BERT WECKHUYSEN

CURRICULUM VITAE and SCIENTIFIC ACCOMPLISHMENTS



*Aarschot, Belgium, July 27 1968*

* *Full professor of Inorganic Chemistry and Catalysis, Utrecht University*
* *Distinguished University Professor, Utrecht University*
* *Inorganic Chemistry and Catalysis, Debye Institute for Nanomaterials Science and Institute for Sustainable and Circular Chemistry, Utrecht University, Universiteitsweg 99, 3584 CG Utrecht, the Netherlands*
* *E-mail:* [*b.m.weckhuysen@uu.nl*](mailto:b.m.weckhuysen@uu.nl)
* *Website: www.inorganic-chemistry-and-catalysis.eu*
* *Researcher ID: D-3742-2009*
* *Elected member of the Royal Dutch Academy of Sciences, European Academy of Sciences and Royal Flemish Academy of Belgium for Sciences and Arts*

A. Short Resume

Bert Weckhuysen (55) received his Master degree in Chemical and Agricultural Engineering with greatest distinction from Leuven University (Belgium) in 1991. After obtaining his PhD degree in Surface Chemistry, Spectroscopy and Catalysis from Leuven University with honours (highest degree) in 1995 under the supervision of Prof. Robert Schoonheydt, he worked as a postdoctoral fellow with Prof. Israel Wachs at Lehigh University (USA) and with Prof. Jack Lunsford at Texas A&M University (USA). From 1997 until 2000 he was a research fellow of the Belgian National Foundation for Scientific Research (NFWO, later named FWO-Flanders) affiliated with Leuven University. Weckhuysen is since October 1 2000 Full Professor at Utrecht University (The Netherlands). Weckhuysen has been appointed as first Distinguished Professor of the Faculty of Science at Utrecht University as of September 2012. Since January 2018 he has been promoted to Distinguished University Professor at Utrecht University. He was a visiting professor at Leuven University (2000-2005) and has done a sabbatical at Stanford University (USA) in 2012 and ETH Zürich (Switzerland) in 2022. He has also been a visiting professor at Stanford University & SLAC National Accelerator Laboratory (2013-2018), University College London (UK, 2014-2017) and ETH Zürich (Switzerland, 2022).

Weckhuysen (co-)authored ~ 730 publications in peer-reviewed scientific journals with an average number of citations per paper of ~ 71 and a Hirsch index of 109 (Web of Science, February 3 2023). Weckhuysen is also the author of ~ 20 conference proceedings publications, ~ 30 other journal publications and editorial material, ~ 30 book chapters, 4 granted patents and 8 patent applications. Furthermore, he is the (co-) editor of three books. He serves/served on the editorial and/or advisory boards of *Applied Catalysis A: General*, *Catalysis Letters*, *Catalysis Today*, *Chem*, *Chemical Society Reviews*, *ChemCatChem*, *Chem Catalysis*, *ChemPhysChem*, *Chemistry Methods*, *Chemical and Biomedical Imaging*, *Faraday Discussions*, *Journal of Applied Chemistry*, *Journal of Nanoscience and Nanotechnology*, *Physical Chemistry Chemical Physics*, *Topics in Catalysis*, *Vibrational Spectroscopy*, *Angewandte Chemie, The Journal of Catalysis* and *Catalysis Science & Technology*. He is/has been chairman of the editorial board of Physical Chemistry Chemical Physics, ChemCatChem and ChemPhysChem. He has been editor of The Journal of Catalysis (2017-2022) and is currently editor-in-chief of *Catalysis Science & Technology* (2023-onwards)

He obtained prestigious VICI (2002), TOP (2006 and 2011), IPP (2020), Groot (2020) and Gravitation (2013) grants from the Netherlands Organization for Scientific Research (NWO). In 2012 he has been awarded an ERC Advanced Grant from the European Research Council (ERC). which was followed in 2019 by a top-up Proof-of-Concept (PoC) grant. For the initiation of innovative education programs, more specifically the Da Vinci Project, he received from the Netherlands Initiative for Education Research (NRO), on behalf of the Ministry of Education, Culture and Science, a Comenius Teaching Fellowship (2019) and a Comenius Senior Fellowship (2021).

Weckhuysen has received several research awards, including the 2006 Royal Dutch Chemical Society Gold Medal, the 2007 DECHEMA Award from The Max Buchner Research Foundation, the 2009 Netherlands Catalysis and Chemistry Award, the Eminent Visitor Award 2009 of the Catalysis Society of South Africa, the 2011 Paul H. Emmett Award in Fundamental Catalysis of the North American Catalysis Society, the International Catalysis Award 2012 of the International Association of Catalysis Societies, the 2013 Vladimir N. Ipatieff Lectureship in Catalysis from Northwestern University, the 2013 John Bourke Award from the Royal Society of Chemistry, the 2013 Spinoza Award from the Netherlands Organization for Scientific Research, the 2017 Kozo Tanabe Prize in Acid-Base Catalysis from the International Acid-Base Group, the 2017 Xing Da Lectureship of Peking University, the 2018 Robert B. Anderson Award from the Canadian Catalysis Society, the 2019 Karl Ziegler Lectureship Award from the Max-Planck-Institut fur Kohlenforschung and the 2022 Frontiers Award of the Max-Planck-Institute for Chemical Energy Conversion. Most recently, he has been the recipient of the inaugural 2023 Chemistry Europe Award. In 2015 he has been appointed Knight in the Order of the Netherlands Lion. In 2018 he received a Certificate for Achievements of the Christoffel Plantin fund for his contributions to the prestige and appeal of Belgium in foreign countries from the Belgian Ambassador in the Netherlands. He also received honorary professorships from Tianjin University (China) and East China University of Science and Technology (China) in 2023 and an honorary doctorate (*doctor honoris causa*) from Ghent University (Belgium) in 2024 for his outstanding contributions to the field of chemistry and catalysis.

Weckhuysen has been supervising many PhD and postdoctoral students, who have now reached important positions in academia (e.g., RWTH Aachen, Nagoya University, Technion, Wuhan University, Dalian Institute of Chemical Physics, Tianjin University, University of Ilmenau, CNRS, and Utrecht University), industry (e.g., Shell, ExxonMobil, Total, BASF, Avantium, ASML, and Albemarle) and governmental institutions (e.g., RIVM and TNO). So far, 90 PhD students have obtained their degree of doctor at Utrecht University with Weckhuysen as promotor, while he has also been the promotor of three PhD students at Twente University (The Netherlands) and one PhD student at Eindhoven University of Technology (The Netherlands) and one PhD student at Leuven University (Belgium).

Weckhuysen was the scientific director of the Dutch Research School for Catalysis (NIOK) in the period 2003-2013 and of a Smartmix research program Biomass Catalysis funded by the Dutch government and chemical industries (CatchBio; 2007-2016; ~29 M€; [www.catchbio.com](http://www.catchbio.com)). Currently, he directs two national research programs, namely a Gravitation research program on Multiscale Catalytic Energy Conversions (MCEC; 2013-2023; ~32 M€; www.mcec-researchcenter.nl) funded by the Dutch government as well as the Advanced Research Center Chemical Building Blocks Consortium (ARC CBBC; 2016-2026; 11 M€/year, [www.arc-cbbc.nl](http://www.arc-cbbc.nl)) with a joint investment by government, businesses and universities. He was (one of) the main initiator(s) of these large research program initiatives. He also directs the European initiative, SUNERGY ([www.sunergy-initiative.eu](http://www.sunergy-initiative.eu)), to foster the science and technology to produce fossil-free fuels and chemicals to create a circular society.

Weckhuysen is an elected member of the Royal Dutch Academy of Sciences (KNAW), Royal Flemish Academy of Belgium for Sciences and Arts (KVAB), the Netherlands Academy of Technology and Innovation (NATI), the Royal Holland Society of Sciences (KHMW), and the European Academy of Science; an alumnus elected member of the Young Academy (DJA, 2005-2010) of the KNAW. Furthermore, he is a fellow of the Royal Society of Chemistry (FRSC), the American Association for Advancement of Science (AAAS) and ChemPubSoc Europe as well as an honorary fellow of the Chinese Chemical Society (CCS). Weckhuysen serves on many boards and panels for national and international research. For example, he has been president of the European Federation of Catalysis Societies (EFCATS; 2017-2023).

B. Publication Track Record

* Hirsch-index of 109 (based on 32 years of research, including the 4-years PhD period)
* Author or co-author of ~ 730 publications in peer-reviewed scientific journals, which have attracted more than 51,800 citations (*Web of Knowledge* analysis, February 3 2024).
* Highly ranked in the Stanford List of Top 2% Scientists as well as a *Clarivate* Highly Cited Researcher in the field of Chemistry.
* Author/co-author of high-impact multidisciplinary and chemistry articles: *Nature* (# = 1 + 2 News & Views), *Science* (# = 1 + 1 Perspective), *Nature Reviews Materials* (# = 1), *Nature Reviews Chemistry* (# = 2), *Nature Materials* (# = 3 + 2 News & Views), *Nature Nanotechnology* (# = 1), *Nature Chemistry* (# = 5 + 4 News & Views), *Nature Catalysis* (# = 9 + 2 News & Views), *Nature Sustainability* (1 News & Views), *Nature Communications* (# = 11), *Nature Protocols* (# = 1), *Science Advances* (# = 1), *Chemical Reviews* (# = 3), *Chemical Society Reviews* (# = 8), *Accounts of Chemical Research* (# = 1), *Journal of the American Chemical Society* (# = 35)*, JACS Au* (# = 7), *Angewandte Chemie-International Edition* (# = 72) and *Chemical Science* (# = 5).
* Author/co-author of articles/chapters in proceedings (# = 21), other journals (# = 17) and books (# = 30).
* Guest editor of themed scientific journal issues: *Physical Chemistry and Chemical Physics* (# = 3), *Catalysis Today* (# = 2), *ChemSusChem* (# = 1), *ChemPhysChem* (# = 1), *Chemical Engineering Science* (# = 1), *Topics in Catalysis* (# = 1), *Topics in Organometallic Chemistry* (# = 1), *Green Chemistry* (# = 2), and *Chemical Society Reviews* (# = 2).
* Editor or co-editor of four scientific books.

C. Research Topics

The Weckhuysen group has been active for many years in the design, synthesis, characterization and application of solid catalysts for the conversion of fossil (crude oil & natural gas) and renewable (biomass and municipal waste) feedstock into transportation fuels, chemicals and materials. More recently, research is devoted to the catalytic activation of CO2 via thermal and electrocatalytic pathways and the photocatalytic and electrocatalytic splitting of water into hydrogen and oxygen, as well as the chemical recycling of plastics.

The group is internationally known for the development of a wide variety of in-situ and operando spectroscopy and microscopy for studying solid catalysts under realistic conditions. This approach has provided unique insights in the working and deactivation mechanisms of catalytic processes, as well as in the internal architecture and surface structure of solid catalysts. The goal is to shed detailed new insight in the working principles of catalytic solids while they work (i.e., at high temperatures and pressures, and under real-life conditions). To achieve this goal the group strives to build a “powerful camera” to chemically image heterogeneous catalysts from the level of the reactor down to the level of single atoms and molecules, thereby linking the different length scales of importance in catalysis. A recent interview in *ChemistryViews* summarizes the scientific approach taken to elucidate the active site and related reaction and deactivation mechanisms in heterogeneous catalysts (“Enjoy Being Like a Detective”; https://www.chemistryviews.org/enjoy-being-like-a-detective/).

More specifically, the following topics are researched in the Weckhuysen group:

* Development and use of advanced spectroscopic methods applied on heterogeneous catalysts during preparation and real operation in order to develop structure-activity relationships for catalytic processes. Systems of interest are supported metal and metal oxide catalysts, zeolites as well as metal organic frameworks (MOFs) and zeolitic imidazolate frameworks (ZIFs). The main emphasis is on space- and time-resolved UV-Vis, Raman, IR, and fluorescence spectroscopy as well as X-ray spectroscopy, diffraction and scattering methods, often in a combined or even integrated fashion. Catalytic reactions under study are methane and light alkanes activation, Fischer-Tropsch synthesis, Sabatier reaction, fluid catalytic cracking, methanol-to-olefins, automotive catalysis as well as selective oxidation, biomass-derived oxygenates hydrogenation/hydrodeoxygenation and olefin polymerization and polyolefin depolymerization reactions.
* Catalytic conversion of biomass and municipal waste, such as plastics, to transportation fuels and bulk chemicals, more specifically the valorization of polyols, e.g., glycerol and sugars, via telomerization, hydrogenolysis and etherification, valorization of lignin, chitin and humins and related model compounds and the conversion of C5- and C6-sugars, including the selective hydrogenation of sugar-derived compounds, such as levulinic acid. This also includes the use of spectroscopy for monitoring biomass and waste conversion processes in the liquid phase (i.e., water at relatively high temperatures and pressures), including issues as catalyst stability.
* Synthesis and characterization of ordered porous materials with catalytic potential. The focus is on the fundamental understanding of assembly processes of porous oxides, the development of spectroscopic tools to evaluate the synthesis parameters and the structural aspects of porous materials, including intergrowth structures, spatiotemporal zoning of elements, such as aluminum, and the processes of dealumination and desilication. The materials focus is on molecular sieves, including zeolites and metal organic frameworks. More recently, this topic has been extended to the detailed investigations of thin-films making use of atomic force microscopy in combination with vibrational and electronic spectroscopy, such as infrared, Raman and fluorescence microscopy.
* Molecular design of transition metal ion complexes in inorganic hosts for catalysis and adsorption. Enzymes, the most effective catalysts in nature, are the inspiration source for this research. Catalytic reactions of interest are NO decomposition, methane activation and selective oxidation reactions. More recently this also involves photo-catalytic and (photo-) electrocatalytic applications, including solar fuels generation, including the construction of thin-films, which could separate and adsorb light molecules, such as CO2, and activate them with light or renewable electricity, harvested from wind or solar panels.

