interests are material design and development for hydrogen storage and heterogeneous catalysis.[8]

● ammonia ● energy materials ● heterogeneous catalysis ● hydrogen storage ● metal hydrides

Céline Chizallet graduated from Ecole Normale Supérieure (Paris, MSc in 2002, 'Agrégation de Chimie' in 2003). She obtained a PhD in Inorganic Chemistry (Paris VI University) in 2006 under the supervision of Prof. Michel Che, in collaboration with Philippe Sautet (ENS-Lyon). She defended her 'Habilitation à Diriger des Recherches' (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 interests deal with computational heterogeneous catalysis, in particular reactions catalyzed by aluminosilicates and supported metals. Her mission at IFPEN is the implementation of ab initio calculations within industrially-oriented experimental research programs. She is the co-author of more than 70 research articles and 2 patents. She was awarded the Edith Flanigen Award (2015), the Young Scientist Award of the Physical Chemistry (2016) and Catalysis (2018) divisions of the French Chemical Society. She also served as president of the Groupe d'Etudes en Catalyse (GECat, 2014-2017), and has been involved in the organization of several international conferences.[9]

● alumina ● aluminosilicates ● density functional theory ● kinetics ● platinum

Clémence Corminboeuf started her independent career as a tenure-track Assistant Professor at EPFL in 2007. She was promoted to Associate Professor in 2014. In 2010, she received the silver medal at the European Young Chemist Award. She has been awarded two ERC grants (starting and consolidator), received the Werner Prize of the Swiss Chemical Society in 2014 and the Theoretical Chemistry Award from the ACS Physical Chemistry Division in 2018. She has co-authored more than 150 publications focusing on the development of electronic structure methods and conceptual tools targeted at applications in the fields of organic electronics and homogeneous catalysis.[10]

● electronic structure methods ● homogeneous catalysis ● machine learning ● organic electronics

Xiuling Cui is a Professor at the Chemistry Department of Zhengzhou University. She studied chemistry at Zhengzhou University and received her PhD in 1999 under the guidance of Acad. Prof. Yangjie Wu. Then, she began her independent research in Zhengzhou University. She was promoted to Associate Professor in 2002, Full Professor in 2008, Minjiang Scholar Professor of the School of Biomedical Sciences, Huaqiao University in 2011, and Distinguished Professor of Henan province in 2015. She worked as a FCT postdoctoral fellow from 2000 to 2006 in the group of Prof. Rita Delgado at ITQB, Universidade Nova Lisboa, Portugal. Her research focuses on methodologies for organic synthesis and marine drugs.[11]

● C–H activation ● homogeneous catalysis ● organic synthesis

Mita Dasog received her BSc in 2009 from the University of Saskatchewan. She then moved to the University of Alberta to begin her PhD studies where she focused on the syntheses, properties, and applications of silicon quantum dots. Her doctoral work was recognized with the Canadian Council of University Chemistry Chairs Doctoral Award in 2015 for outstanding doctoral research work in Canada. After her PhD, she was a Green Talents visiting scholar at the Technical University of Munich investigating carbon dioxide sequestration. Dr. Dasog

went on to hold an NSERC postdoctoral position with Dr. Nathan Lewis at the California Institute of Technology, where she studied light-material interactions and engineered semiconductor-liquid interfaces through surface chemistry. She joined the Dalhousie University Chemistry Department in 2016 as an Assistant Professor. Her independent research focuses on designing solid-state reactions to prepare and assess electrocatalysts, photocatalysts, and plasmonic nanomaterials. Dr. Dasog was recognized as one of the top 150 Canadian women in STEM in 2017.[12]

● electrocatalysis ● plasmonics ● photocatalysis ● semiconductors ● water splitting

Paula Diaconescu joined the UCLA Department of Chemistry & Biochemistry in 2005, after spending two years as a postdoctoral fellow in the group of Professor Robert Grubbs at California Institute of Technology. She obtained her PhD degree in 2003 under the supervision of Professor Christopher Cummins at Massachusetts Institute of Technology. The Diaconescu group is interested in the design and synthesis of metal complexes with specific geometric and electronic properties. Current research efforts focus on the design of reactive species with applications to small molecule activation, organic synthesis, and polymer formation, especially as related to switchable catalysis. This new area of chemistry is inspired by nature's sensory processes and uses external agents as switches in order to control the catalytic activity of multiple species with different reactivity.[13]

● coordination chemistry ● organometallic synthesis ● polymer synthesis ● switchable catalysis

Mei Dong is a Professor at the Institute of Coal Chemistry, Chinese Academy of Sciences since 2011. She received her PhD in Physical Chemistry from the same institution in 2001. Her expertise is in heterogeneous catalysis, mainly related to methanol conversion processes and the synthesis of molecular sieves with tailored morphology and controlled active sites. By controlling the synthetic conditions of zeolites and revealing the formation mechanism, she achieved the oriented assembly of zeolite crystals with special morphologies, such as the chain-like morphology, and hollow zeolite spheres. To study the interactions between metals ions and zeolites with different crystal sizes and morphologies, an in-situ method for characterizing the structure of catalysts by synchrotron radiation X-ray was developed, which can be used for the preparation and activation of zeolite catalysts, and the in-situ monitoring of their applications in methanol conversion reaction. She has published more than 50 papers in international journals and has authored more than 10 patents.[14]

● ethylene aromatization ● heterogeneous catalysis ● in-situ characterization ● methanol ●zeolites

Muriel Durandetti received her PhD (Paris VI University) in 1994 under the supervision of Prof. Périchon on nickel-catalyzed electrosynthesis. Then she worked for four years as Assistant Professor in Paris XII University. In 1998, she became Associate Professor, and developed electrocatalyzed cross-coupling reactions using nickel, chromium or iron salts. She completed these works with mechanistic investigations using electroanalytical processes. In 2005, she moved to Rouen Normandy University as Associate Professor in the group of Jacques Maddaluno. Her research focused on intramolecular cyclization reactions by carbometallation with lithium, magnesium, nickel and palladium catalysts, which allow access to various complex polycyclic scaffolds. Recently, she focused her attention on the synthesis of silylated heterocycles, and opened new strategies to generate valuable scaffolds.[15]

● carbometallation ● electrosynthesis ● nickel catalysis ● reaction mechanisms ● silylated heterocycles

María Escudero Escribano is Assistant Professor at the University of Copenhagen (UCPH) since 2017. She obtained her PhD in Chemistry from the Autonomous University of Madrid and carried out her postdoctoral research at DTU and Stanford University. She holds a Villum Young Investigator grant from the Villum Foundation. María leads the NanoElectrochemistry group at UCPH, which investigates tailored interfaces for energy conversion and synthesis of renewable fuels and chemicals. She has received numerous awards in recognition of her early career achievements at both international and national levels.[16]

● electrocatalysis ● energy materials ● nanoelectrochemistry ● renewable fuels ● sustainability

Shuang Gao earned her Master degree in Inorganic Chemistry from Northeast Normal University in 1992. She was a Lecturer at Jilin University from 1992 to 1999. She obtained her PhD in Chemistry from Jilin University in 1997. She then conducted postdoctoral research at the University of British Columbia and Dalian Institute of Chemical Physics, Chinese Academy of Sciences from 1998 to 2001. In 2001, she joined Dalian Institute of Chemical Physics and to lead the selective oxidation group. The research activities of Prof. Gao's group are mainly focused on the design and synthesis of catalytic materials, including polyoxometalates, metal complex and

carbon materials, aiming at applications in important organic reactions that are potentially significant for energy conversion and environmental protection, such as epoxidation of olefins, aerobic oxidation of alcohols and hydroxylation of benzene.[17]

● carbocatalysis ● environmental chemistry ● heterogeneous catalysis ● oxidation ● polyoxometalates

Olga García Mancheño received her PhD in 2005 from the Universidad Autónoma de Madrid under the supervision of Prof. J. C. Carretero in the field of organometallic asymmetric catalysis. During her PhD, she also did two short research stays with Prof. M. T. Reetz (Max-Planck-Institut für Kohlenforschung) and Prof. K. A. Jørgensen (University of Aarhus). She next carried out her postdoc in the group of Prof. C. Bolm at the RWTH-Aachen University (2005–2008) working on sulfoximine and nitrene transfer chemistry. In 2008 she started her independent career at the University of Münster. After her first appointment in 2013 as Professor for Organic Chemistry at the University of Regensburg and the Straubing Center of Science, she returned to the University of Münster at the end of 2017 to take over her current position. Her research focuses on the design of novel anion-binding catalysts and the development of efficient (catalytic) synthetic methods, including oxidative C–H functionalization. Recently, her research interests have extended to photocatalysis.[18]

● asymmetric catalysis ● C–H functionalization ● catalyst design ● organic synthesis ● photocatalysis