D. Summary of Research Activities

Over the past two decades, Weckhuysen initiated many breakthroughs in the development and application of spectroscopy and microscopy for studying real-life catalyst materials under real-life working conditions. This so-called *operando* approach has been introduced and coined in the early 2000s by Weckhuysen, Banares, Mestl and Gaigneaux (B.M. Weckhuysen, Determining active sites in catalytic materials: Operando spectroscopy is more than a buzzword. *Phys. Chem. Chem. Phys.* 2003, 5, 4351; B.M. Weckhuysen, Studying birth, life and death of catalytic solids with operando spectroscopy, *Natl. Sci. Rev.* 2015, 2, 147 and B.M. Weckhuysen et al., *Operando* nanoscale sensors in catalysis: All eyes on catalyst particles, *ACS Nano* 2020, 14, 3725). The central theme is to elucidate the concept of active sites in heterogeneous catalysis (*Nat. Rev. Chem.* 2022, 6, 89). He has also been the organizer of the first International Congress on *Operando* Spectroscopy in Lunteren (The Netherlands, March 2003). Since the introduction of the *operando* spectroscopy approach in the scientific literature, it has fully developed itself and can now be found in other fields well beyond the area of catalysis, thereby showing its scientific and technological importance as well as its broad impact for both academia and industry.

By employing the *operando* methodology, the Weckhuysen group has provided ma y novel insights in the working and deactivation mechanisms of a wide variety of both existing and new catalytic processes. The goal has always been to understand the working principles of catalytic materials while they work (i.e., at high temperatures and pressures, and under real-life conditions). To achieve these goals, the Weckhuysen group continuously pushes the scientific and technical boundaries to build the “ultimate camera” to chemically image catalyst materials from the level of the reactor down to the level of single atoms and molecules, thereby linking the different length scales of importance in catalysis (I.L.C. Buurmans, B.M. Weckhuysen, Heterogeneities of individual catalyst particles in space and time as monitored by spectroscopy, *Nature Chemistry* 2012, 4, 873; B.M. Weckhuysen, Chemical imaging of spatial heterogeneities in catalytic solids at different length and time scales. *Angew. Chem. Int. Ed.* 2009, 48, 4910; C. Vogt, B.M. Weckhuysen, The concept of active site in heterogeneous catalysis, *Nature Reviews Chemistry* 2022, 6, 89). This ambition has been described in interviews in *Chemical & Engineering News* (“Hunting for the Hidden Chemistry in Solid Catalysts”, July 2017 issue), *Chemistry World* (“Lights-Camera-Catalysis!”, August 2018 issue) and *ChemistryViews* (“Enjoy Being Like a Detective”, August 2023 issue).

Over the years, his group has systematically introduced new tools, and various combination of them, in the field of heterogeneous catalysis. This allowed to answer long-standing scientific questions surrounding the working principles of the industrially important chemical processes. Illustrative examples include active phase elucidation and related deactivation mechanisms of *Fischer-Tropsch synthesis* (e.g., *Angew. Chem. Int. Ed.* 2018, 57, 11957; 2012, 51, 11986; *ChemCatChem* 2019, 11, 1039; 11, 3042; 2016, 8, 1531), metal incorporation, pore blocking and acid site destruction in fluid catalytic cracking (e.g., *Angew. Chem. Int. Ed.* 2020, 59, 3922; *Sci. Adv.* 2015, 1, e1400199; *Chem. Soc. Rev.* 2015, 44, 7342; *J. Am. Chem. Soc.* 2015, 137, 102), metal sintering and coke formation in *alkane dehydrogenation* (e.g., *Angew. Chem. Int. Ed.* 2017, 56, 8986; 2014, 53, 9251; *Chem. Rev.* 2014, 114, 10613), role of methylaluminoxane, Lewis acid generation and catalyst particle brake-up in *olefin polymerization* (e.g., *J. Am. Chem. Soc.* 2020, 142, 3691; *ACS Catal.* 2019, 9, 3059; *Macromolecules* 2018, 51, 343; *Angew. Chem. Int. Ed.* 2015, 54, 13073), first carbon-carbon formation and coke formation in *alcohols-to-olefins catalysis* (e.g., *Nat. Catal.* 2018, 1, 398, *Angew. Chem. Int. Ed.* 2020, 59, 20024; 2019, 58, 3908; 2018, 57, 8095; 2016, 55, 15840) and selective formation of aromatics in *lignin catalysis* (e.g., *Angew. Chem. Int. Ed.* 2016, 55, 8164; *ChemCatChem* 2013, 5, 2964; *Green Chemistry* 2013, 15, 3049). More recent research is devoted to *thermo- and electrocatalytic CO2 activation* (e.g., *Nat. Commun.* 2022, 13, 324; *Nat. Commun.* 2021, 12, 7096; *Nat. Catal.* 2019, 2, 188; 2018, 1, 127; *ChemCatChem* 2020, 12, 2792; *Angew. Chem. Int. Ed.* 2021, 60, 16576*; Angew. Chem. Int.* 2022, 61, e202209334; *J. Am. Chem. Soc.* 2022, 144, 15047) and *H2O splitting into H2 and O2* (e.g., *ChemSusChem* 2020, 13, 3172; 2019, 12, 3491; 2018, 11, 1374; *ACS Appl. Mater. Interf.* 2019, 11, 36485), as well as in *chemical recycling of plastics* (e.g., *Angew. Chem. Int. Ed.* 2020, 59, 15402; 2021, 60, 16101; and *Chem. Sci.* 2023, 14, 10068).

The table below summarizes various *in-situ* and *operando* spectroscopy and microscopy methods, or combinations of techniques, which have been introduced in the field of heterogeneous catalysis by the Weckhuysen group.

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| *In-situ* or *Operando* Approach | Method | References |
| Single Method | UV-Vis Spectroscopy | *J. Catal.* 2001, 204, 253 |
| Luminescence Thermometry | *ACS Catal.* 2018, 8, 2397 |
| Shell-Isolated Surface-Enhanced Raman Spectroscopy (SHINERS) | *Nature Catalysis* 2019, 2, 986 |
| Time-gated Raman Spectroscopy | *Catal. Sci. Technol.* 2023, 13, 6366 |
| Diagonal Offset Raman Spectroscopy (DORS) | *Angew. Chem. Int. Ed.* 2012, 51, 957 |
| Coherent Anti-Stokes Raman Spectroscopy (CARS) | *Angew. Chem. Int. Ed.* 2009, 48, 8990 |
| Combining Methods | Atomic Force Microscopy (AFM) and Raman Spectroscopy | *Nature Nanotechnology* 2012, 7, 583 |
| Atomic Force Microscopy (AFM) and Infrared Spectroscopy | *Angew. Chem. Int. Ed.* 2021, 60, 1620 |
| Scanning Electron Microscopy (SEM) and Fluorescence Microscopy | *Angew. Chem. Int. Ed.* 2012, 51, 1428 |
| Transmission Electron Microscopy (TEM) and Single-Molecule Fluorescence Microscopy | *Angew. Chem. Int. Ed.* 2018, 57, 257 |
| Microscopy Methods | Scanning Transmission X-ray Microscopy (STXM) | *Nature* 2008, 57, 11957 |
| Transmission X-ray Tomography (TXM) | *Angew. Chem. Int. Ed.* 2012, 51, 11986 |
| UV-Vis Microscopy | *Angew. Chem. Int. Ed.* 2007, 46, 3652 |
| Synchrotron-based Infrared Microscopy | *Angew. Chem. Int. Ed.* 2008, 47, 3543 |
| Confocal Fluorescence Microscopy (CFM) | *Nature Chemistry* 2011, 3, 862 |
| Atom Probe Tomography (APT) | *Nature Communications* 2015, 6, 7589 |
| Transmission Electron Microscopy (TEM) | *Science* 2023, 380, 644 |

In what follows, three scientific highlights on the new fundamental insights obtained with these *operando* spectroscopy and microscopy methods is given.

1. Development and use of X-ray nano-tomography (i.e., STXM, TXM & X-ray ptychography), in combination with *operando* cells, to visualize the deactivation of fluid catalytic cracking (FCC) materials by pore blockage due to metal deposition (e.g., Fe and Ni) and steaming (leading to zeolite dealumination) (*Angew. Chem. Int. Ed.* 2020, 59, 3922; 2016, 55, 11134; *Nat. Commun.* 2016, 7, 12634; *Sci. Adv.* 2015, 1, e1400199; *J. Am. Chem. Soc.* 2015, 137, 102) and the various causes of (de-) activation of Co/TiO2 Fischer-Tropsch synthesis catalysts (*Angew. Chem. Int. Ed.* 2018, 57, 11957; 2012, 51, 11986; *Catal. Sci. Technol.* 2016, 6, 4438; *Chem. Commun.* 2013, 49, 4622) and Cu-SSZ-13 DeNOx catalysts (*Angew. Chem. Int. Ed.* 2020, 59, 14610). Recently, FCC-based catalysts have been developed for plastic waste recycling, where pore accessibility is essential to increase the contact between the active site and e.g., polypropylene to be cracked to smaller chemicals (*Angew. Chem. Int. Ed.* 2020, 59, 15402; 2021, 60, 16101; 2023, 62, e202306033; and *Chem. Sci.* 2023, 14, 10068). Furthermore, the method can be used to experimentally discriminate between the different – previously theoretically postulated - mechanisms for catalyst particle breakup during olefin polymerization (*J. Am. Chem. Soc.* 2020, 142, 3691; *JACS Au* 2021, 6, 852; *ChemCatChem* 2022, 14, e202200067).
2. Development and use of atom probe tomography (APT) to image e.g., C, Al, Si and P single-atoms within zeolite-based catalysts in 3-D with nanometer resolution (*Angew. Chem. Int. Ed.* 2018, 57, 10422). APT revealed hydrocarbon pool-based C clusters near Al in the case of zeolites H-ZSM-5, H-SSZ-13 and H-β (*Angew. Chem. Int. Ed.* 2016, 55, 11173; *JACS Au* 2022, 2, 2513, *ChemPhysChem* 2023, 24, e202300094) and Si in the case of H-SAPO-34, while Si islands in H-SAPO-34 (*J. Am. Chem. Soc.* 2018, 140, 9154), CuAl2O4 clusters in deactivated Cu-ZSM-5 DeNOx automotive catalysts (*Nat. Commun.* 2017, 8, 1666) and Al cluster sizes in steamed H-ZSM-5 (*Nat. Commun.* 2015, 6, 7589) were identified and quantified, thereby providing unprecedented insights in aluminium distribution in zeolites. Most recently, APT has been for the first time to study mesoporous supported metal nanoparticle-based catalysts, more specifically Ni-Pd/SiO2, active in CO2 hydrogenation (*J. Am. Chem. Soc.* 2023, 145, 17299).
3. Development of multi-laser excitation confocal fluorescence microscopy and UV-Vis micro-spectroscopy to visualize the reactivity, accessibility, location and size of zeolite domains within real-life FCC materials (e.g., *Nat. Chem.* 2011, 3, 862; *Chem. Eur. J.* 2020, 26, 8546; 2014, 20, 3667; 2012, 18, 1094) and industrially used mm-sized catalyst bodies (e.g., *Nat. Chem.* 2019, 11, 23; *ACS Catal.* 2019, 9, 4792; *ChemCatChem* 2019, 11, 4788; *ACS Sustainable Chem. Engin.* 2020, 9, 291) for biomass-derived pyrolysis oil and methanol-to-hydrocarbons catalysis. This has been achieved by using dye molecules differing in their size and reactivity, some of them made within the zeolite domains by Brönsted acid catalysis. Single-molecule fluorescence microscopy allowed to visualize proton-transfer processes and dealumination processes within zeolite H-ZSM-5 crystals (*J. Am. Chem. Soc.* 2018, 140, 14195; 2016, 138, 13586; 2015, 137, 6559). Single-molecule fluorescence & transmission electron microscopy was combined in one set-up to locally correlate catalyst deactivation with zeolite dealumination and identify the active phase (*Angew. Chem. Int. Ed.* 2018, 57, 257). The confocal fluorescence microscopy methodology is also applicable in a high-throughput manner to understand the different mechanisms for catalyst particle breakup during olefin polymerization (*J. Am. Chem. Soc.* 2022, 144, 21287). Most recently, we have used this approach to study the transport of resorufin in zeolite crystals and were able to diffusion coefficient on the transport through the zeolite channels of zeolite β (*Chem. Eur. J.* 2023, 29, e202302553).

Enclosures

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1. [Publications in International Scientific Journals.](#Enclosure_1)
2. [Publications in National Scientific Journals.](#Enclosure_2)
3. [Books and Book chapters.](#Enclosure_3)
4. [Conference Proceedings.](#Enclosure_4)
5. [Patents and patent applications.](#Enclosure_5)
6. [Invited Plenary and Keynote lectures.](#Enclosure_6)
7. [Invited Lectures at Universities and Chemical Companies.](#Enclosure_7)
8. [Scientific Awards and Honours.](#Enclosure_8)
9. [Organization of Conferences and Workshops.](#Enclosure_9)
10. [Editorial and International Advisory Board of Scientific Journals.](#Enclosure_10)
11. [Active Participation in National and International Boards.](#Enclosure_11)

**Enclosure 1: Publications in International Scientific Journals**

(Sorted by journal and in reversed chronologic order.)

Nature and Science group Publications

1. M. Monai, K. Jenkinson, A.E.M. Melcherts, J.N. Louwen, E.A. Irmak, S. Van Aert, T. Atlantzis, C. Vogt, W. van der Stam, T. Duchon, B. Smid, E. Groeneveld, P. Berben, S. Bals, B.M. Weckhuysen, Restructuring of titanium oxide overlayers over nickel nanoparticles during catalysis, *Science* 2023, **380**, 644.
2. B.M. Weckhuysen, A sustainable alternative to bisphenol A, *Nature Sustainability* 2023, **6**, 1516.
3. S. Yang, H. An, S. Arnouts, H. Wang, X. Yu, J. de Ruiter, S. Bals, T. Altanztzis, B.M. Weckhuysen, W. van der Stam, Halide-guided active site exposure in bismuth electrocatalysts for selective CO2 conversion into formic acid, *Nature Catalysis* 2023, **6**, 796-806.
4. S.H. Chung, T. Li, T. Shoinkhorova, S. Komaty, A. Ramirez, I. Mukhambetov, E. Abou-Hamad, G. Shterk, S. Telalovic, A. Dikhtiarenko, B. Sirks, P. Lavrik, X. Tang, B.M. Weckhuysen, P.C.A. Bruijnincx, J. Gascon, J. Ruiz-Martinez, Origin of active sites on silica-magnesia catalysts and control of reactive environment in the one-step ethanol-to-butadiene process, *Nature Catalysis* 2023, **6**, 363.
5. T.T. Le, W. Qin, A. Agarwal, N. Nikolopoulos, D. Fu, M.D. Patton, C. Wiland, S.R. Bare, J.C. Palmer, B.M. Weckhuysen, J.D. Rimer, Elemental Zoning Enhances Mass Transport in Zeolite Catalysts, *Nature Catalysis* 2023, **6**, 254.
6. G. Delen, M. Monai, K. Stanciakova, B. Baumgartner, F. Meirer, B.M. Weckhuysen, Structure Sensitivity in Gas Sorption and Conversion on Metal-Organic Frameworks, *Nature Communications* 2023, **14**, 129.
7. J. Xiao, K. Cheng, X. Xie, M. Wang, S. Xing, Y. Liu, T. Hartman, D. Fu, K. Bossers, M.A. van Huis, A. van Blaaderen, Y. Wang, B.M. Weckhuysen, Tandem catalysis with double-shelled hollow spheres, *Nature Materials* 2022, **21**, 572 (including front cover).
8. I.C. Ten Have, J.J.G. Kromwijk, M. Monai, D. Ferri, E.B. Sterk, F. Meirer, B.M. Weckhuysen, Uncovering the reaction mechanism behind CoO as active phase for CO2 hydrogenation, *Nature Communications* 2022, **13**, 324.
9. K.W. Bossers, L.D.B. Mandemaker, N. Nikolopoulos, Y. Liu, M. Rohnke, P. de Peinder, B.J.P. Terlingen, F. Walther, J.M. Dorrestein, T. Hartman, B.M. Weckhuysen, A Ziegler-type Spherical Cap Model Reveals Early-Stage Ethylene Polymerization Growth Versus Catalyst Fragmentation Relationships, *Nature Communications* 2022, **13**, 4954.
10. M. Baldus, B.M. Weckhuysen, Giving Oxygenates a New Spin, *Nature Catalysis* 2022, **5**, 584.
11. C. Vogt, B.M. Weckhuysen, The concept of active site in heterogeneous catalysis, *Nature Reviews Chemistry* 2022, **6**, 89 (including front cover).
12. C. Vogt, F. Meirer, M. Monai, E. Groeneveld, D. Ferri, R.A. van Santen, M. Nachtegaal, R.R. Unocic, A.I. Frenkel, B.M. Weckhuysen, Dynamic restructuring of supported metal nanoparticles and its implications for structure insensitive catalysis, *Nature Communications* 2021, **12**, 7096.
13. A.E. Nieuwelink, J.C. Vollenbroek, R.M. Tiggelaar, J.G. Bomer, A. van den Berg, M. Odijk, B.M. Weckhuysen, High-throughput activity screening and sorting of single catalyst particles with a droplet microreactor using dielectrophoresis, *Nature Catalysis* 2021, **4**, 1070.
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**Enclosure 3: Books and Book Chapters**

Books

1. B.M. Weckhuysen, P. Van Der Voort, G. Catana (Editors). *Spectroscopy of transition metal ions on surfaces*. Leuven University Press, Leuven, 2000, 332 pages. ISBN 90-586-7025-2.
2. B.M. Weckhuysen (Editor). *In situ Spectroscopy of Catalysts*. American Scientific Publishers, San Diego, 2004, 332 pages. ISBN 1-58883-026-8.
3. M.A.R. Meier, B.M. Weckhuysen, P.C.A. Bruijnincx (Editors). *Organometallics and Renewables*, Springer-Verlag Berlin Heidelberg, Topics in Organometallic Chemistry Vol. 39, 2012, 228 pages. ISBN 978-3-642-28287-4 (print) and 978-3-642-28288-1 (online).
4. K. Wüthrich, B. Weckhuysen, L. Rongy, A. De Wit (Editors), *Computational Modeling: From Chemistry to Materials to Biology*, World Scientific, Singapore, 2020, 400 pages. ISBN 978-981-122-820-9.

Book Chapters

1. B.M. Weckhuysen, P. Van Der Voort, G. Catana. Spectroscopic characterization of heterogeneous catalysts, in *Spectroscopy of transition metal ions on surfaces*, Weckhuysen, B.M.; Van Der Voort, P.; Catana, G. (Eds), Leuven University Press, Leuven, 2000, p. 13.
2. B.M. Weckhuysen, R.A. Schoonheydt. General principles of electron spin resonance, in *Spectroscopy of transition metal ions on surfaces*, Weckhuysen, B.M.; Van Der Voort, P.; Catana, G. (Eds), Leuven University Press, Leuven, 2000, p. 25.
3. B.M. Weckhuysen, R.A. Schoonheydt (2000). General principles of vibrational spectroscopies, in *Spectroscopy of transition metal ions on surfaces*, Weckhuysen, B.M.; Van Der Voort, P.; Catana, G. (Eds), Leuven University Press, Leuven, 2000, p. 157.
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8. B.M. Weckhuysen (2004). Ultraviolet-Visible spectroscopy, in *In situ Characterization of Catalysts*, Weckhuysen, B.M. (Ed.), American Scientific Publishers, San Diego, p. 255.
9. F. Morales, B.M. Weckhuysen (2006). Promotion effects in Co-based Fischer-Tropsch catalysis, in *Catalysis*, Vol. 19, Spivey, J.J. (Ed.), Royal Society of Chemistry, Cambridge, p. 1.
10. J.A. Bergwerff, B.M. Weckhuysen (2008). Active phase-support interactions: oxide-support interactions. In *Handbook of Heterogeneous Catalysis*, 2nd Ed., Wiley-VCH, Weinheim, Ertl, G.; Knozinger, H.; Schuth, F.; Weitkamp, J. (Eds.), p. 1188.
11. A. Ruppert, B.M. Weckhuysen (2008). Active phase-support interactions: metal-support interactions. In *Handbook of Heterogeneous Catalysis*, 2nd Ed., Wiley-VCH, Weinheim, Ertl, G.; Knozinger, H.; Schuth, F.; Weitkamp, J. (Eds.), p. 1178.
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Enclosure 4: Conference Proceedings

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Enclosure 5: Patents and Patent Applications

A. Granted Patents

1. *United States Patent 9,956,547* (2018). Preparation of polyglycerols. Inventors: A. Kaiser, B.M. Weckhuysen, D. Leinweber, F. Kirby, F.X. Scherl, H.J. Metz & P.C.A. Bruijnincx.
2. *United States Patent 9,095,844* (2015). Catalyst for glycerol aqueous phase reforming and preparation thereof. Inventors: Y.M. Chung, T. J. Kim, S.H. Oh, D. Ayse Boga,P.C.A. Bruijnincx & B.M. Weckhuysen.
3. *United States Patent 8,370,082* (2013) & *European Patent 2 142 908 B1* (2010). Method for predicting a physical property of a residue obtainable from a crude oil. Inventors: P. de Peinder, F.A.J. Singelenberg, T. Visser & B.M. Weckhuysen.
4. *United States Patent 7,476,374* (2009). Catalytic destruction of halogenated hydrocarbons. Inventors: B. Weckhuysen, R. Schoonheydt & P. Van der Avert.

B. Patent Applications

1. *International Patent Application PCT/NL2023/050544* (2023). Mechanochemical Catalytic Depolymerization. Inventors: I. Vollmer, B.M. Weckhuysen & A.H. Hergesell.
2. *United States Patent Application 2017/0266651 A1* (2017).Process for the manufacture of alcohol and/or ketone. Inventors: S. Chouzier, L.F. Rascon Cruz, B.M. Weckhuysen & S. Mastroianni.
3. *Patent Cooperation Treaty International Patent Application WO 2016/135268 A1* (2016). Method for preparing a chemical compound using a ruthenium metal catalyst on a zirconium oxide support in the presence of a contaminant. Inventors: J. Ftouni, P.C.A. Bruijnincx & B.M. Weckhuysen
4. *Patent Cooperation Treaty International Patent Application WO 2015/026234 A1* (2015). Supported monometallic and bimetallic catalysts for the hydrogenation of levulinic acid. Inventors: W. Luo, M. Sankar, P.C.A. Bruijnincx, B.M. Weckhuysen.
5. *Patent Cooperation Treaty International Patent Application WO 2012/177138 A1* (2012). Process for the liquid-phase reforming of lignin to aromatic chemicals and hydrogen. Inventors: J. Zakzeski, P.C.A. Bruijnincx & B.M. Weckhuysen.
6. *European Patent Application EP 2014362 A1* (2009). Metathesis of chlorinated waste compounds. Inventors: A.W.A.M. van der Heijden, J.H. Bitter & B.M. Weckhuysen.
7. *European Patent Application EP 1961726 A1* (2008). Process for the conversion of glycerol and catalytically active material suitable thereof. Inventors: A.M. Ruppert & B.M. Weckhuysen.
8. *Patent Cooperation Treaty International Patent Application WO 2005/082815 A1* (2005) & *European Patent Application EP 1564198 A1* (2005). Heterogeneous chromium catalysts. Inventors: C. Nenu, P. Bodart & B.M. Weckhuysen.