Hélène Gérard received a Master degree in catalysis from ENS-Lyon and University Claude Bernard-Lyon I (France). Afterwards, she did her PhD in Theoretical Chemistry, investigating the reactivity of ruthenium-olefin metal complexes under the supervision of Dr. Odile Eisenstein at the University Montpellier II (France), and in collaboration with P. R. K. Caulton and E. Davidson (Indiana University, Bloomington, USA). In 2001, after graduation and a postdoctoral period under the supervision of Professor Glenn J. Martyna (Indiana University, Bloomington, USA), she was appointed Associate Professor by UPMC (Paris, France). She got involved in the theoretical study of the chemical reactivity of main group (Li and B) organometallic complexes. From a theoretical point of view, this requires the design of modelling strategies for complex environments. She received her Habilitation in 2007 and became Full Professor in 2009. Since then, her research activities have focused on the study of the structure, properties and reactivity of organometallic or inorganic molecular systems in complex media (solvated, in presence of chelating agents, counter-ions, salts, etc.). A special focus has been given to the biomimetic redox properties of copper complexes, and their application as asymmetric catalysts. Most recently, her interest turned to their reactivity for the one-step synthesis of metallic nanoparticles. These studies are performed in close collaboration with experimental groups ranging from organic synthesis to physical chemistry.[19]

● copper complexes ● molecular modelling ● organometallic chemistry ● reaction mechanisms

Miho Hatanaka received her PhD in Theoretical Chemistry in 2011 at Keio University (Japan) under the supervision of Prof. Satoshi Yabushita. After a four-year postdoctoral stay at Fukui Institute for Fundamental Chemistry, Kyoto University (Japan) with Prof. Keiji Morokuma, she became Assistant Professor at Kindai University (Japan) in 2015. In 2017 she was promoted to Associate Professor at Nara Institute of Science and Technology (Japan). From 2015 until 2019 she was also a PRESTO researcher of Japan Science and Technology Agency. Her research focuses on the development of new computational methods and their application to functional materials to understand the mechanisms and predict their properties. An important application is the design of lanthanide luminescent materials based on her proposed approximation method. Another major research line is the application of an automated reaction path search method, called the Global Reaction Route Mapping (GRRM), to elucidate the mechanism of various catalytic reactions. Recently her interests have expanded towards autonomous molecular design based on machine learning.[20]

● automated reaction path search ● chiral catalysts ● density functional theory ● luminescent materials ● machine learning

Sophie Hermans is an inorganic chemist. She obtained her first degree ('Licence en Chimie') at UCLouvain in Belgium, with final-year and DEA projects supervised by Prof. M. Devillers. She started her research career as a synthetic chemist, making new metal complexes, and in particular mixed-metal clusters. She obtained her PhD at the University of Cambridge (UK) under the supervision of Prof. Brian F. G. Johnson. She obtained a Junior Research Fellowship (Newnham College) to pursue postdoctoral studies in Cambridge and collaborated with Prof. Sir John M. Thomas to immobilize the mixed-metal clusters in MCM-41 for heterogeneous catalytic applications. After moving back to UCLouvain with a FNRS 'Chargée de recherches' post, she started working on carbon-supported catalysts and chemical functionalization of (nano)-carbon surfaces. She obtained the FNRS 'Chercheur Qualifié' and Assistant Professor positions in 2005, and was promoted to Full Professor in 2014 and FNRS 'Maître de recherches' in 2015. Her research interests are still related to inorganic molecular chemistry, carbon materials, surface functionalization and nanostructured materials preparation.[21]

● biomass ● carbon ● functionalization ● nanomaterials ● supported catalysts

Corinna R. Hess grew up in Chicago, where she also carried out her undergraduate studies (University of Chicago) and developed her appreciation for inorganic chemistry (undergraduate research with Prof. Gregory Hillhouse). She subsequently pursued her PhD studies in the field of bioinorganic chemistry, supervised by Professor Harry Gray, at the California Institute of Technology. As part of her PhD project, she performed electrochemical studies with an amine oxidase. Following postdoctoral positions at the University of California, Berkeley, and the Max Planck Institute for Bioinorganic Chemistry, she joined the Chemistry Department at Durham University as a Lecturer (2010). In 2014 she was appointed as the Assistant Professor of Bioinorganic Chemistry at the Technical University of Munich (TUM). Research in the Hess group centers on the development of molecular electro- and photo-catalysts. The emphasis is on the generation of catalysts based on earth-abundant transition metals, for energy and sustainable chemistry related processes, including H_2 evolution.[22]

● base-metal catalysis ● electrocatalysis ● molecular catalysis ● photocatalysis ● sustainability

Francesca M. Kerton received her PhD in Organometallic Chemistry in 1999 from the University of Sussex, and was a Royal Society University Research Fellow at the University of York from 2002 until 2004. Since 2005, she has worked at Memorial University of Newfoundland, Canada. She was promoted in 2015 to Professor of Green Chemistry and received the Dean of Science Distinguished Scholar Medal in 2016. She is the recipient of the 2019 Canadian Green Chemistry and Engineering Award, and current chair of the Canadian National Committee for IUPAC. Her research focuses on catalysis including fundamental mechanistic studies, chemistry of degradable and biorenewable materials, and transformations of carbon dioxide and carbohydrates. An overarching theme of her research is sustainable chemistry related to the oceans, which includes the study of the behavior of polymers in seawater, and valorization of fish-processing waste and aquaculture by-products. In 2017, her edited book *Fuels, Chemicals and Materials from the Oceans and Aquatic Sources* was published. Recently her interests have expanded towards biocatalysis and carbonaceous materials.[23]

● carbon dioxide ● catalysis ● degradable polymers ● reaction mechanisms ● renewable feedstocks

Julia R. Khusnutdinova received her PhD degree in Organometallic Chemistry from the University of Maryland in 2009. She then worked as a postdoctoral fellow at the Washington University in St. Louis and then at the Weizmann Institute of Science in the group of Prof. Milstein. Since 2015 she is an Assistant Professor at the Okinawa Institute of Science and Technology (OIST) in Japan leading the Coordination Chemistry and Catalysis Unit. Her research focuses on the utilization of transition metal complexes for catalytic applications and 'smart materials' design. One of the major research lines involves the utilization of first-row transition metals, in particular, manganese, in sustainable homogeneous catalysis. The group attempts ligand modifications to allow for secondary coordination sphere interactions or metal-ligand cooperativity that open up low energy pathways for bond breaking/bond formation processes and leads to efficient catalysis. Another major research line involves the use of fluxional coordination compounds for the design of stimuli-responsive polymer materials, which can be used, for example, in non-destructive detection of mechanical stress in polymers using conformationally flexible photoluminescent copper(I) complexes. One other recent major research direction involves the synthesis of polymetallic linear chain complexes and their organometallic reactivity.[24]

● homogeneous catalysis ● linear chain complexes ● manganese ● photoluminescent copper complexes ● stimuli-responsive materials

Doris Kunz received her Diploma (1997) and PhD (2000) from the University of Münster working in the group of Gerhard Erker on amino acid-functionalized metallocenes. In 2001 she moved for to Yale University for a two-year postdoc stay on C–H activation with John F. Hartwig. She started her independent career in 2003 at Heidelberg University under the mentorship of Peter Hofmann and financially supported by an Emmy-Noether fellowship of the German Research Foundation (DFG). After receiving the Habilitation in Organic Chemistry in 2008, she was appointed Professor for Inorganic Chemistry by the University of Tübingen in 2009. In 2009 and 2011 she was Visiting Professor at the Université de Bourgogne in Dijon. Her research focuses on anellated NHC ligands and multidentate NHC ligands to obtain electron rich metal complexes for catalysis. Applications include the isomerization and the deoxygenation of epoxides. Another topic deals with diazafulvalenes and electron poor ylidic Cp-ligands.[25]

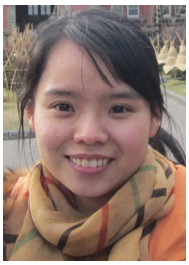
● diazafulvalenes ● homogeneous catalysis ● metal complexes ● N-heterocyclic carbenes ● pincer ligands

Alessandra Lattanzi received her PhD from 'La Sapienza' University of Rome in 1997. She has been visiting scientist in the groups of Prof. V. K. Aggarwal (Sheffield, 1999–2000) and Dr. N. E. Leadbeater (London, 2001). She has been working at University of Salerno in the Chemistry and Biology Department since 1997, first as a Lecturer, then as Associate Professor. Since 2019, she is Full Professor of Organic Chemistry at the same department. Her research activity started in the area of stereoselective metal-catalyzed oxidations of alkenes and sulfides. She is interested in the description of molecular chirality through geometrical and algebraic approaches. Recent interests include asymmetric organocatalysis with a focus on one-pot-, step-economic and environmentally friendly synthesis of heterocyclic compounds.[26]