Enclosure 6: Invited Plenary and Keynote Lectures

1. Diffuse reflectance spectroscopy of supported metal-oxide catalysts. New applications of spectroscopy in catalysis. Spring American Chemical Society Meeting, Dallas (Texas, U.S.A.), 29.03-02.04.98 (key-note lecture).
2. Characterization of Alkane Dehydrogenation Catalysts, 2nd Leuven School on Catalysis, Bruges (Belgium), 06.12-09.12.98. (key-note lecture).
3. Rationalizing zeolite synthesis via experimental design and in situ spectroscopy, Meeting of the Dutch Zeolite Association, Leuven (Belgium), 18.12.98 (plenary lecture).
4. Diffuse reflectance spectroscopy in the UV-Vis-NIR region: *in situ* characterization of transition metal ions on surfaces, Workshop “Spectroscopy of transition metal ions on surfaces and defect sites in solids”, Nieuwpoort (Belgium), 21.03-23.03.99. (key-note lecture).
5. Snapshots of a heterogeneous catalyst: possibilities and limitations. 5th European Congress on Catalysis, Limerick (Ireland), 02.09.-07.09.01 (key-note lecture).
6. Spectroscopy for the advancement of heterogeneous catalysis, Spring Symposium of the New York Catalysis Society, New York, U.S.A., 17.03-22.03.01 (key-note lecture).
7. Surface chemistry, spectroscopy and the role of vanadium in heterogeneous catalysis, 4th International Symposium on Group V Elements, Toledo (Spain), 09.04-12.04.02 (key-note lecture).
8. Snapshots of a working catalyst: probing catalytic solids with in situ spectroscopy, Annual Norwegian Catalysis Society Meeting, Hafjell (Norway), 28.11-29.11.02. (key-note lecture).
9. Coordination chemistry and in-situ spectroscopy of transition metal ions in zeolites, 15th German Zeolite Meeting, Kaiserslautern (Germany), 05.03-07.03-03. (plenary lecture).
10. NanoCat Summer School “Highlights in nano-scale catalyt design and engineering” – International Summer School on Molecular and Supramolecular Approach to Nano-Designed Catalysts, Turin (Italy), 14.09-20.09.03. (plenary lecture).
11. Chemistry, spectroscopy and the role of supported vanadium oxides in heterogeneous catalysis. Annual Meeting of German Science on Vanadium Oxides, Schmockwitz (Germany), 09.10.-10.10.03. (plenary lecture).
12. Optical characterization techniques. Euroconference on Guest-Functionalized Molecular Sieve Systems, Hattingen (Germany), 20.03-25.03.04. (plenary lecture).
13. Probing catalytic solids with operando spectroscopy: a multi-technique approach. Post 13th International Catalysis Conference Summer School, Caen (France), 18.07-21.07.04. (plenary lecture).
14. Catalysts in action: the power of operando spectroscopy. 3rd European School on Catalysis, Ustron (Poland), 22.09-26.09.04. (plenary lecture).
15. Breaking and making of molecules: catalytic solids in action. Chech Annual Symposium on Catalysis, Prague (Chech Republic), 08.11-09.11.04. (plenary lecture).
16. UV-Vis microspectrometry: probing the initial stages of supported metal oxide catalyst preparation. First Conference of the European Union Coordination Action “CO-ordination of Nanostructured Catalytic Oxides Research and Development in Europe” (CONCORDE), Louvain-la-Neuve (Belgium), 26.01-28.01.05. (key-note lecture).
17. In-situ characterization of oxides. 2nd CONCORDE Workshop “In situ characterisation and modelling of oxide catalysts”, Belfast (Northern Ireland), 18.02-19.02.05. (plenary lecture).
18. Host-guest chemistry of Fe-, Cu- and Co-ions in molecular sieves. International workshop on microporous and mesoporous materals as catalytic hosts for Fe, Co and Cu, Scheveningen (The Netherlands). 01.03-04.03.05. (plenary lecture).
19. Operando spectroscopy in heterogeneous catalysis: possibilities, challenges and limitations. Flanders catalysis contact forum “The Active site, from catalyst to reactor”, Brussels (Belgium), 19.05-20.05.05 (plenary lecture).
20. Snapshots of catalysts at work: probing heterogeneous catalysts with spectroscopy and microscopy. Royal Society of Chemistry SURCAT Meeting “Novel Surfaces, New catalytic Chemistry”, Aberdeen (United Kingdom), 13.07-15.07.05. (plenary lecture).
21. Oxidation catalysts caught in the act: the power of in-situ spectroscopy. 5th World Congress on Oxidation Catalysis, Sapporo (Japan), 25.09.-30.09.05. (key-note lecture).
22. Probing catalysts at work: the power of in-situ spectroscopy and microscopy. Workshop “New methods for the investigation of catalytic reaction mechanisms – kinetics and operando spectroscopy”, Berlin (Germany), 27.10.-28.10.05. (plenary lecture).
23. Spectroscopy of metal oxide-based catalysis: An emerging playing field for both experimentalists and theoreticians. International symposium “Catalysis on oxide-type materials: theory and experiment, share needs and capabilities”, Krakow (Poland), 17.11-19.11.05. (key-note lecture).
24. In-situ spectroscopy of catalytic oxides. 2nd Conference of the European Union Coordination Action “CO-ordination of Nanostructured Catalytic Oxides Research and Development in Europe” (CONCORDE), Thessaloniki (Greece), 26.01-28.01.06. (plenary lecture).
25. Chicago Catalysis Club lecture. Catalysts live and up close: spectroscopy of catalytic solids at work. Chicago (IL, USA), 13.02.06. (invited lecture).
26. Catalysts live and up close. 38th Polish Congress on Catalysis, Krakow (Poland), 15.03-18.03.06 (plenary lecture).
27. Catalysts live and up close. 2nd International congress on Operando spectroscopy: Fundamental and technical aspects of spectroscopy of catalysts under working conditions, Toledo (Spain), 23.04.-27.04.06. (plenary lecture).
28. Passie voor Licht en Katalysatoren. Happening 50 jaar Chemie bij NWO, Bussum (Netherlands), 08.06.06. (invited lecture).
29. Catalysts live and up close: In-situ spectroscopy of Catalytic Solids. Gordon Conference on Catalysis, New Hampshire (USA), 25.06.-30.06.05. (invited lecture).
30. Host-guest chemistry of zeolite-encaged metal ion complexes. Pannonian Congress on Catalysis, Szeged (Hungary), 04.07-07.07.06. (plenary lecture).
31. Spectroscopy for probing catalyst preparation processes. International Congress on Preparation of Catalysts, Louvain-la-Neuve (Belgium), 10.09.-13.09.06-. (key-note lecture).
32. Catalyst locomotion: Probing catalytic solids with in-situ spectroscopy and microscopy. 2nd Chinese-Dutch Annual Catalysis Workshop “Chemistry and catalytic reactivity of small transition metal oxide clusters occluded in micro- and mesoporous materials. Maastricht, the Netherlands, 18.10-21.10.06 (invited lecture).
33. Katalyse op moderne wijze onderzocht. Koninklijke Maatschappij voor Natuurkunde “Diligentia”, The Hague, the Netherlands, 30.10.06 (invited lecture).
34. Catalysts live and up close: Probing catalytic solids with spectroscopy and microscopy. 10th International European Science and Engineering Symposium “Advanced Materials”, Machelen, Belgium, 29.11-30.11.06. (plenary lecture).
35. Towards catalyst diagnostics with in-situ spectroscopy: prototype development and implementation in industrial pilot-scale reactors. ACTS means Business: Converting excellent knowledge into business potential. Eindhoven, The Netherlands, 06.12.06. (invited lecture).
36. Catalyst locomotion: Towards understanding heterogeneous catalysts making use of in-situ spectroscopy. Gordon Conference on the Chemistry of Hydrocarbon Resources, California, USA, 07.01-12.01-07 (invited lecture).
37. Heterogeneous catalysis and in-situ spectroscopy: Endeavours in understanding catalytic phenomena. NCCC-VIII, Noordwijkerhout, the Netherlands, 05.03-07.03.07 (key-note lecture).
38. Zeolites: From boiling stones to smart crystals. PAC Symposium “Boiling Points”, Utrecht, the Netherlands, 01.03.07 (plenary lecture).
39. Catalysts live and up close: Probing catalytic solids at work. First IDECAT Conference on Catalysis, Porquerolles (France), 12.05-17.05.2007 (invited lecture).
40. Catalysts live and up close: Probing catalytic solids at work. First International School on Applied Catalysis and IX Italian Seminar on Catalysis 2007, Bari (Italy), 03.06-09.06-07 (invited lecture).
41. Catalysts live and up close: In-situ micro-spectroscopic studies of single zeolite crystals in the act. 3rd International Conference on Catalysis: fundamentals and application, Novosibirsk, Russia, 04.07-08.07.07 (key-note lecture).
42. Catalytic solids at the end of their lifespan: How can we characterize aging catalysts? ExxonMobil Conference on Catalyst Deactivation, Hershey (PA, USA), 16.10.07 (invited lecture).
43. In-situ spectroscopy and catalytic solids: what can we learn about reaction and deactivation mechanisms? Catalysis Society of Metropolitan New York Lecture, New York (NY, USA), 17.10.07 (invited lecture).
44. Vizualizing catalysts at work, Het Element, Delft (The Netherlands), 08.11.07 (plenary lecture).
45. In-situ spectroscopy of catalytic solids with synchrotron radiation, Workshop ‘In situ and time reolved studies of catalysts and catalytic processes’, ESRF, Grenoble, France, 06.02-07.02.08 (invited lecture).
46. Space and time resolved in-situ spectroscopy of catalytic solids in the act, ACS Symposium in honour of the G. Olah Award for Israel E. Wachs, New Orleans (LA, USA), 06.04-07.04.08 (invited lecture).
47. Space and time resolved in-situ spectroscopy of catalytic solids in the act. International Conference ‘Catalysis for Society’, Krakow, Poland, 11.05-15.05.08 (plenary lecture).
48. Chemocatalytic conversion of biomass, 4th International Conference on Renewable Resources and Biorefineries, Rotterdam, the Netherlands, 01.06-04.06.08 (invited lecture).
49. In situ spectroscopy of zeolites in the act. Gordon Conference on Nanoporous materials, Waterville (MA, USA), 15.07-20.07.08 (invited lecture).
50. Control of catalytic phenomena at the nanoscale. International conference “Nanocatalysis: Fundamental & Applications”, Pre-conference to the International Congress on Catalysis, Dalian (China), 09.07-12.07.08 (key-note lecture).
51. Single site heterogeneous catalysts: Design, characterization and catalysis. Creation and Control of Advanced Selective Catalysis, Pre-conference to the International Congress on Catalysis and celebration of the 50th anniversary of the Catalysis Society of Japan, Kyoto (Japan) 09.07-11.07.08 (invited lecture).
52. Catalyst Locomotion: Probing catalytic solids at work with in-situ spectroscopy and microscopy, International Congress on Catalysis, Seoul (Korea), 13.07-18.07.08 (invited lecture).
53. In-situ spectroscopy of catalytic solids, Workshop ‘Grand challenges of electron chemistry and catalysis at interfaces’, University of California, Santa Barbara (CA, USA), 11.08-15.08.08 (plenary lecture)
54. In-situ microspectroscopy of molecular sieves: elucidating pore size effects and reaction mechanism. 4th International FEZA Conference “Zeolites and related materials: trends, targets and challenges”, Paris (France), 02.09-06.09.08 (plenary lecture).
55. De wondere wereld van de katalyse: Op weg naar een duurzame samenleving. Woudschotenconferentie voor docenten Chemie, Zeist (The Netherlands), 07.11-08.11.08 (keynote lecture).
56. Catalyst imaging by STXM and optical micro-spectroscopy, North American Congress on Catalysis, San Francisco (CA, USA), 07.06-12.06.09 (keynote lecture).
57. Catalysts in the act, European Congress on Catalysis, Salamanca (Spain), 30.08-04.09.09 (keynote lecture).
58. Space resolved spectroscopy of acidity in molecular sieves, Zeolites and Molecular Sieves Congress, ZMPC 2009, Tokyo (Japan), 03.08-07.08.09 (keynote lecture).
59. **Shedding physicochemical insights in catalyst deactivation phenomena with in-situ micro-spectroscopy. International Symposium on Catalyst Deactivation, Delft (The Netherlands), 25.10-28.10.09 (plenary lecture).**
60. Combining microscopy and spectroscopy to shed new insight in heterogeneous catalysts. Catalysis Society of South Africa Conference, Worcester (South Africa), 08.11-11.11.09 (plenary and opening lecture).
61. Microscopy and nanoscopy of catalytic solids at work, Materials Research Society symposium, San Francisco (CA, USA), 05.04-09-04.10 (keynote lecture).
62. Catalytic solids at work: The power of synchrotron-based in-situ spectroscopy, NSLS User Meeting, Brookhaven (NY, USA), 24.05.10 (opening key-note lecture)
63. Playing the catalysis murder mystery game: Whodunit?, International Congress on Progress in Fundamental and Applied Catalysis, Dalian, China, 03.06-06.06.10 (key-note lecture)
64. In-situ Micro- and Nanospectroscopy of Zeolites: Reactivity, Acidity, Diffusion Barriers and Dealumination, Les Sciences de la Catalyse a l'Aube du 21eme siecle, Lyon (France), 22.11-23.11.10 (opening key-note lecture).
65. The catalytic valorization of lignin for the production of renewable chemicals, International Symposium on Biomass Conversion: Fundamentals & Applications, Miyazaki (Japan), 01.12-02.12.10 (key-note lecture)
66. Iron-based Fischer-Tropsch Synthesis: new insights from In-situ spectroscopy, diffraction and theory, Royal Society of Chemistry SurCat Symposium, London (UK), 13.12.10 (plenary lecture)
67. The Magic of Catalysis: Water 2 Wine, Utrecht (The Netherlands), Lecture of the 375th Dies Natalis of Utrecht University, 25.03.11.