● asymmetric organocatalysis ● cascade reactions ● chirality ● green chemistry ● heterocyclic compounds

Yang Li received her PhD from Lanzhou University in 2006 with Prof Xiao-Ping Cao. After graduation, she joined in WuXi PharmaTech Co. Ltd. as a research group leader. In Apr. 2009, she started postdoctoral research at Peking University with Prof. Zhang-Jie Shi, and Leibniz-Institut für Katalyse e.V. an der Universität Rostock (LIKAT) with Prof. Matthias Beller. In 2014 she initiated her independent work at Center for Organic Chemistry, Frontier Institute of Science and Technology (FIST), Xi'an Jiaotong University. Currently, she is interested in green, sustainable and energy chemistry via visible-light photoredox catalysis and transition-metal catalysis. Her research focuses on hydrogen energy including hydrogen production from renewable resources and hydrogen storage, as well as efficient chemical bond construction by H_2-release.[27]

● dehydrogenative coupling ● hydrogen storage ● renewable hydrogen ● transition metal catalysis ● visible light photoredox catalysis



Weiwei Lin obtained her BSc from China University of Geosciences in 2009, and her PhD from Changchun Institute of Applied Chemistry, Chinese Academy of Sciences in 2014. Since 2014 she is an Assistant Professor in the group of Professor Fengyu Zhao. Her research interests focus on the synthesis of supported catalysts and carbon dioxide conversion.[28]

● alloys ● bimetallic catalysts ● carbon dioxide conversion ● heterogeneous catalysts ● nanocatalysis

Tracy L. Lohr obtained her PhD in Organometallic Chemistry at the University of Calgary (Canada) with Prof. Warren E. Piers. She then pursued a 2-year post-doctoral fellowship with Prof. Tobin J. Marks (in collaboration with Peter C. Stair) at Northwestern University in heterogeneous catalysis. She spent the following two years as a Research Assistant Professor of Chemistry at Northwestern in the Center for Catalysis and Surface Science working in the areas of both homo- and heterogeneous catalysis, with particular focus on olefin polymerization, the development of ALD precursors, lanthanide hydroelementation, biomass valorization using tandem catalysis, and various heterogeneous oxidative processes. She was awarded the Clara Immerwahr Award (UniSysCat, Berlin) in 2018 for significant contributions to the field of catalysis. In May of 2018 she joined the Chemical Catalysis Group of Shell Catalysts & Technologies where she currently works on the selective oxidation of C1 & C2 feedstocks.[29]

● heterogeneous catalysis ● hydrocarbon oxidation

Sandra Luber graduated from ETH Zürich (Switzerland) in 2007 with a MSc in Chemistry. She obtained her PhD in Quantum Chemistry in 2009 under the supervision of Markus Reiher. In 2010 she was a postdoctoral researcher at the Biozentrum Basel, before moving to the group of Victor S. Batista at Yale University. In 2012 she was part of the *Start-In* program for young talents at BASF (Germany). From 2012 to 2017 she was a project group leader at the University of Zurich. She finished her Habilitation in 2016, and was promoted to SNSF Professor in March 2017. Her research deals with the development and application of theoretical (mainly first-principles) methods at the interface of chemistry, biology, physics, and materials science.[30]

● ab initio molecular dynamics ● catalysis ● density functional theory ● quantum Monte Carlo ● theoretical spectroscopy

Jing-Li Luo is a Professor in the Department of Chemical and Materials Engineering, University of Alberta, Canada. She obtained her PhD in Materials Science and Engineering at McMaster University in 1992. Her current research focuses on fuel cells for natural resource conversion, energy storage materials, clean energy technology and corrosion control. She has received a number of awards, including Canadian Metal Chemistry Award in 2014, Canadian Research Chair in Alternative fuel cells from 2004 to 2015, McCalla professorship in 2003, Morris Cohen Award in 2002. She was elected a Fellow of the Canadian Academy of Engineering in 2016.[31]

● CO_2 conversion ● corrosion ● energy conversion ● energy storage ● solid oxide electrochemical cells

Stephanie L. MacQuarrie obtained her BSc from Mount Allison University in 1996. She continued to pursue chemistry in graduate school at Virginia Polytechnic Institute and State University where she earned her PhD in Organic Chemistry under the supervision of Professor Paul Carlier in 2005. Then she accepted a postdoctoral position in Professor Cathleen Crudden's group at Queen's University. In 2009 Stephanie started at Cape Breton University as Assistant Professor of Organic Chemistry. She is now Associate Professor of Chemistry, Associate Dean of Science and Technology and runs a National Science and Engineering Research Council funded research program with mainly undergraduate students. The MacQuarrie group implements an innovative method of supporting an array of chiral organic catalysts with enhanced homogeneous properties via charge matching between the ionically bound catalyst and the charged supports. The materials are prepared in as inexpensive and green a manner as possible and the supports range from highly ordered silicas to renewable resources such as biochar.[23]

● chiral catalysts ● organocatalysis ● supported catalysts ● sustainability

Belén Martín Matute received her PhD in 2002 at the Autonomous University of Madrid, Spain, and joined Stockholm University as a postdoc shortly after. Since 2008, she has been working at Stockholm University, where she became Full Professor in 2014. Her research focuses on the development of sustainable catalytic methods to construct carbon-carbon and carbon-heteroatom bonds selectively. She employs both homogeneous and heterogeneous metal- and organo-catalysts. In the area of heterogeneous catalysis, a major research line is the use of metal-organic frameworks as carriers of catalytic entities, including nanoparticles and single-site supported complexes. In the last few years, she has also focused on the development of operando spectroscopic techniques to study reaction mechanisms of both homogeneous and heterogeneous catalytic processes.[32]

● catalysis ● metal-organic frameworks ● organic synthesis ● reaction mechanisms ● sustainability

Sara Meninno graduated in 2011 and obtained her Ph.D. in Chemistry in 2015 from University of Salerno under the supervision of Prof. Alessandra Lattanzi. Her work is focused on the development of new organocatalyzed one-pot and tandem methodologies as efficient tools to access chiral heterocycles, potentially useful as synthetic intermediates or bioactive compounds. She was recently awarded by Accademia Nazionale dei Lincei a Royal Society of Chemistry fellowship to spend in UK. She joined Prof. Rios' group at Southampton University to work on synergistic catalysis.[26]

● cooperativity ● organocatalysis ● organic synthesis ● synergistic catalysis ● tandem catalysis

Audrey Moores received her BSc (2001), MSc (2002) and PhD (2005) from Ecole Polytechnique, Palaiseau in France. She did a post-doctoral fellowship at Yale University, before starting her independent carrier at McGill University, Montréal, Canada as a Canada Research Chair in Green Chemistry in 2007. She became an Associate Professor in 2014. Between 2012 and 2016 she was the co-associate director of the Centre for Green Chemistry and Catalysis. Since 2017, she co-leads the McGill Sustainability Systems Initiative-Materials. Her research focuses on catalysis and photocatalysis using metal, metal oxide and biomass-based nanomaterials, with a special emphasis on sustainable processes and use of earth-abundant starting materials. She also develops solid phase methods to access nanomaterials and functional polymers. She was selected as an emerging leader in 2017 by the RSC journal *Green Chemistry*.[33,34]

● mechanochemistry ● nanocatalysis ● plasmonic materials ● sustainability

Yumiko Nakajima received her PhD from Tokyo Institute of Technology (Japan) in 2005. She then continued her studies as a Postdoc (sponsored by a Humboldt Research Fellowship) at RWTH Aachen University, Germany (2005–2007) and at RIKEN, Japan (2007–2008). She joined Kyoto University as an Assistant Professor in 2008. She spent the years 2009–2013 as a JST PRESTO project researcher. In 2013, she moved to the National Institute of Advanced Industrial Science and Technology (AIST) as Senior Researcher and was then promoted to Team Leader in 2017. Her research interests are in organometallic chemistry, coordination chemistry and silicon chemistry. Her research focuses on the development of novel synthetic reactions based on the precise design of new transition-metal catalysts. Recently, she has applied this method to silicon chemistry and developed several catalysts, which enable us to synthesize various important organosilicon compounds with high efficiency and reaction selectivity.[35]

● homogeneous catalysis ● ligand design ● organosilicon compounds ● transition-metal catalysis

Elaine O'Reilly was born in Dublin, Ireland in 1982. She graduated from University College Dublin (UCD) with a BSc (Hons) in Chemistry (2006) and began a PhD in Organic Chemistry at UCD with Dr Francesca Paradisi. In 2010, she moved to the University of Manchester where she spent four years working as a Postdoctoral Research Fellow under the direction of Prof. Nick Turner. In 2014, she joined Manchester Metropolitan University as a Lecturer in Chemical Biology before moving to the University of Nottingham in 2015 as Assistant Professor in Chemical Biology and then Associate Professor in 2018. Elaine moved to her current position as Associate Professor of Chemical Biology at UCD in 2019. Her research focuses on the development and application of biocatalysts and biocatalytic methodology for organic chemistry applications.[36]

● biocatalysis ● biocatalytic retrosynthesis ● enzyme engineering

Regina Palkovits is Full Professor for Heterogeneous Catalysis & Chemical Technology at RWTH Aachen University. She graduated in Chemical Engineering from Technical University Dortmund in 2003 and obtained her PhD under the supervision of Prof. Ferdi Schüth at the Max-Planck-Institut für Kohlenforschung in 2006. Afterwards, she joined the group of Prof. Bert Weckhuysen at Utrecht University as postdoctoral fellow. In 2008, she returned as a group leader to the Max-Planck-Institut für Kohlenforschung and since 2010 she is Professor at RWTH Aachen University. With heterogeneous catalysis and material design as core expertise, her group tackles global challenges via the development of sustainable chemical transformations and processes. Core areas comprehend biomass valorization, environmental catalysis, chemical energy storage and the development of high performance materials as key enabler. She is the recipient of the EFCATS Young Researcher Award 2019 for her contribution to the development of catalysts for the valorization of renewable carbon sources.[37]

● energy ● heterogeneous catalysis ● nanostructured materials ● renewable resources ● sustainability

Laura Prati is currently Full Professor in Inorganic Chemistry at the University of Milan, and Head of the Chemistry Department since 2017. She received her specialisation in analytical techniques for fine chemicals from Politecnico of Milano in 1985 and was awarded a PhD in Industrial Chemistry in 1988. She was Visiting Professor at Universitè Pierre et Marie Curie (Paris) [2015] and at Centro de Ciencias Aplicadas y Desarrollo Tecnológico, Universidad Nacional Autónoma de México (Mexico City) [2015 and 2017]. For several years she has applied low impact environmental catalytic methodologies as alternative processes to the stoichiometric ones based on organic synthesis. She introduced the use of gold as active metal in the aerobic selective oxidation of organic compounds, contributing to the development of the unusual gold catalytic properties, the main one being the resistance in the liquid phase to poisoning due to overoxidation. Her skills include the preparation and functionalization of materials for the obtention of highly dispersed metallic catalysts on oxides, active carbons and mesoporous systems. She collaborates actively with industrial partners, and several research groups, in Europe and in the United States.[38]

● clusters ● green chemistry ● heterogeneous catalysis ● nanoparticles ● small-molecule activation

Maria João Ramos is currently a Full Professor at the Univ. Porto, Portugal. She has received, in 2014, a Doctorate Honoris Causa from the University Stockholm (Sweden) for her work in Computational Biochemistry, and she has been the Vice-Rector for R&D at the University of Porto, during the period 2014–2018, as well as one of the Directors of its Science and Technology Park, and Associate Director of the Centre for Computational Drug Discovery of the University of Oxford. She was awarded the Medinabeitia-Lourenco Prize in 2019, she was part of the team (Graham Richards, Univ. Oxford) to whom the Italgas Prize for Research and Technological Innovation was awarded in 2001, and she got the Calouste Gulbenkian Foundation Prize for Best Student.

She has a first degree in Chemistry (Univ. Porto), a PhD in Quantum Chemistry (Univ. Glasgow), and post-docs in Computational Biochemistry (Univ. Oxford and Univ. Zurich). She is the author of just over 400 scientific publications, 5 books and 12 book chapters. Most of her scientific work has been devoted to her research in computational biochemistry, namely computational enzymology and drug discovery.[39]

● computational enzymology ● drug discovery ● molecular dynamics ● quantum mechanics ● QM/MM

Liane M. Rossi received a BSc degree in Chemical Engineering from the Federal University of Rio Grande do Sul–UFRGS (Brazil) in 1994 and her PhD in Chemistry from the Federal University of Santa Catarina–UFSC (Brazil) in 2001. After working as postdoctoral researcher in Brazil and USA, she joined the Institute of Chemistry at the University of São Paulo–USP (Brazil) in 2004, and was appointed Full Professor of Chemistry in 2016. Her research interests in the field of catalysis focus on novel approaches for the synthesis of supported metal nanoparticles

with controlled size, morphology and surface properties, catalyst recovery and recycling, new reactivity patterns at metal-ligands interfaces, bimetallic and hybrid catalysts, and the concepts of green chemistry in selective reactions. The main catalytic processes under study are selective hydrogenations and oxidations for biomass conversion into chemicals and CO_2 conversion and valorization.[40]

● bimetallic catalysts ● biomass ● carbon dioxide ● gold ● nanocatalysis

Beatriz Royo graduated in Chemistry in 1989 at the University of Alcalá in Madrid (Spain) and received her PhD from the University of Sussex (UK) in 1993. Her work was devoted to main-group chemistry, and was developed under the supervision of Prof. Mike F. Lappert. She then moved back to the University of Alcalá where she stayed four years as an Assistant Professor, doing research on *ansa*-metallocene chemistry of titanium, zirconium, and hafnium for polymerization reactions. In January 1997, she joined the group of Carlos Romão at ITQB NOVA in Lisbon (Portugal) as a postdoctoral fellow, working first in the development of the indenyl chemistry of molybdenum and tungsten, and later in the development of new CO releasing drugs. In 2004, she became group leader of the organometallic catalysis group at ITQB NOVA. Currently she is Principal Investigator and Head of the Chemistry Division at ITQB NOVA. Her research focuses on the development of first-row transition metal complexes with specific properties for their application in catalysis and biology.[41]

● base-metal catalysis ● first-row transition metal catalysis ● homogeneous ● organometallics

Laurel L. Schafer has received her BSc from the University of Guelph and her PhD from the University of Victoria. She then went on to the University of California-Berkeley to complete an NSERC post-doctoral fellowship with Prof. T. D. Tilley. In 2001, she joined the University of British Columbia in Vancouver where she is now a Professor and a Canada Research Chair in Catalyst Development. The Schafer group has developed a family of N,O-chelated early transition metal complexes for atom-economic catalysis to prepare amines, heterocycles, and amine-containing polymers. For this work Laurel has received numerous awards including a Sloan Fellowship, a Humboldt Award, a Killam Research Fellowship, the Clara Benson research award from the Canadian Society for Chemistry and a Killam Award for Graduate Student Mentorship.[42]

● catalysis ● early transition metals ● hydroamination ● hydroaminoalkylation ● metal-ligand cooperativity

Philomena Schlexer Lamoureux obtained her PhD in Materials Science and Nanotechnology, and joined SUNCAT as a Feodor Lynen Research Fellow in 2017. She combines first-principles modeling with machine learning and data science to establish site-specific quantitative structure-property relationships for catalysis. She developed and implemented methods for atomic site-based feature analysis and established models to understand and efficiently calculate electro-catalytic reactions. (ca. 30 papers, 1 chapter, May 2019).[43]

● data science ● density functional theory ● electrocatalysis ● machine learning ● structure-property relationships

Emmanuelle Schulz graduated from ESCIL in Lyon and received her PhD degree in 1992 for studies concerning the total synthesis of Strigol (Pr. P. Welzel, Ruhr-Universität Bochum/Université de Lyon). After an industrial postdoc (RP Agro), she joined the group of Prof. M. Lemaire in Lyon and obtained a permanent position at the CNRS. Since 2000, she has been working in the Institut de Chimie Moléculaire et des Matériaux d'Orsay (Université Paris Sud/Université Paris Saclay). Her research interests are mainly directed towards asymmetric catalysis. She explores the enantioselective hydroamination reaction promoted by chiral rare-earth-based catalysts. New procedures for the easy recovery and reuse of chiral organometallic catalysts, specifically with enantiopure salen complexes, are also developed in her group.[44]

● asymmetric catalysis ● chiral organometallic catalysis ● rare-earth catalysis ● salen ligands

Chuan Shi obtained her PhD at Dalian University of Technology, where she currently is a full-time Professor of the School of Chemistry. Her research interests focus on nano-catalysis and interface chemistry, with the emphasis on understanding the synergy between non-thermal plasma with catalysis at the nanoscale and discovering the special properties of nano-materials for catalytic applications in environmental catalysis and conversions of energy-related small molecules.[45]

● environmental catalysis ● nanocatalysis ● non-thermal plasma ● small-molecule activation ● sustainability

Jingying Shi received her PhD degree in Physical Chemistry in 2006 from Zhejiang University, China. Then she worked as a postdoctoral fellow in the State Key Laboratory of Catalysis in Dalian Institute of Chemical Physics, Chinese Academy of Sciences. In 2008, she worked as a research staff in the same institute. She has been dedicated to the development of materials and processes to convert and store renewable energy for almost two decades. Her research interests focus on the fabrication of photoanodes, photocathodes as well as the design of dual-photoelectrode photoelectrochemical devices for solar-to-chemicals conversion to produce hydrogen via overall water splitting or to generate electricity via solar rechargeable batteries or solar-assisted fuel cells. Recently her interests have expanded towards electrochemical water splitting and photoelectrochemical oxygen reduction reaction.[46]

● batteries ● electrocatalysis ● fuel cells ● photocatalysis ● water splitting

Xian-Ying Shi received her PhD in Applied Chemistry from Shaanxi Normal University in 2008, and joined the same university as an Associate Professor. From July 2011 to October 2013, she went to the chemistry department of McGill University as a visiting scholar. In 2016, she was promoted to a Full Professor at Shaanxi Normal University.