68. Catalysts Live and Up Close: Insights from In-situ Micro- and Nano-Spectroscopy Studies, North American Congress on Catalysis, Detroit (MI, USA), 05.06-10.06.11 (plenary lecture).
69. In-situ Micro- and Nanospectroscopy of Zeolites: Reactivity, Acidity, Diffusion Barriers and Dealumination, International Symposium of the Federation of European Zeolite Association, Valencia (Spain), 03.07-07.07.11 (key-note lecture).
70. Application of high-energy photons in heterogeneous catalysis research, European Congress on Catalysis, Glasgow (United Kingdom), 31.08-02.09.11 (key-note lecture).
71. Probing Microporous Oxide Formation Processes Using Simultaneous Multiple In-situ Techniques, Chemie schafft Zukunft, German Chemistry Congress, Bremen (Germany), 04.09-07.09.11 (key-note lecture).
72. Micro-spectroscopy of Fischer-Tropsch and Methanol-to-Olefin Catalysts at Work, Cape Town, International Symposium for Syngas Conversion, Cape Town (South Africa), 01.04-04.04.2012 (key-note lecture).
73. Chemical Imaging of Catalytic Solids at the Single Particle Level, 4th International Congress on Operando Spectroscopy, Upton (NY, USA), 29.04-03.05.2012 (plenary lecture).
74. In-situ Spectroscopy of Catalytic Solids: Dynamic Processes at the Individual Particle Level, Gordon Conference on Catalysis, New London (NH, USA), 24.06-29.06.2012 (invited lecture).
75. Catalysts Live and Up Close: Heterogeneities in Space and Time, 15th International Congress on Catalysis, Munich (Germany), 01.07-06.07.2012 (plenary lecture).
76. Chemical Imaging of Individual Catalyst Particles in Space and Time, 14th Netherlands Congress on Catalysis and Chemistry, Noordwijkerhout (The Netherlands), 11.03-13.03.2013 (plenary lecture).
77. Catalytic Conversion of Lignin, Minisymposium on Sustainable Catalysis, University of St. Andrews, St. Andrews (United Kingdom), 24.03.2013-25.03.2013 (plenary lecture).
78. X-ray Microscopy and Tomography of Catalytic Solids at Work, Wilhelm und Else Heraeus-Seminar “Energy-related catalysis today and tomorrow: From fundamentals to applications”, Bad Honnef (Germany), 25.03.2013-28.03.2013 (plenary lecture).
79. Nanoscale imaging of acidity, porosity and reactivity within molecular sieves, International Symposium on Acid-Base Catalysis, Tokyo (Japan), 12.05.2013-15.05.2013 (plenary lecture).
80. Catalytic Valorization of Lignin, International Symposium of Green Chemistry, La Rochelle (France), 21.05.2013-24.05.2013 (plenary lecture).
81. Life and death of a fluid catalytic cracking particle, International Zeolite Conference, Moscow (Russia), 07.07.2013-12.07.2013 (key-note lecture).
82. Surface Enhanced Raman Spectroscopy for Catalysis Research, International Conference on Photochemistry, Leuven (Belgium), 21.07.2013-26.07.2013 (key-note lecture).
83. Nanoscale chemical imaging of catalyst particles at work, International Symposium on the Relationships between Homogeneous and Heterogeneous Catalysis, Sapporro (Japan), 04.08.2013-09.08.2013 (key-note lecture).
84. Chemical Imaging of Spatial Heterogeneities in Catalytic Solids at Different Length and Time Scales, European Congress on Catalysis, Lyon (France), 01.09.2013-06.09.2013 (plenary opening lecture).
85. Catalytic Valorization of Lignin, Norwegian Catalysis Symposium, Trondheim (Norway), 02.12.2013-03-12.2013 (key-note lecture).
86. Towards Solar Light-Induced Vapor Bubble Nanoreactor Catalysis, Physics@FOM 2014, Veldhoven (The Netherlands), 21.01.2014-23.01.2014 (invited focus session lecture).
87. A City that runs on CO2, TEDx Binnenhof 2014, The Hague (The Netherlands), 31.03.2014 (invited lecture).
88. Niet alles is goud, wat blinkt: Over alchemie, chemie en Katalyse, KNCV Voorjaarbijeenkomst 2014, Bussum (The Netherlands), 08.05.2014 (key-note lecture).
89. Recent Advances in Single Catalyst Particle Spectroscopy, Advanced Porous Materials 2014 Symposium, ETH Zurich (Switzerland), 02.06.2014-03.06.2014 (key-note lecture).
90. In-situ spectroscopic tools for monitoring catalytic biomass transformations, Cascatbel Summerschool, Bysice (Czech Republic), 11.06.2014, (invited lecture).
91. About Apples and Catalyst Particles: New Vistas on the Grand Old Lady of Zeolite Catalysis, 6th International FEZA Conference, Leipzig (Germany), 08.09.2014-11.09.2014 (plenary opening lecture).
92. About Apples and Catalyst Particles: New Vistas on the Grand Old Lady of Zeolite Catalysis, Stanford University, Palo Alto (CA, USA), 15.9.2014-20.9.2014, 2014 Annual Meeting of the Pacific Coast Catalysis Society (key-note lecture).
93. Op weg naar een duurzamere samenleving: Droom wordt werkelijkheid met chemie, Koninklijk Genootschap Physica, Alkmaar (The Netherlands), 03.11.214 (invited lecture).
94. Op weg naar een duurzamere samenleving: Droom wordt werkelijkheid met chemie, Woudschoten Chemie Conferentie, Zeist (The Netherlands), 07.11.2014-08-11.2014 (plenary lecture).
95. How to use nature for our purpose: Catalysis for the producton of biomass-based building blocks, Dutch Catalysis Society Workshop “Catalysis for the Future: Practical Aspects of using Alternative Resources for Fuels and Chemicals”, Amsterdam (The Netherlands), 14.11.2014 (invited lecture).
96. Micro-spectroscopic Characterization of Zeolite-based Catalyst Materials: Life and Death of a Single Catalyst Particle, 1st Winter Conference of the UK Catalysis Hub, Harwell (United Kingdom), 10.12.2014-11-12.2.2014 (plenary lecture).
97. Towards a Circular Economy? - Catalysis for the Production of Biomass-Based Building Blocks, ChemEner2015 Conference, Berlin (Germany), 18.01.2015-21.01.2015 (plenary lecture).
98. Recent Progress in the Characterization of Zeolite-based Catalyst Materials, Euro-Asian Zeolite Conference, Nice (France) 26.01.2015-28.01.2015 (plenary lecture).
99. Towards a Multiscale Science Approach in Heterogeneous Catalysis, Rideal Conference, Berlin (Germany), 25.03.2015-27.03.2015 (invited lecture).
100. Towards a Circular Economy? – Catalysis for the Production of Biomass-Based Building Blocks, EXPO 2015, Milan (Italy), 11.05.2015 (invited lecture).
101. In-situ Spectroscopy of Real Catalysts, SUNCAT Summer School, Stanford University, Stanford (USA), 24.08.2015-28.08.2015 (key-note lecture).
102. Towards a Circular Economy? Catalysis for the Production of Biomass-Based Building Blocks, 2nd EuCheMS Congress on Green and Sustainable Chemistry, Lisbon (Portugal), 04.10.2015-07.10.2015 (plenary lecture).
103. Zeolites studied at the level of single particles, molecules and atoms, 25th Anniversary ITQ, Valencia (Spain), 22.10.2015-23.10.2015 (invited lecture).
104. Catalytic Materials studied at the Level of Single Particles, Molecules and Atoms, XLVIII Polish Annual Conference on Catalysis, Cracow (Poland), 16.03.2016-18.03.2016 (plenary lecture).
105. Photo-spectroscopy of mixtures of catalyst particles reveals their age and type, Faraday Discussions: Designing New Heterogeneous Catalysts, London (UK), 04.04.2016-06.04.2016 (invited lecture).
106. X-ray Micro-Spectroscopy of Hydrodesulfurization Catalysts, 7th International Symposium on Molecular Aspects of Catalysis by Sulfides (MACS-VII), Doorn (The Netherlands), 22.05.2016-26.05.2016 (plenary lecture).
107. Polyethylene with Reverse Co-monomer Incorporation: From an Industrial Serendipitous Discovery to Fundamental Understanding, Blue Sky Conferences on Catalytic Olefin Polymerization, Sorrento (Italy), 27.06.2016-01.07.2016 (key-note lecture).
108. Catalytic solids studied at the level of single particles, molecules and atoms, 16th International Congress on Catalysis, Beijing (China), 03.07.2016-08.07.2016 (invited lecture).
109. Operando spectroscopy and microscopy of Fischer-Tropsch synthesis and methanol-to-olefins catalysts, Post-symposium on Catalysis for Syngas and Methanol Conversion of the 16th International Congress on Catalysis, Beijing (China), 09.07.2016-11.07.2016 (plenary lecture).
110. Operando spectroscopy of a catalytic solid: Towards a molecular movie, 24th Solvay Conference on Chemistry, Catalysis in Chemistry & Biology, Brussels (Belgium), 18.10.2016-22.10.2016 (invited lecture).
111. In-situ and Operando Micro-Spectroscopy of Catalytic Solids, AVS International Symposium, Nashville (TN, USA), 06.11.2016-11.11.2016 (key-note lecture).
112. Advances in Multiscale Spectroscopy of Catalytic Solids at Work, Materials Research Society Meeting, Boston (MA, USA), 27.11.2016-02.12.2016 (key-note lecture).
113. Advances in Operando X-ray Spectroscopy of Solid Catalysts, Spring American Chemical Society Meeting, San Francisco (CA, USA), 02.04.2017-06.04.2017 (invited lecture).
114. Catalysis for Levulinic Acid Hydrogenation: Influence of Catalyst Composition, Syntheiss and Feed Impurities, Spring American Chemical Society Meeting, San Francisco (CA, USA), 02.04.2017-06.04.2017 (invited lecture).
115. Single Molecule Fluorescence of a Single Catalyst Particle, Spring American Chemical Society Meeting, San Francisco (CA, USA), 02.04.2017-06.04.2017 (invited lecture).
116. Advances in Operando Spectroscopy of Solid Catalysts, Spring American Chemical Society Meeting, San Francisco (CA, USA), 02.04.2017-06.04.2017 (invited lecture).
117. Putting Zeolites in the Picture: Recent Advances in Nano-Spectroscopy, 8th Acid-Base Conference, Rio de Janeiro (Brazil), 08.04.2017-10.04.2017 (plenary and opening lecture).
118. Central Science & Grand Challenges: Towards More Chemistry between Scientific Disciplines, HERCuLES symposium of the Academia Europaea "Crossing over to the future: Interdisciplinarity in research and higher education", Stokholm (Sweden), 18.05.2017-20.05.2017 (key-note lecture).
119. Advances in Chemical Imaging of Solid Catalysts at Work, Telluride Symposium “The Theory and Practice of Catalysis”, Telluride (CO, USA), 10.06.2017-14.06.2017 (invited lecture).
120. Advances in Chemical Imaging of Solid Catalysts at Work, “Operando and in situ spectroscopy: advances in the study of functional materials” Symposium of the Spanisch Chemical Royal Society (RSEQ) Meeting, Stiges (Spain), 26.06.2017 (invited lecture).
121. Putting Zeolites in the Picture: Recent Advances in Nano-Spectroscopy, Gordon Research Conference on Nanoporous Materials and Their Applications, Andover (NH, USA), 06.08.2017-11.08.2017 (invited lecture).
122. Putting Solid Catalysts in the Picture: Recent Advances in Nano-Spectroscopy, 19th Brazilian Congress on Catalysis and IX Mercosul Congresson Catalysis, Ouro Preto (Brazil), 17.09.2017-21.09.2017 (plenary and opening lecture).
123. Planet that Runs on CO2, Workshop to honour the 60th birthday of Jean-Marie Solvay, President of the Solvay Institutes, Brussels (Belgium), 18.10.2017 (invited lecture).
124. Putting Solid Catalysts in the Picture: Recent Advances in Nano-Spectroscopy, 8th Asian-Pacific Chemical Reaction Engineering Symposium, Shanghai (China), 12.11.2017-15.11.2017 (plenary and opening lecture).
125. Catalyst Live and Up Close: The Clean Energy Transition, 4th International Symposium on Chemistry for Energy Conversion and Storage, Berlin (Germany, 28.01.2018-31.01.2018 (plenary lecture).
126. Catalyst Live and Up Close: The Clean Energy Transition, UK-Netherlands Bilateral International Meeting of the Royal Society and KNAW, Newport Pagnell (United Kingdom), 21.02.2018-22.02.2018 (plenary lecture).
127. Catalytic Conversion of CO2 into Chemicals: Influence of Metal Particle Size and Reaction Conditions. International Conference on Catalysis and Surface Chemistry, Krakow (Poland), 19.03.2018-22.03.2018 (plenary lecture).
128. 15th Years of Operando Spectroscopy, 6th International Congress on Operando Spectroscopy, Malaga (Spain), 15.04.2018-19.04.2018 (opening key-note lecture).
129. Nanoscale Catalyst Filming of Zeolite-based Catalysts, 3rd Scientific-Technological Symposium on Catalytic Hydroprocessing in Oil Refining, Lyon (France), 16.04.2018-20.04.2018 (plenary lecture).
130. Putting Solid Catalysts in the Picture: Towards a Molecular Movie, 25th Canadian Catalysis Symposium, Saskatoon (Canada), 08.05.2018-11.05.2018 (plenary lecture).
131. Catalyst Live and Up Close: The Clean Energy Transition, 25th Canadian Catalysis Symposium, Saskatoon, (Canada), 08.05.2018-11.05.2018 (plenary and opening lecture).
132. Catalyst Live and Up Close: Structure and dynamics probed with operando microscopy and spectroscopy, UKSR50: 50 years of Synchrotron Radiation in the UK and its global impact, Liverpool (UK), 26.06.2018-29.06.2018 (plenary lecture).
133. Solid Catalysts Live and Up Close: Spectroscopy and Microscopy of Inorganic Materials Go Nano, 4th International Conference on Advanced Complex Inorganic Nanomaterials, Namur (Belgium), 16.07.2018-20.07.2018 (plenary lecture).
134. Catalyst Live and Up Close: The Clean Energy Transition, 18th International Symposium on the Relations between Homogeneous and Heterogeneous Catalysis (ISHHC18), Sydney (Australia), 22.07.2018-25.07.2018 (plenary lecture).
135. Catalyst Live and Up Close: Structure and dynamics probed with operando microscopy and spectroscopy, 8th Tokyo Conference on Advanced Catalytic Science and Technology (TOCAT8), Yokohama (Japan, 05.08.2018-10.08.2018 (plenary lecture).
136. Advances in X-ray Micro-Spectroscopy of Heterogeneous Catalysts, International Conference on X-ray Microscopy, Saskatoon (Canada), 19.08.2018-24.08.2018 (plenary lecture).