She has been working in the green catalytic synthesis for over 15 years, and her main interests are the supported multiple-layer ionic liquid for catalyzing on-water reactions, one-step tandem strategy to construct biologically relevant scaffold, and the C–H functionalization under mild reaction conditions. She has published over 50 peer-reviewed journal papers and holds 8 issued patents. The current topics include: (1) Tandem C–H functionalization catalyzed by transition metals; (2) Construction of C–C bonds via decarboxylative/decarbonylative coupling reactions; (3) New catalytic system for selective oxidation by hydrogen peroxide.[47]

● C–H functionalization ● decarbonylation ● decarboxylation ● on-water reactions ● tandem cyclization

Maria-Magdalena Titirici graduated from University of Bucharest in 2000 with a BSc in Chemistry. She obtained her PhD at the University of Dortmund, Germany in 2005. Between 2006–2012 she led the group "Sustainable Carbon Materials" at the Max Planck Institute of Colloids and Interfaces, Potsdam, Germany where she also obtained her Habilitation. In 2013 Magda became an Associate Professor in Materials Science at Queen Mary University of London. She was promoted to a Full Professor in Sustainable Materials Chemistry in 2014. Since January 2019, Magda moved to Imperial College London in the Department of Chemical Engineering as a Chair in Sustainable Energy Materials. Her research interests are in the area of sustainable materials for energy applications where she has published around 200 papers.[34]

● biomass valorization ● electrocatalysis ● energy materials ● photocatalysis ● sustainability

Cristina Trujillo obtained her PhD (Cum Laude) in Theoretical and Computational Chemistry in 2008 at Universidad Autónoma de Madrid (UAM). During 2008-2016, she has held several postdoctoral positions in Spain, Prague and Ireland. Dr. Cristina Trujillo joined Trinity College Dublin in February 2019 as Research Fellow, being awarded with a Science Foundation of Ireland-Starting Investigator Research Grant (SFI-SIRG). Recently she has received the 2019 L'Oréal-UNESCO For Women in Science UK and Ireland Highly Commended certificate. She has expertise in highly fundamental topics within computational organic chemistry such as asymmetric catalysis, computationally-led catalysis design, reaction mechanisms and weak interactions from the theoretical perspective. Cristina's research group works on the area of asymmetric catalysis, with particular focus on the application of computational techniques in the design of organocatalysts as well as prediction and control of catalytic processes, with a direct impact on the development of important pharmaceutical products.[48]

● asymmetric catalysis ● catalyst design ● computational organic chemistry ● density functional theory ● weak interactions

Svetlana Tsogoeva is Professor of Organic Chemistry at the Friedrich-Alexander-University of Erlangen-Nuremberg, Germany, since February 2007. She received her Diploma in Chemistry with Distinction in 1995 from St. Petersburg State University, where she completed her doctoral thesis in 1998 on the 'Synthesis of Modified Analogues of Steroid Estrogens' supported by Procter & Gamble. In 1998, she moved to the Johann Wolfgang Goethe-University Frankfurt am Main, Germany, for a postdoctoral project under the sponsorship of the German Research Foundation.

In July 2000 she joined Degussa AG, Fine Chemicals Division in Hanau-Wolfgang, Germany as a research scientist, where she worked on the synthesis and the application of new oligopeptide catalysts for the enantioselective Julia-Colonna asymmetric epoxidation of olefins. In January 2002 she was appointed a First Junior Professor in Germany at the Georg-August-Univer-

sity of Göttingen, where she established her own research group supported by BMBF, DFG, FCI and Degussa AG.

Her research is currently focused on organocatalysis, one-pot & domino processes, deracemization of chiral bioactive compounds, synthesis of artemisinin-derived hybrids for medicinal chemistry, as well as chemistry in live cells.[49]

● domino reactions ● one-pot reactions ● medicinal chemistry ● organocatalysis ● sustainable chemistry

Laura Turculet obtained a B.Sc. degree in Chemistry from the Massachusetts Institute of Technology (1998) and a PhD (Inorganic Chemistry, 2003) from U. C. Berkeley, where she worked in the group of Professor T. Don Tilley. After a postdoctoral appointment (2003-2005) at the University of Washington in St. Louis, Laura moved to Canada and the Department of Chemistry at Dalhousie University (Halifax, Nova Scotia) as an Assistant Professor in 2005, and was subsequently promoted to Associate Professor in 2010. Research in the Turculet group spans the areas of synthetic organometallic chemistry, catalysis, and materials. These efforts emphasize a ligand design approach for the preparation of transition metal complexes that exhibit new and/or improved reactivity properties by virtue of their unique construction, with the goal of utilizing such complexes as catalysts for new chemical transformations. Current work in the Turculet group includes the study of PSiP bis(phosphino)silyl pincer ligation, as well as mono-anionic, bidentate P,N ligation, especially in the context of first-row transition metal catalysis.[50]

● catalysis ● ligand design ● organometallics ● pincer ligands ● silicon

Sayaka Uchida is an Associate Professor of Inorganic Chemistry at the Department of Basic Science, The University of Tokyo. She received her PhD in 2002 from The University of Tokyo and worked as an assistant Professor (Noritaka Mizuno Group, Department of Applied Chemistry). She was promoted to Associate Professor in 2009 and moved to the Department of Basic Science where she currently runs her own research group. She also served as a PRESTO researcher at the Japan Science and Technology Agency (JST) from 2013–2017. She has received several prizes including Young Scientists' Prize for the Commendation for Science and Technology from the Minister of Education, Culture, Sports, Science and Technology (MEXT). Her research focuses on design and synthesis of hierarchically-assembled porous ionic crystals based on polyoxometalates, with unique ion/gas adsorption, diffusion, and catalytic properties for energy storage and conversion systems.[51]

● heterogeneous catalysis ● ionic crystals ● polyoxometalates ● porous materials ● proton conduction

Anabela A. Valente studied chemical engineering (Dipl.-Ing. in 1993) at the Universidade Nova de Lisboa (Portugal). She received her doctorate in chemical engineering/catalysis at the same university in 2000 (under Prof. Joaquim Vital). After a postdoctoral period at the University of Aveiro (UA, Portugal), in the field of Materials Engineering (under Prof. João Rocha), she became assistant researcher at CICECO-Aveiro Institute of Materials (UA). Since 2015, she has held the position of principal investigator at the same institute. Her research is related to applied homogeneous/heterogeneous catalysis and materials science. She is responsible for a team interested in the chemical valorization of biomass-derived compounds (e.g. carbohydrates, fatty acids, terpenes) and repurposing industrial byproducts via catalytic routes. Relevant catalytic strategies have included: one-pot conversion of furfural over multifunctional reduction/acid catalysts (e.g. zeotypes, mesoporous silicates, composites), targeting bio-based chemicals; continuous flow acid-catalysed oligomerization of light olefins, targeting clean synthetic fuels.[52]

● acid-base reactions ● biomass valorization ● catalysis ● multifunctional catalysts ● redox reactions

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, a multidisciplinary research center composed of about 40 researchers. She obtained her PhD in 2001 from the Ghent University on a on a subject dealing with theoretical simulations of chemical reactions with static and dynamical approaches. Afterwards she continued research within the framework of a postdoctoral fellowship from the National Fund for Scientific Research Flanders. Honors include the laureate of the Royal Academy for Science and the Arts of Belgium in 2011. She is recipient of two flagship grants from the European Research Council: a Starting Grant in 2010 and a Consolidator Grant in 2015. Within this framework she built up a large expertise in first principle kinetics of complex chemical transformations in nanoporous materials, encompassing zeolites and metal organic frameworks. Within the framework of her ERC CoG grant, she built up an extensive expertise on first principle molecular dynamics simulations of chemical transformations in nanoporous materials, with the aim to simulate chemical reactions and physical transformations at operating conditions. Very recently, she is further developing research activities to simulate more realistic systems including spatial heterogeneities. She is also an elected member of the Royal (Flemish) Academy for Science and the Arts of Belgium.[53]

● density functional theory ● first principles kinetics ● heterogeneous catalysis ● molecular dynamics ● nanoporous materials

Ying Wan completed her academic degrees in Industrial Catalysis at East China University of Science and Technology, receiving her PhD in 2002. Then, she joined Shanghai Normal University, where she got a Professor position. In 2005–2007, she was a postdoctoral member in Fudan University. Her research focuses on metal catalysis, gaining insight in the site requirements in production of fine chemicals, including selective oxidation, selective hydrogenation, and C–H bond functionalization. A major research line is proposing the d charge descriptor for surface adsorption and catalytic activity, and illustrating the rational design for transitional metal catalysts. One of the most important applications is the design and fine tuning of the electronic properties of stable mesoporous carbon supported metal catalysts, to solve the problems of leaching, aggregation, segregation, and poisoning for traditional activated carbon supported metal catalysts, and enhance the C–C bond formation efficiency using water as the solvent.[54]

● *d* charge ● green chemistry ● metal catalysis ● mesoporous carbon ● rational design

Aiqin Wang received her PhD degree of Physical Chemistry from Dalian Institute of Chemical Physics (DICP) in 2001, and then worked as an Assistant Professor in DICP for two years. After a two-year postdoctoral fellowship at the National Taiwan University, she returned to DICP in 2005 and joined Prof. Tao Zhang's group where she was promoted to a Full Professor in 2009. She became a Joint Professor of State Key Laboratory of Catalysis in 2013 and a Chair Professor in 2017. Her research interests include catalytic conversion of biomass, subnano- and single-atom catalysts, and green synthesis of value-added chemicals. She is the author or co-author of more than 270 peer-reviewed scientific publications, and serves as an Editorial Board member of *Chinese Journal of Catalysis* and an Advisory Board member for *Sustainable Energy and Fuels*.[55]

● alloys ● biomass ● hydrogenation ● hydrogenolysis ● single-atom catalysts

Yanqin Wang received her PhD in Physical Chemistry in 1999, and worked 5 years as a postdoctoral scholar at Bar-Ilan University, Israel; Max-Planck Institute of Colloid and Interface Science, and Max-Planck Institute of Coal Research, Germany. Since 2004 she works at East China University of Science of Technology as a full professor. Her research interests include nano-/mesoporous materials and their applications in catalysis, mainly focused on the design of solid acid/base and bifunctional/multifunctional catalysts used in biomass conversion, especially niobium-based catalysts. An important application is the design of more efficient and durable catalysts for biofuel production from biomass-derived compounds, with the collaboration of SinoPec.[56]

● biofuels ● biomass valorization ● heterogeneous catalysis ● mesoporous materials ● multifunctional catalysis

Karen Wilson received her PhD in Surface Science & Catalysis from the University of Cambridge in 1996, where she continued as a postdoctoral researcher, until moving in 1998 to a postdoctoral position at the Green Chemistry Centre of Excellence at the University of York. In 1999, she was appointed to a Lectureship in Inorganic Chemistry at the University of York, prior to relocating in 2009 to the Cardiff Catalysis Institute, Cardiff University as Reader in Physical Chemistry. In 2013, Karen was appointed Research Director and Chair of Catalysis, at the European Bioenergy Research Institute (EBRI) at Aston University, where she also held a prestigious Royal Society Industry Fellowship in collaboration with Johnson Matthey. In 2018, Karen began an exciting new chapter of her career when she was appointed as Professor of Catalysis at RMIT University in Melbourne, Australia. Karen's research focuses on the development of tunable porous heterogeneous catalysts for use in green and sustainable chemistry and the utilization of renewable resources in chemical processes. She is particularly interested in understanding structure-reactivity relations in catalysis, the impact of hierarchically porous catalysts on mass transport in catalytic reactions, and methods to tune surface hydrophobicity or improve the hydrothermally stability of porous catalysts for aqueous phase processes.[57]

● biomass conversion ● biorefining ● green chemistry ● hierarchical porous materials ● solid acids and bases

Margit Winkler received her PhD in Organic Chemistry in 2005, and worked as a scientific assistant at the Institute of Organic Chemistry at Graz University of Technology until 2007. Then, she joined the group of Prof. David O'Hagan at the University of St. Andrews as an Erwin-Schrödinger fellow to study fluorinase enzymes. Back to Austria, she investigated natural biocatalysts for chemical synthesis as a Senior Researcher at the Austrian Center of Industrial Biotechnology – in close collaboration with industry – and as an Elise-Richter fellow at Graz University of Technology. In 2016, she received the Springer Young Scientists Best Paper Award. Her venia docendi in Biotechnology was awarded in 2019. Margit is fascinated by enzymes and cellular systems as means to cata-

lyze chemical transformations. One important goal is to reach beyond the limitations of a natural enzyme by applying protein engineering to develop it towards desired characteristics. A further strong research line is the discovery and detailed study of enzymes that are not (well) known yet, in order to understand them in depth and to determine whether and how they could become applicable for synthesis of desired compounds in satisfying amounts and qualities.[58]

● bioactive compounds ●biocatalysis ● biotechnology ● carboxylate reductase ● enzymology

Chanjuan Xi is a Professor of Department of Chemistry, Tsinghua University. She graduated from Lanzhou University in 1986. She worked at Lanzhou Institute of Chemical Physics, CAS (1986–1995). In course of her work, she earned a Master's degree in Chemistry in 1994. In 1996, she joined Hokkaido University and earned her PhD in Pharmaceutical Sciences in 1999, and spent one year as a postdoctoral fellow in the Catalysis Research Center in Hokkaido University. In 2000, she joined Tsinghua University as Associate Professor and then she was promoted to a Full Professor in 2005. She was a Visiting Professor at Hokkaido University in 2011, and at the University of Strasbourg in 2015. Her research focuses on the oxidative coupling of unsaturated substrates based on the early transition metal complexes and selective cleavage of C–H, C–C and C–X bonds catalyzed by transition-metal compounds towards synthesis of cyclic compounds. Recently her interests have expanded towards sustainable organic chemistry.[59]

● C–H activation ● homogeneous catalysis ● organic synthesis ● transition-metal catalysis

Qihua Yang received her PhD in Chemistry in 1997 and did postdoctoral research at Dalian Institute of Chemical Physics, LCOMS-CNRS/CPE (France) and Toyota Central R&D Labs. Inc. (Japan). Since 2013 she worked at the State Key Laboratory of Catalysis, Dalian Institute of Chemical Physics, Chinese Academy of Sciences. Her research focuses on the synthesis of organic-inorganic porous materials for catalysis with special emphasis on asymmetric catalysis in nanoreactors and understanding the pore confinement effect, the flexibility of active sites and microenvironment on the catalytic performance of the solid catalysts. Now, her research interests have extended to photocatalysis and CO_2 conversion.[60]

● asymmetric catalysis ● carbon dioxide ● chiral solid materials ● hybrid materials ● photocatalysis

Huilei Yu received her PhD in Biochemical Engineering from East China University of Science and Technology (ECUST) in 2008, and then she worked in ECUST until now. In 2013, she was a visiting Professor in Greg Stephanopoulos's lab at MIT. Her research focused on addressing the key problems hindering the application of diverse biocatalysts such as ketoreductase, P450 monooxygenase, Baeyer-Villiger monooxygenase, and epoxide hydrolase in chemical industry. Her research interests include the stress-directed screening of biocatalysts with high tolerance for high substrate loading and hash environments; the rational design of biocatalysts with high activity and selectivity; and the synthesis of valuable chiral products using multi-enzyme cascade systems.[61]

● biocatalysis ● fine chemicals ● multi-enzyme cascades ● protein engineering

Jihong Yu received her PhD degree from Jilin University in 1995, and worked as a postdoctoral fellow first at the Hong Kong University of Science and Technology and then at Tohoku University in Japan from 1996 to1998. She has been a Full Professor in the Chemistry Department, Jilin University since 1999. She was elected as the Academician of the Chinese Academy of Sciences in 2015 and the Fellow of TWAS in 2016. Her research interest is in the designed synthesis and application of zeolitic nanoporous materials in heterogeneous catalysis, gas/liquid separation, and host-gust assembly of metal clusters and nanodots in zeolites. She has co-authored over 300 research papers including *Science, Nat. Commun., Sci. Adv., Chem, J. Am. Chem. Soc., Angew. Chem. Int. Ed.*, etc.; obtained over 20 authorized Chinese Invention Patents. Currently, she serves as Associate Editor of *Chemical Science*, Vice President of Chinese Chemical Association, and Chair of Chinese Zeolite Association. She was the winner of the National Prize for Natural Science, and was awarded the IUPAC 2017 Distinguished Women in Chemistry/Chemical Engineering Award.[62]