137. Hunting for the Hidden Chemistry in Solid Catalysts: Towards a Molecular Movie, 7th EuCheMS, Liverpool (UK), 26.08.2018-30.08.2018 (keynote lecture).
138. Catalysis for the Production of Chemicals and Fuels from Biomass and CO2, 8th IUPAC International Conference on Green Chemistry, Bangkok (Thailand), 09.09.2018-14.09.2018 (keynote lecture).
139. Catalyst Live and Up Close, Frontiers in Chemistry – ArmChemFront, Yerevan (Armenia), 21.10.2018-25.10.2018 (plenary lecture).
140. Catalyst Live and Up Close, NWO Chains Conference, Veldhoven (the Netherlands), 04.12.2018-05.12.2018 (plenary lecture).
141. Catalytic Conversion of CO2, Industry & Energy: When Electrons Power Molecules, Geleen (the Netherlands), 13.12.2018 (plenary lecture)
142. Breaking and Making Chemical Bonds: Seeing the Active Site, International Workshop on Advanced Heterogeneous Catalysts for Biomass Conversion, Sapporo (Japan), 03.02.2019-05.02.2019 (plenary lecture).
143. How Can Chemistry Make Our Society More Sustainable?, 25th Annual PAC Symposium, Amsterdam (the Netherlands), 07.03.2019 (key-note lecture).
144. Nanoscale X-ray Filming of a Single Catalyst Particle, 26th North American Congress on Catalysis, Chicago (IL, USA), 23.07.2019-28.07.2019. (invited lecture)
145. Catalyst Images, Imaging & Imagination, Telluride Workshop on Theory and Practice of Catalysis, Telluride (CO, USA), 20.07.2019-23.07.2019. (invited lecture)
146. Catalysts Live & Up Close, European Materials Research Society 2019 Fall Meeting, Warsaw (Poland), 16.09.2019 (key-note lecture).
147. Catalysts Live & Up Close, Science Forum Chemistry of the German Chemical Society, Aachen (Germany), 18.09.2019 (key-note lecture).
148. Modeling of Functional Materials, 25th Solvay Conference on Chemistry “Computational Modeling: From Chemistry to Materials to Biology”, Brussels (Belgium), 16.10.2019-19.10.2019 (invited lecture).
149. Catalyst Images, Imaging & Imagination, 16th National Processtechology Symposium, Eindhoven (the Netherlands), 31.10.2019 (plenary lecture).
150. Visualizing Molecules in Action on Catalyst Surfaces with Nano-Spectroscopy, Nature Conference on Functional Dynamics: Visualizing Molecules in Action, Tempe (AZ, USA), 06.11.2019-09.11.2019 (invited lecture).
151. Images, Imaging and Imagination: Probing Solid Catalysts at Work, IC Future, Oulo (Finland), 08.01.2020-10.01.2020 (keynote lecture).
152. Making Fuels and Chemicals with Renewable Electricity and CO2, 8th Conference on Fuels Science: From Products to Propulsion, Aachen (Germany), 22.06.2020-24.06.2020 (keynote lecture).
153. Operando Spectroscopy and Microscopy of Solid Catalysts, 26th Annual Meeting of the Slovenian Chemical Society, Portoroz, Slovenia 16.09.2020-18.09.2020 (plenary lecture, online).
154. Making Fuels and Chemicals with Renewable Electricity and CO2, Materials Innovation Institute (M2i) Conference, 14.12.2020 (keynote lecture, online).
155. Single Catalyst Particle Diagnostics in a Microreactor for Performing Multiphase Hydrogenation Reactions, Faraday Discussions “Reaction Mechanisms in Catalysis”, London, UK, 17.02.2021-19.02.2021 (invited lecture, online).
156. Micro-spectroscopy of Binder Effects in Catalytic Fast Pyrolysis of Biomass, International e-Conference on Analytical and Applied Pyrolysis, 12.04.2021-13.04.2021 (keynote lecture, online).
157. Single-Molecule Tracking Reveals Diffusion Heterogeneity in Zeolite Channels, Probing Chemical Reactivity by Single-Molecule Spectroscopy Virtual Symposium, 08.06.2021 (invited lecture, online).
158. New operando insights in the catalytic chemistry of small molecule activation, Advances in Catalysis for C1 Chemistry, Dalian, China, 23.07.2021-25.07.2021 (plenary lecture, online).
159. Thermo- & Electrocatalytic Conversion of CO2 into Valuable Chemicals: Insights from *In-situ* and *Operando* Spectroscopy, 18th International Conference of Carbon Dioxide Utilization, Daejeon, South Korea, 18.07.2021-22.07.2021 (keynote lecture, online).
160. Using the Sun and its Energy to Fuel a Circular Society, 9th UK Solar Fuels Network Symposium, 09.09.2021 (keynote lecture, online).
161. Advances in In-situ and Operando Characterization of Functional Nanomaterials, EUROMAT2021, 13.09.2021 (keynote lecture, online).
162. Plastics: What can we do?, Great Plains Catalysis Society Fall Virtual Symposium, USA, 17.09.2021 (invited lecture, online).
163. Advanced AFM-IR Studies of Functional Nanomaterials: When Scanning Probe Microscopy Teams up with Vibrational Spectroscopy, SCIX2021, Providence, RI, USA, 26.09.2021-01.10.2021 (invited lecture, online).
164. Advances in *Operando* Spectroscopy and its Role in the Refinery of the Future, 20nd National Congress on Catalysis, Wuhan, China, 10.10.2021-15.10.10.2021 (plenary lecture, online)
165. Perspectives for Plastic Waste and CO2 Valorization, 2nd ComBioCat Symposium “Catalysis Across Borders", 18.10.2021-19.10.2021, Rostock, Germany (keynote lecture, online).
166. Perspectives for the Catalytic Valorization of CO2, Catalysis Science & Technology 10th Anniversary Symposium, 16.11.2021-17.10.2021, Cambridge, UK (invited lecture, online).
167. Operando Spectroscopy and its Role in the Refinery of the Future, 52nd Symposium on Catalysis, 08.11.2021-09.11.2021, Prague, Czech Republic (plenary lecture)
168. A Roadmap towards the Refinery of the Future, 15.11.2021-17.11.2021, Malmö, Sweden (keynote lecture)
169. Towards a Carbon-Neutral Society by 2050, European Industry & Energy Summit 2021, 07.12.2021-08.01.2021, Rotterdam, the Netherlands (keynote lecture).
170. Single-Molecule and Single-Particle Fluoresence Microscopy of Heterogeneous Catalysts, Pacifichem 2021, 15.12.2021-20.12.2021, Honolulu, Hawai, USA (keynote lecture, online)
171. Operando Spectroscopy and Microscopy of Solid Catalysts at Work, Pacifichem 2021, 15.12.2021-20.12.2021, Honolulu, Hawai, USA (keynote lecture, online)
172. Advances in Operando Spectroscopy and Microscopy, WE-Heraeus Seminar, 10.01.2022-13.01.2022, Bad Honnef, Germany (plenary lecture, online).
173. New Operando Insights in the Catalytic Conversion of Small Molecule Activation, International Congress on Cutting Edge Research in Materials & Sustainable Chemical Technologies (CRMSCT-2022), 28.01.2022, Jaipur, India (plenary lecture, online).
174. A Roadmap for Catalysis to Support a Society Powered by Renewable Energies, EFCATS Winterschool CatEnerChem, 18.03.2022, Aussois, France (plenary lecture, online).
175. Advanced AFM-IR and AFM-Raman Studies of Solid Catalysts: When Scanning Probe Microscopy Teams Up with Vibrational Spectroscopy, Spring ACS Conference, 20.03.2022-24.03.2022, San Diego (CA, USA) (keynote lecture).
176. Advances and Perspectives in Chemical Recycling of Plastics: Giving New Life to Plastic Waste, Spring ACS Conference, 20.03.2022-24.03.2022, San Diego (CA, USA) (keynote lecture).
177. *Operando* Attenuated Total Reflection-Infrared Spectroscopy Studies of Lignin Conversion Processes, Spring ACS Conference, 20.03.2022-24.03.2022, San Diego (CA, USA) (keynote lecture).
178. High-Throughput Activity Screening and Sorting of Single Catalyst Particles with Microreactor Technology and In-situ Spectroscopy, Spring ACS Conference, 20.03.2022-24.03.2022, San Diego (CA, USA) (invited lecture).
179. Advances in the *Operando* and *In-situ* Characterization of Solid Catalysts: Principles, Potential Pitfalls and Showcases, Catalysts 2022 Webinar on In Situ/Operando Catalyst Characterization, 22.04.2022, online (keynote lecture).
180. *Operando* Spectroscopy of CO2 Activation in the Gas and Liquid-Phase: Similarities and Differences in Reaction Mechanisms, Renewable Energy & Solar Fuels Gordon Research Conference, 08.05.2022-12.05.2022, Luca (Italy) (invited lecture).
181. Elucidating the Origin of Catalyst Activation and Deactivation with Operando Spectroscopy and Microscopy, North American Congress on Catalysis, 22.05.2022-27.05.2022, New York City (NY, USA) (keynote lecture).
182. Towards the Refinery of the Future and the Role of *Operando* Spectroscopy, 19th Nordic Symposium on Catalysis, 06.06.2022-08.06.2022, Espoo (Finland) (plenary lecture).
183. Advances in *Operando* Spectroscopy of Small Molecules and Its Role in Designing the Refinery of the Future, XXXVIII Reunión Bienal de Química, 26.06.2022-28.06.2022, Granada (Spain) (invited lecture).
184. Bridging the Gap between Planar Model Catalysts and Industrially Relevant Solid Catalysts with Infrared Nano-Spectroscopy, 28.06.2022, 19th International Symposium on the Relationships between Homogeneous and Heterogeneous Catalysis, Oslo (Norway) (keynote lecture).
185. Paving the Way for Lignin Valorization, Lignin Gordon Research Conference, 31.07.2022-04.08.2022, Easton (MA, USA) (invited opening lecture).
186. *Operando* Spectroscopy of Thermocatalysis and Electrocatalysis of CO2 and CO, Fall ACS Conference, 19.08.2022-23.08.2022, Chicago (IL, USA) (invited lecture)
187. Advances and Perspectives in the Chemical Recycling of Plastics, Fall ACS Conference, 19.08.2022-23.08.2022, Chicago (IL, USA) (invited lecture)
188. What Can You Do with CO2? Catalysis Connected, 15.09.2022-16.09.2022, Eindhoven (the Netherlands) (keynote lecture)
189. Single-Molecule Observation of Diffusion and Catalysis in Nanoporous Solids, Diffusion Fundamentals IX Symposium, Krakow (Poland), 21.09.2022-24.09.2022 (keynote lecture).
190. Towards the Refinery of the Future: Role of *Operando* Spectroscopy in the Making and Breaking of Chemical Bonds, International Symposium on Future Technologies for Carbon Neutrality, Nankai (China), 19.10.2022 (plenary talk, online).
191. Towards the Refinery of the Future: Role of *In-situ* and *Operando* Spectroscopy of Solid Catalysts, Seventh International Conference on Multifunctional, Hybrid and Nanomaterials, 19.10.2022-23.10.2022, Genoa (Italy) (keynote lecture).
192. Advances in *Operando* Spectrsocopy and its Role in the Refinery of the Future, CACEE-2022, Conference on Advances in Catalysis for Energy & Environment, 01.11.2022, Mumbai (India) (plenary lecture, online).
193. Towards the Refinery of the Future: Perspectives on Carbon Dioxide and Waste Valorization, DECARB 2022, Decarbonization of Energy Intensive Industries, 10.11.2022, Prague (Czech Republic) (keynote lecture).
194. Towards the Refinery of the Future: Recent Strides in the Development of In Situ and Operando Spectroscopy of Solid Catalysts, Meeting of the Catalysis Society of India, 15.11.2022, Mumbai (India) (keynote lecture, online).
195. Probing Catalysts at Work Across Different Length and Time Scales with Spectroscopy and Microscopy, “Future of Physical Chemistry Research” Symposium, 09-11.01.2023, Fritz Haber Institute (FHI) of the Max Planck Society, Berlin (Germany) (keynote lecture).
196. Advances and Perspectives in Chemical Recycling of Plastics, World Plastics Association Summit, 22-25.03.2023, Monaco (keynote lecture).
197. Advances and Perspectives in the Catalytic Hydrogenation of CO and CO2, Syngas Convention IV “Fuels and Chemicals from Synthesis Gas: State of the Art”, 02-05.04.2023, Cape Town (South Africa) (plenary talk).
198. *Operando* Spectroscopy of Catalysts: Short History, Practicalities & Technicalities, Important trends and showcases, Summer School associated with the 7th International Congress on Operando Spectroscopy, 07-12.05.2023, Swiss Light Source, Villigen (Switzerland) (plenary talk).
199. Recent Advances in Chemical Imaging of Solid Catalysts, NJU-ACS Joint Summit on Chemical and Biomedical Imaging, 19.05.2023 (keynote lecture, online).
200. *Operando* Spectroscopy of CO and CO2 Activation Processes, WE Heraeus Seminar on Sustainable Aviation Fuels, 24-27.05.2023, Bad Honnef (Germany) (plenary talk).
201. Probing catalysts at work at different length and time scales with spectroscopy and microscopy, European Chemistry School for Ukrainians, 01.06.2023 (keynote lecture, online).
202. Trends and advances in *operando* spectroscopy, *Nanomaterials* Webinar, 12.06.2023 (keynote lecture, online).
203. Spectroscopy and Microscopy of Supported Olefin Polymerization Catalysis: Towards a Better Understanding of Catalyst Activation and Fragmentation, 12-15.05.2023, Bluesky-Incorep Conference, Sorrento (Italy) (keynote lecture).
204. Spectroscopy and Microscopy of Zeolites and Metal-Organic Frameworks at Work, 9th Conference on the Federation of the European Zeolite Associations, 02-06.07.2023, Portorose (Slovenia) (plenary lecture).
205. Challenges, Opportunities and New Understanding in the Upcycling of Plastic Waste, 2023 Plastics Recycling and Upcycling Gordon Research Conference, 09-13.07.2023, Manchester (NH, USA) (invited lecture).
206. Advances in *Operando* Spectroscopy and Microscopy of Catalysts, 49th IUPAC World Chemistry Congress, 20-25.08.2023, The Hague (the Netherlands) (keynote lecture).
207. Catalysis at the Level of Single Catalyst Particles, Single Molecules and Single Atoms: Seeing is Believing?, TU/e-ICAT Joint International Symposium on Catalysis, Advanced Technologies for Sustainable Society, 01-02.11.2023, Eindhoven (the Netherlands) (keynote lecture).
208. Creating Value from Plastic through Catalysis, Brightlands Circular Plastics Event, 07.12.2023, Geleen (the Netherlands) (keynote lecture).