● carbon dots ● heterogeneous catalysis ● metal nanocatalysts ● zeolites

Jovana Zečević graduated in 2008 at the University of Belgrade where she studied chemical engineering at the Faculty of Technology and Metallurgy. During her studies she spent a year at the Clausthal University of Technology, Germany. In 2009 she joined the group of Inorganic Chemistry and Catalysis at Utrecht University, The Netherlands, where she obtained her PhD in 2013. During her postdoctoral studies in

2014 she was a visiting researcher at Leibniz Institute for New Materials, Saarbrücken, Germany. Since 2014 she is an Assistant Professor at Utrecht University. Her research interests involve application of advanced transmission electron microscopy (TEM) tools for characterization of catalysts and nanomaterials, as well as the design and synthesis of heterogeneous catalysts. Besides using electron tomography for 3D nanoscale imaging, she is now focusing on application of liquid and gas-phase TEM for in-situ studies of catalysts and related nanomaterials, investigating structural evolution during synthesis and structural changes during application of these materials.[63]

● electron microscopy ● heterogeneous catalysis ● nanocatalysis ● liquid-phase TEM

Kirsten Zeitler studied chemistry in Munich and received her PhD from the Ludwig-Maximilians Universität München (LMU) in 2001. As a fellow of the German Academic Exchange Service (DAAD) she joined the University of Pennsylvania (UPenn) in Philadelphia for postdoctoral studies. After being awarded a Liebig fellowship of the Fonds der Chemischen Industrie, she then started her independent career as a junior research group leader at of the University of Regensburg in the summer of 2004 where she was awarded with the Thieme Journal Award (2005) and the Award of the Otto-Röhm-Memorial Foundation (2008). 2011 Kirsten received her Habilitation and was the recipient of the Habilitation award of the University of Regensburg. In the summer of 2012 she accepted a position at the University of Leipzig, where she currently holds a Professorship for Catalysis and Organic Synthesis. The main research interests of her group are organocatalysis (mainly NHC catalysis) as well as visible-light photocatalysis and the development of new synthetic methodology, especially involving multicatalytic approaches.[64].

● multicatalysis ● N-heterocyclic carbenes ● organocatalysis ● photocatalysis ● Umpolung

Yahong Zhang received her PhD in Physical Chemistry at Jilin University in 2001. She had a postdoctoral experience at Fudan University from 2001 to 2003. She joined the Department of Chemistry of Fudan University since 2004. In 2008 she was a visiting Scholar at National Advanced Industrial Science and Technology in Japan. Currently she is Professor of Physical Chemistry at Fudan University. Her research mainly focuses on the synthesis of nanozeolite materials and their applications in catalysis, biology and other relevant field. They include the construction of various hierarchical porous materials with different structures and morphologies, the study on the formation mechanism of well-tailored hierarchical molecular sieves and the inherent relationship between their performances and hierarchical structures. Recently, she also expands her research interests into catalytic conversion of biomass. The major research focuses on developing new catalytic system and technological route of biomass-derived sugars towards new platform molecules and paying close attention to the retainment of chiral structure during their catalytic transformation.[65]

● biomass conversion ● catalysis ● platform chemicals ● rational design ● zeolites

Fengyu Zhao received her PhD in the field of chemical materials in 2000 from Tohoku University (Japan), and then worked as a JST/JSPS research fellow for 4 years at Supercritical Fluid Research Center of AIST and at Hokkaido University. Since 2004, she works as a Full Professor at Changchun Institute of Applied Chemistry, Chinese Academy of Sciences. Her research group focuses on green synthesis with heterogeneous transition metal supported catalysts, including the catalytic conversion of biomass, conversion of CO_2, selective hydrogenation, and catalytic reactions in green solvents like supercritical carbon dioxide and water. The purpose of research is clarify the features of supercritical CO_2 as a green solvent, its effects on the reaction rate and product selectivity, and the SMSI in the heterogeneous catalysis as well as catalytic reaction mechanisms. In addition, her research group pays more attention to activation of CO_2 and use of CO_2 as carbonyl or methyl building block to synthesize value-added chemicals and polymers. Moreover, they also design efficient industrial catalysts through collaboration with companies.[28]

● biomass conversion ● carbon dioxide ● heterogeneous catalysis ● hydrogenation ● supercritical fluids

Xin Zhou received her PhD in Physical Chemistry from Jilin University in 2005. From 2006 until 2010, she was a postdoctoral fellow supervised by Prof. Weston T. Borden at University of North Texas. She was a visiting scholar at Eindhoven University of Technology in 2013 and at University of South California in 2016–2017, respectively. She is currently a Professor of Chemistry in Dalian University. Her research interests focus on theoretical and computational studies of photocatalytic and photovoltaic materials, and exploration of the relationship between the structure and property of organic and inorganic semiconductors, collaborating closely with the experimental works.[66]

● charge separation and transfer ● density functional theory ● semiconductor-based photocatalysts ● solar energy conversion ● water splitting

Yan Zhu obtained her PhD in Physical Chemistry in 2007 from Nanjing University. She worked as a research associate at Keio University from 2007 to 2008 and postdoctoral researcher at Carnegie Mellon University from 2008 to 2011. In 2011, she became a Professor in Shanghai Advanced Research Institute of Chinese Academy of Sciences. Since 2017 as a full-time Professor she works at Nanjing University. Her research focuses on the design and synthesis of atomically precise metal clusters with exact atom packing structure, attainment of atomic-level information on the nature of metal catalysis, and precise control of well-defined atomic structure of clusters for superior catalytic performance in the important chemical reactions. Another major research interest is catalytic conversion of small molecules such as CH_4, CO_2, and CO toward high value-added chemicals, e.g. oxidative coupling of methane, catalytic oxidation of methane, CO_2 reforming of methane, CO_2 hydrogenation, and CO oxidation.[67]

● atomic precision ● clusters ● heterogeneous catalysis ● well-defined catalysts

Petra E. de Jongh received her PhD in photoelectrochemistry in 1999, and worked 5 years as a senior scientist at Philips Research Laboratories in the Netherlands and Singapore. Since 2004 she works at Utrecht University and, since 2014, is Chair of Catalysts and Energy Materials. Her research focuses on supported nanoparticles and mesostructured materials, and on gaining insight in the impact of particle size and distribution, confinement and pore structure on the functionality of these materials. Important is the design of more efficient and durable catalysts, often in collaboration with industry, involving, for instance, studies of supported metal nanoparticles under dynamic and high pressure and temperature conditions. Another major research line is the use of inorganic materials for energy storage and conversion, including fast ion conductors for all solid-state batteries and electrocatalysts. Since 2018 Petra is a member of the Royal Netherlands Academy of Arts and Sciences.

● energy materials ● heterogeneous catalysis ● mesostructured materials ● structure-activity relationships ● supported nanoparticles

Deryn E. Fogg is Full Professor and University Research Chair at the University of Ottawa (Canada), and Professor II at the University of Bergen (Norway). She received a PhD from the University of British Columbia in 1994, where she worked on asymmetric hydrogenation with Brian James. Following postdoctoral research with Dick Schrock at MIT on polymer-quantum dot nanocomposites (with collaborators Moungi Bawendi and Michael Rubner), she took up a faculty position at Ottawa in 1997. Her research focuses on the interplay between mechanism, implementation, and catalyst design in olefin metathesis and tandem catalysis, and on the development of new tools for insight into homogeneous catalysis. Her work is situated at the interface of organometallic and organic chemistry, and she has a particular interest in unanticipated catalyst transformations and their consequences in pharmaceutical manufacturing. A founding member of uOttawa's Center for Catalysis Research & Innovation (2000), Fogg served as its first Associate Director (to 2008). She is a Fellow of the Canadian Institute for Chemistry (2009), the Royal Society of Chemistry (2013), and the Royal Society of Canada (2014), and was a Visiting Fellow of Magdalen College, Oxford in 2015. She is a recipient of Ontario's Polanyi Prize in Chemistry, a Canada-wide NSERC Discovery Accelerator award, and the Canadian Society for Chemistry's Strem Award for Inorganic Chemistry. From 2000-2009, she chaired "Bacon & Eggheads", a breakfast lecture series for Canadian Parliamentarians that presents leading research with important implications for federal decision-makers. A Board member for a number of leading conferences and journals in organometallic chemistry and catalysis, she served as Associate Editor of the American Chemical Society journal *Organometallics* from 2013-19, and was elected Permanent Secretary of the *International Symposium on Homogeneous Catalysis* in 2014.

● homogeneous catalysis ● olefin metathesis ● organic synthesis ● reaction mechanisms ● tandem catalysis

Li-Zhu Wu received her PhD from the Chinese Academy of Sciences under the supervision of Professor Chen-Ho Tung. From 1997 until 1998 she was a postdoctoral researcher at the University of Hong Kong, in the group of Professor Chi-Ming Che. Since 1998 she works at the Technical Institute of Physics and Chemistry, Chinese Academy of Sciences. Her research focuses on photochemical transformations including artificial photosynthesis for hydrogen and oxygen evolution, as well as carbon dioxide reduction. She is also interested in developing new photochemical strategies using visible light for organic synthesis, and in the investigation of photoinduced electron transfer, energy transfer, and chemical reactions in supramolecular systems.