Enclosure 7: Invited Lectures at Universities and Chemical Companies

1. *Lehigh University*, Bethlehem (PA, USA), 14.07.95, Diffuse reflectance spectroscopy of supported transition metal oxide catalysts.
2. *United Catalysts Inc.*, Louisville (KY, USA), 01.09.95, Surface chemistry of chromium in inorganic oxides.
3. *Lehigh University*, Bethlehem (PA, USA), 15.09.95, Surface chemistry of chromium in inorganic oxides.
4. *Union Carbide Corp.*, Piscataway (NJ, USA), 18.09.95, Surface chemistry of chromium in inorganic oxides.
5. *Universität Düsseldorf*, Düsseldorf (Germany), 03.06.96, Zeolite encapsulated transition metal ion complexes as mimics of natural enzymes.
6. *Union Carbide Corp.*, Piscataway (NJ, U.S.A.), 25.07.96, *In situ* spectroscopy of supported chromium oxide catalysts.
7. *United Catalysts Inc.*, Louisville (KY, U.S.A.), 29.07.96, *In situ* spectroscopy of supported chromium oxide catalysts.
8. *Lehigh University*, Bethlehem (PA, U.S.A.), 02.08.96, *In situ* spectroscopy of supported chromium oxide catalysts.
9. *ABB Lummus Corp*., Bloomfield (NJ, U.S.A.), 07.08.96, Surface chemistry and spectroscopy of chromium in inorganic oxides.
10. *ABB Lummus Corp*., Bloomfield (NJ, U.S.A.), 06.09.96, Surface chemistry and spectroscopy of Cr/Al2O3 catalysts.
11. *Fritz-Haber-Institute of the Max-Planck-Society*, Berlin (Germany), 28.11.97, Chemistry, spectroscopy and chemometrics of supported transition metal ions.
12. *Technische Universiteit Eindhoven*, Eindhoven (The Netherlands), 16.12.97, Chemistry, spectroscopy and chemometrics of supported transition metal ions.
13. *Weizmann Institute of Science*, Rehovot (Israel), 20.2.98, Chemistry, spectroscopy and chemometrics of supported transition metal ions.
14. *Borealis Kallo N.V*., Antwerp (Belgium), 18.5.98, *In situ* spectroscopy of supported chromium oxide catalysts.
15. *Technische Universiteit Munchen* (Munich, Germany), 17.7.98, Rationalizing heterogeneous catalysis and zeolite synthesis *via* experimental design.
16. *Institute of Physics and Material Science* (Bucharest, Romania), 12.10.98, *In situ* spectroscopy of supported chromium oxide catalysts.
17. *Hokkaido University* (Sapporo, Japan), 10.11.98, Cu(amino acid) complexes on inorganic surfaces : nature as inspiration source for the development of advanced nanomaterials.
18. *Fritz-Haber-Institute of the Max-Planck-Society*, Berlin (Germany), 20.01.99, Rationalising heterogeneous catalysis and zeolite synthesis via experimental design and *in-situ* spectroscopy.
19. *Ruhr-University Bochum*, Bochum (Germany), 26.01.99, Rationalising heterogeneous catalysis and zeolite synthesis via experimental design and *in-situ* spectroscopy. Uitgenodigde lezing in het kader van het Graduiertenkolleg “Dynamische prozesse an Festkorperoberflachen”.
20. *United Catalysts Inc.*, Louisville (KY, U.S.A.), 28.05.99, Supported chromium oxide catalysts and their activity in alkane dehydrogenation reactions.
21. *Helsinki University*, Helsinki (Finland), 24.08.99, Raman spectroscopy of metal oxide catalysts: theory and applications.
22. *Helsinki University of Technology*, Espoo (Finland), 26.08.99, Supported chromium oxide catalysts and their activity in alkane dehydrogenation reactions.
23. *Weizmann Institute of Science*, Rehovot (Israel), 26.11.99, *In situ* Spectroscopy of the Formation of Microporous Transition-metal ion containing Aluminophosphates under Hydrothermal conditions.
24. *Fritz-Haber-Institute of the Max-Planck-Society*, Berlin (Germany), 08.12.99, *In situ* Spectroscopy of the Formation of Microporous Transition-metal ion containing Aluminophosphates under Hydrothermal conditions.
25. *Weizmann Institute of Science*, Rehovot (Israel), 25.01.01, Spectroscopy for the advancement of catalysis.
26. *Akzo Nobel*, Dobbs Ferry (NY, U.S.A.), 20.03.01, *In situ* spectroscopy of catalysts: possibilities and limitations.
27. *ABB Lummus Global*, Bloomfield (NJ, U.S.A.), 22.03.01, Alkane dehydrogenations over supported chromium oxide catalysts.
28. *Haldor Topsoe*, Lyngby (Denmark), 06.04.01, Spectroscopy for the advancement of heterogeneous catalysis.
29. *Thermo-Optek*, Breda (The Netherlands), 24.04.01, Raman spectroscopy: basic principles and applications in the field of heterogeneous catalysis.
30. *Avantium Technologies*, Delft (The Netherlands), 26.04.01, The use of design of experiments and chemometrics in zeolite synthesis and heterogeneous catalysis.
31. *Universiteit Leiden*, Leiden (The Netherlands), 22.10.01, Geometry and framework interactions of zeolite-encapsulated copper(II)-histidine complexes and their activity in oxidation catalysis.
32. *Université de Caen*, Caen (France), 29.11.01, Snapshots of a working catalyst: possibilities and limitations of in situ spectroscopy.
33. *Université de Louvain-la-Neuve* (Belgium), 15.05.02, Snapshots of a working catalyst: possibilities and limitations of in situ spectroscopy.
34. *Sud-Chemie*, Louisville (KY, U.S.A.), 20.09.02, Low temperature destruction of chlorinated hydrocarbons over supported alkaline earth and lanthanide oxides.
35. *DOW Chemicals*, Zurich (Switzerland), 08.10.02, Low temperature destruction of chlorinated hydrocarbons over supported alkaline earth and lanthanide oxides.
36. *Twente University* (The Netherlands), 15.11.02, Low temperature destruction of chlorinated hydrocarbons over supported alkaline earth and lanthanide oxides.
37. *University of Amsterdam* (The Netherlands), 14.01.03, Probing catalytic solids with in situ spectroscopy.
38. *University of Bucharest* (Romenia), 02.05.03, Low-temperature destruction of chlorinated hydrocarbons over supported alkaline earth and lanthanide oxides.
39. *Borealis*, Antwerp (Belgium), 04.07.03, Operando spectroscopy of Cr/Al2O3 dehydrogenation catalysts.
40. *University of Amsterdam*, Amsterdam (The Netherlands), 07.01.04, Low-temperature destruction of chlorinated hydrocarbons over lanthanide oxides.
41. *University of Nijmegen*, Nijmegen (The Netherlands), 07.01.04, Low-temperature destruction of chlorinated hydrocarbons over lanthanide oxides.
42. *Johnson Matthey*, Teesside (United Kingdom), 19.01.04, Snapshots of a working catalyst: a multi-technique approach.
43. *University of Leiden*, Leiden (The Netherlands), 10.02.04, Snapshots of a working catalyst: a multi-technique approach.
44. *University of Utrecht*, Utrecht (The Netherlands), 12.02.04, Breaking and Making.
45. *University of Twente*, Utrecht (The Netherlands), 17.02.04, Breaking and Making.
46. *SABIC*, Geleen (The Netherlands), 09.06.04, Snapshots of a working catalyst: a multi-technique approach.
47. *University of Stuttgart*, Stuttgart (Germany), 19.11.04, Promotion effects in heterogeneous catalysis.
48. *Delft University of Technology*, Delft (The Netherlands), 16.12.04, Catalytic solids caught in the act: the power of in-situ spectroscopy.
49. *Toyota,* Toyota(Japan), 26.09.05, Probing catalytic solids with spectroscopy and microscopy.
50. *University of Chicago,* Chicago(IL, U.S.A.), 14.02.06, Catalysts in action: where we have been and where we are going.
51. *DOW Chemicals,* Midland (MI, U.S.A.), 15.02.06, Catalysts live and up close: spectroscopy of catalysts at work.
52. *UOP,* Des Plaines (IL, U.S.A.), 17.02.06, Catalysts in action: where we have been and where we are going.
53. *BASF*, Ludwigshaven (Germany), 20.02.06, Catalysts live and up close: spectroscopy of catalysts at work.
54. *Oslo University* (Norway), 30.03.06, Catalysts live and up close: Probing catalysts at work.
55. *Gent University* (Belgium), 12.05.06, Spectroscopy and its use in heterogeneous catalysis.
56. *Max-Planck Institut fur Kohlenforschung,* Mullheim (Germany), 18.10.06, Catalyst locomotion: Probing catalytic solids with in-situ spectroscopy and microscopy
57. *Gent University (Belgium), 30.03.07,* Zeolites, from boiling stones to catalytic nanomaterials*.*
58. *University of Amsterdam, Amsterdam Chemisch Dispuut (The Netherlands), 02-04.07,* Let’s talk about catalysis.
59. *Voorjaarsbijeenkomst Samenwerkende Bedrijven Eemsdelta, Delfzijl (The Netherlands), 29.05.07,* Van een fossiel-gebaseerde naar biomassa-gebaseerde economie: realiteit of utopie?
60. *ExxonMobil*, Clinton (NJ, USA), 15.10.07, Catalysts live and up close: Probing catalysts at work.
61. *BASF*, Iselin (NJ, USA), 19.10.07, Catalysts live and up close: Probing catalysts at work.
62. *Pacific Northwest National Laboratory*, Richland (WA, USA), 22.10.07, Distinguished Catalyst Researcher Lecture Series, A close-up view of catalytic solids in action.
63. *Institute of Chemistry of Lyon*, Lyon (France), 18.12.07, A Close-Up View of Catalytic Solids in Action.
64. *Radboud University of Nijmegen*, Nijmegen (The Netherlands), 12.02.2008, A Close-Up View of Catalytic Solids in Action.
65. *University of Caen*, Caen (France), 19.02.2008, A Close-Up View of Catalytic Solids in Action.
66. *Utrecht University*, Utrecht (The Netherlands), USS Proton Ouderdag, 08.03.2008, Katalyse voor een duurzame samenleving.
67. *Total*, Feluy (Belgium), 03.07.08, A Close-Up View of Catalytic Solids in Action.
68. *Sumitomo*, Osaka (Japan), 12.07.08, A Close-Up View of Catalytic Solids in Action.
69. *Leuven University*, Leuven (Belgium), 01.10.08, Transition metal ions in porous oxides: Unique catalytic centers.
70. *University of Oslo*, Oslo (Norway), 03.11.08, A Close-Up View of Catalytic Solids in Action.