● photocatalysis ● photochemistry ● supramolecular chemistry ● artificial photosynthesis ● organic synthesis

Keywords: catalysis · diversity · gender equality · science and gender

[1] P. C. Zonetti, V. L. Bridi, G. G. Gonzalez, C. R. Moreira, O. C. Alves, R. R. de Avillez, L. G. Appel, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900633.
[2] P. L. Arnold, J. M. Purkis, R. Rutkauskaite, D. Kovacs, J. B. Love, J. Austin, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900037.
[3] E. A. Tarasenko, I. V. Shestakov, V. B. Rybakov, I. P. Beletskaya, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900575.
[4] C. Negri, E. Borfecchia, M. Cutini, K. A. Lomachenko, T. V. W. Janssens, G. Berlier, S. Bordiga, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900590.
[5] C. Liu, B. Bradshaw, F. Maseras, J. Bonjoch, M. Besora, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900543.
[6] O. P. Schmidt, A. M. Dechert-Schmitt, M. R. Garnsey, H. M. Wisniewska, D. G. Blackmond, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900560.
[7] X. Frogneux, A. Pesesse, S. Delacroix, F. Ribot, S. Carenco, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900172.
[8] X. Ju, L. Liu, X. Zhang, J. Feng, T. He, P. Chen, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900306.
[9] A. Gorczyca, P. Raybaud, V. Moizan, Y. Joly, C. Chizallet, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900429.
[10] B. Sawatlon, M. D. Wodrich, B. Meyer, A. Fabrizio, C. Corminboeuf, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900597.
[11] T. Wan, S. Du, C. Pi, Y. Wang, R. Li, Y. Wu, X. Cui, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201801512.
[12] M. J. Kirshenbaum, M. H. Richter, M. Dasog, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201801736.
[13] A. Lai, Z. C. Hern, P. L. Diaconescu, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900747.
[14] J. Gao, C. Wei, M. Dong, G. Wang, Z. Li, Z. Qin, J. Wang, W. Fan, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900596.
[15] L. Noël-Duchesneau, J. Maddaluno, M. Durandetti, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900609.
[16] P. Sebastián-Pascual, S. Mezzavilla, I. E. L. Stephens, M. Escudero-Escribano, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900552.
[17] S. S. Shang, S. Gao, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900336.
[18] T. Brandhofer, O. García Mancheño, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900446.
[19] S. Halbert, J. Lauberteaux, C. Blons, R. M. de Figueiredo, C. Crévisy, O. Baslé, J.-M. Campagne, M. Mauduit, H. Gérard, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900233.
[20] A. Miyazaki, M. Hatanaka, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900555.
[21] T. Haynes, T. D'hondt, A. L. Morritt, Y. Z. Khimyak, D. Desmecht, V. Dubois, S. Hermans, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900522.
[22] G. C. Tok, A. T. S. Freiberg, H. A. Gasteiger, C. R. Hess, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900953.
[23] J. L. Vidal, V. P. Andrea, S. L. MacQuarrie, F. M. Kerton, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900290.
[24] A. Dubey, S. M. W. Rahaman, R. R. Fayzullin, J. R. Khusnutdinova, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900358.
[25] Y. Tian, E. Jürgens, K. Mill, R. Jordan, T. Maulbetsch, D. Kunz, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900594.
[26] S. Meninno, C. Volpe, A. Lattanzi, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900569.
[27] F.-F. Tan, K.-L. Tang, P. Zhang, Y.-J. Guo, M. Qu, Y. Li, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900087.
[28] K. Liu, Z. Zhao, W. Lin, Q. Liu, Q. Wu, R. Shi, C. Zhang, H. Cheng, M. Arai, F. Zhao, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900582.
[29] J. Li, S. Liu, T. L. Lohr, T. J. Marks, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900436.
[30] R. Han, K. Rempfer, M. Zhang, H. Dobbek, A. Zouni, H. Dau, S. Luber, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900351.
[31] S.-N. Zhang, M. Li, B. Hua, N. Duan, S. Ding, S. Bergens, K. Shankar, J. L. Luo, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900395.
[32] A. Valiente, S. Carrasco, A. Sanz Marco, C. W. Tai, A. Bermejo Gómez, B. Martín Matute, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900556.
[33] A. Y. Li, N. Dumaresq, A. Segalla, N. Braidy, A. Moores, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900592.
[34] A. Li, S. A. Nicolae, M. Qiao, K. Preuss, P. A. Szilágyi, A. Moores, M.-M. Titirici, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900910.
[35] Y. Naganawa, H. Guo, K. Sakamoto, Y. Nakajima, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900047.
[36] H. Eastman, J. Ryan, B. Maciá, V. Caprio, E. O'Reilly, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900658.
[37] X. Wang, A. K. Beine, P. J. C. Hausoul, R. Palkovits, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900299.
[38] M. Stucchi, A. Jouve, A. Villa, G. Nagy, M. Németh, C. Evangelisti, R. Zanella, L. Prati, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900591.
[39] P. Paiva, S. F. Sousa, P. A. Fernandes, M. João Ramos, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900548.
[40] T. A. G. Silva, C. P. Ferraz, R. V. Gonçalves, E. Teixeira-Neto, R. Wojcieszak, L. M. Rossi, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900553.
[41] S. C. A. Sousa, C. J. Carrasco, M. F. Pinto, B. Royo, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900662.
[42] R. C. DiPucchio, S. C. Rosca, G. Athavan, L. L. Schafer, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900398.
[43] P. Schlexer Lamoureux, K. Winther, J. A. Garrido Torres, V. Streibel, M. Zhao, M. Bajdich, F. Abild-Pedersen, T. Bligaard, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900595.
[44] E. Schulz, M. Abd El Sater, N. Jaber, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900557.
[45] B. Chen, L. Wu, B. Wu, Z. Wang, L. Yu, M. Crocker, A. Zhu, C. Shi, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900581.
[46] D. Li, R. Chen, P. Wang, Z. Li, J. Zhu, F. Fan, J. Shi, C. Li, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900573.
[47] F. Pu, Z.-W. Liu, L.-Y. Zhang, J. Fan, X. Y. Shi, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900444.
[48] C. Trujillo, M. Litvajova, R. Craig, S. A. Cronin, S. J. Connon, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900756.
[49] S. B. Tsogoeva, B. W. Grau, S. Bönisch, A. Neuhauser, F. Hampel, A. Görling, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900746.
[50] D. J. Hale, L. J. Murphy, R. Mcdonald, M. J. Ferguson, L. Turculet, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900550.
[51] T. Yamada, K. Kamata, E. Hayashi, M. Hara, S. Uchida, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900614.
[52] A. F. Silva, A. Fernandes, M. M. Antunes, M. F. Ribeiro, C. M. Silva, A. A. Valente, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201801975.
[53] S. Bailleul, S. M. J. Rogge, L. Vanduyfhuys, V. Van Speybroeck, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900618.
[54] H. Li, H. Shen, C. Pei, S. Chen, Y. Wan, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900626.
[55] N. Lei, X. Zhao, B. Hou, M. Yang, M. Zhou, F. Liu, A. Wang, T. Zhang, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900689.
[56] W. Guo, T. Tong, X. Liu, Y. Guo, Y. Wang, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900335.
[57] L. J. Durndell, G. Zou, W. Shangguan, A. F. Lee, K. Wilson, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900481.
[58] M. Horvat, S. Fritsche, R. Kourist, M. Winkler, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900333.
[59] W. Hang, S. Zou, C. Xi, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201802082.
[60] H. Li, M. Zhong, C. Li, Y. Ren, J. Chen, Q. Yang, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900311.
[61] Z.-B. Sun, Z. J. Zhang, F. L. Li, Y. Nie, H. L. Yu, J. H. Xu, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900492.
[62] M. Chen, Q. Sun, G. Yang, X. Chen, Q. Zhang, Y. Zhang, X. Yang, J. Yu, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900412.
[63] L. I. van der Wal, K. P. de Jong, J. Zečević, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900441.

[64] C. Selg, F. B. Kraft, L. Welcke, K. Zeitler, *ChemCatChem* **2018**, *11*, https://doi.org/10.1002/cctc.201801454.
[65] W. Hou, Y. Yan, G. Li, Y. Zhan, L. Feng, R. Zhang, Z. Hua Li, Y. Zhang, Y. Tang, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900094.
[66] X. Zhou, H. Dong, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900567.
[67] T. Wang, Y. Xu, J. Yang, X. Ju, W. Ding, Y. Zhu, *ChemCatChem* **2019**, *11*, https://doi.org/10.1002/cctc.201900514.