71. *Free University of Brussels*, Brussels (Belgium), 10.12.08, In-situ spectroscopy and heterogeneous catalysis: Probing catalytic solids at different length scales.
72. *Albemarle Catalysts*, Amersfoort (The Netherlands), 18.12.08, Catalytic solids: The workhorses of the chemical industry.
73. *Haldor Topsoe,* Lyngby (Denmark), 23.02.09,In-situ spectroscopy and heterogeneous catalysis: Probing catalytic solids at different length scales.
74. *Leuven University,* Leuven (Belgium), 02.07.09,In-situ spectroscopy and heterogeneous catalysis: Probing catalytic solids at different length scales.
75. *University of Johannesburg*, Johannesburg (South Africa), 02.11.09, Understanding Catalyst Preparation Processes: New Insights from Space and Time Resolved Spectroscopy.
76. *University of Witwatersrand,* Johannesburg (South Africa), 02.11.09, Understanding Catalyst Preparation Processes: New Insights from Space and Time Resolved Spectroscopy.
77. *SASOL,* Sasolburg (South Africa), 03.11.09, Co- and Fe-based Fischer-Tropsch catalysis: New insights from spectroscopy and microscopy.
78. *SASOL, Sasoburg (South Africa), 03.11.09,* **Shedding physicochemical insights in catalyst deactivation phenomena with in-situ micro-spectroscopy.**
79. *University of Kwazulu Natal,* Durban (South Africa), 04.11.09, An Eye on the Inside of Zeolite Mateirals: New Insights in Molecular Diffusion Barriers, Mesoporosity and Bronsted Acidity.
80. *University of Cape Town,* Cape Town (South Africa), 05.11.09, Understanding Catalyst Preparation Processes: New Insights from Space and Time Resolved Spectroscopy
81. *University of Stellenbosch,* Stellenbosch (South Africa), 06.11.09, Catalysis for Renewables: Towards a Biomass-based Society.
82. *ExxonMobil*, Machelen (Belgium), 02.12.09, Playing the catalysis murder mystery game: Whodunit?
83. *Technical University of Denmark*, Lyngby (Denmark), 17.12.09, Catalysis for Renewables: Towards a Biomass-based Society.
84. *Energy Centre Netherlands (ECN), Petten (the Netherlands), 10.03.10,* Catalysis for Renewables: Towards a Biomass-based Society.
85. *Stanford University*, Palo Alto (CA, USA), Playing the catalysis murder mystery game: Whodunit?
86. *University of California at Berkeley*, Berkeley (CA, USA), Playing the catalysis murder mystery game: Whodunit?
87. *Rutgers University,* Piscataway (NJ, USA), *25.05.10,* Playing the catalysis murder mystery game: Whodunit?
88. *University of Oslo,* Oslo (Norway),16.06.10, An Eye on the inside of zeolite materials: New insights in barriers, mesoporosity and Bronsted acidity.
89. *Soleil Synchrotron,* Paris (France),24.06.10, Catalytic Solids in the Spotlights: Combining synchrotron radiation techniques with optical spectroscopies.
90. *University of Aachen,* Aachen (Germany), 03.02.11, Catalytic Valorization of Biomass for the Production of Renewable Chemicals.
91. *University of Antwerp,* Antwerp (Belgium), 08.02.11, A sustainable world: A dream can become reality with chemistry.
92. *Utrecht University*, Utrecht (The Netherlands), 25.03.11, The Magic of Catalysis: Water 2 Wine, Lecture of the 375th Dies Natalis of Utrecht University.
93. *Dow Chemicals,* Freeport (TX, USA), 14.04.11,Playing the catalysis murder mystery game: Whodunit?
94. *Rice University,* Houston (TX, USA), 15.04.11, In-situ characterization of Fe-based Fischer-Tropsch catalysts.
95. *Chevron*, Richmond (CA, USA), 16.05.11, An eye on the inside of zeolite materials: New insights in barriers, mesoporosity and Bronsted acidity.
96. *Grace Davison*, Colombia (MA, USA), 05.10.11, In situ spectroscopy of catalytic solids at the single particle level.
97. *University of Leuven*, Leuven (Belgium), 18.12.11, A sustainable world: A dream can become reality with chemistry, Christmas lecture.
98. *BASF*, Ludwigshafen (Germany), 08.02.12, In-situ spectroscopy of catalytic solids at the single particle level.
99. *Caen University*, Caen (France), 01.03.2012, Relationships between structures and properties of porous materials.
100. *Akzo Nobel*, Zeist (The Netherlands), 27.03.2012, New developments in green chemistry: Catalytic valorization of biomass.
101. *SLAC National Accelerator Laboratory*, Menlo Park (CA, USA), 23.05.2012, Active sites in catalysis: Catch me if you can!
102. *University of California at Berkeley*, Berkeley (CA, USA), 30.05.2012, In-situ spectroscopy of porous functional materials at the single particle level.
103. *Stanford University*, Palo Alto (CA, USA), 29.06.2012, In-situ spectroscopy of catalytic solids: Dynamic processes at the individual particle level.
104. *Albemarle Catalysts*, Houston (TX, USA), 16.07.2012, Catalysts live and up close: Heterogeneities in space and time.
105. *Haldor Topsoe*, 23.08.2012, Chemical imaging of catalysts with photons.
106. *Stanford University*, Stanford (CA, USA), 28.8.2012, Putting Catalysts in the Picture: In-situ Chemical Imaging at the Nanoscale.
107. *King Abdulaziz University,* Jeddah (Saudi Arabia), 5.11.2012, Catalysts Live and Up Close: Heterogeneities in Space and Time.
108. *Utrecht University*, Utrecht (The Netherlands), 7.1.2013, New Years lecture, Towards a Sustainable Society, Dreams May Come True with Catalysts.
109. *Eindhoven University of Technology,* Eindhoven (The Netherlands), 24.1.2013, Chemical Imaging of Heterogeneities of Individual Catalyst Particles in Space and Time.
110. *University of Oslo*, Oslo (Norway), 7.12.2012, Putting Catalysts in the Picture: In-Situ Chemical Imaging at the Nanoscale.
111. *Michigan Catalysis Society Meeting,* Livonia, Detroit (MI, USA), 6.2.2013, Heterogeneities of individual catalyst particles in space and time as monitored by spectroscopy.
112. *Dow Chemicals*, Midland (MI, USA), 7.2.2013, Heterogeneities of individual catalyst particles in space and time as monitored by spectroscopy.
113. *Argonne National Laboratory*, Argonne (IL, USA), 11.2.2013, Chemical Imaging of Spatial Heterogeneities in Catalytic Solids at Different Length and Time Scales.
114. *BP*, Naperville (IL, USA), 12.2.2013, Heterogeneities of individual catalyst particles in space and time as monitored by spectroscopy.
115. *UOP, Honeywell*, Des Plaines (IL, USA), 13.2.2013, Heterogeneities of individual catalyst particles in space and time as monitored by spectroscopy.
116. *Northwestern University*, Evanston (IL, USA), Ipatieff Award Lecture, 14.2.2013, Heterogeneities of individual catalyst particles in space and time as monitored by spectroscopy: Rational catalyst design within reach?
117. *Vrije Universiteit Amsterdam*, Amsterdam (The Netherlands), PAC symposium, 7.3.13, A sustainable world: Dreams can come true with catalysis.
118. *Albemarle Catalysts*, Baton Rouge (LA, USA), 10.04.2013, Heterogeneities of individual catalyst particles in space and time as monitored by spectroscopy: Rational catalyst design within reach?
119. *National Institute of Chemistry,* Lubljana (Slovenia), 27.05.2013, Heterogeneities of individual catalyst particles in space and time as monitored by spectroscopy: Rational catalyst design within reach?
120. *Clariant*, Munich (Germany), 08.05.2013, Heterogeneities of individual catalyst particles in space and time as monitored by spectroscopy: Rational catalyst design within reach?
121. *National Institute of Chemistry,* Ljubljana (Slovenia), 27.05.2013, Heterogeneities of individual catalyst particles in space and time as monitored by spectroscopy: Rational catalyst design within reach?
122. *Utrecht University*, Utrecht (The Netherlands), 25.10.2013, Van ‘t Hoff, Ostwald and Arrhenius: Physical Chemistry of Heterogeneous Catalysis.
123. *SABIC*, Geleen (The Netherlands), 06.12.2013, Heterogeneities of individual catalyst particles in space and time as monitored by spectroscopy.
124. *University of St. Andrews,* St. Andrews (United Kingdom), 24.02.2014, Heterogeneities of individual catalyst particles in space and time as monitored by spectroscopy.
125. *University College London*, London (United Kingdom), 26.02.2014, Catalyst live and up close: Recent strides in micro- and nanospectroscopy of catalysts at work.
126. *Cardiff University*, Cardiff (United Kingdom), 27.02.2014, Heterogeneities of individual catalyst particles in space and time as monitored by spectroscopy.
127. *Eindhoven University of Technology,* Eindhoven (The Netherlands), 18.03.2014, Catalytic valorization of lignin.
128. *Shell*, Amsterdam (The Netherlands), Centennial Annual Conference, 26.03.2014-28.03.2014, Chemical imaging of catalytic solids with X-rays.
129. *Clariant*, Frankfurt (Germany), 08.04.2014, Heterogeneities of individual catalyst particles in space and time as monitored by spectroscopy: Rational catalyst design within reach?
130. *Borregaard*, Sarpsborg (Norway), 06.05.2014, Catalytic valorization of lignin.
131. *Koninklijke VNP - Vereniging van Nederlandse Papier en Kartonfabrieken*, Den Haag (The Netherlands), 25.06.2014, Een grondstof die sectoren verbindt. De veelzijdigheid en potentiele toepassingen van lignine- het belang voor verschillende sectoren.
132. *Stanford University,* Stanford (Palo Alto, CA, USA), 02-07-2014, Catalytic Conversion of Lignin for the Production of Renewable Chemicals.
133. *Radboud University*, Nijmegen (The Netherlands),28-10-2014, About Apples and Catalyst Particles: New Vistas on the Grand Old Lady of Zeolite Catalysis
134. *Albemarle Catalysts* (Pasadena, TX, USA), 03-12-2014, About Apples and Catalyst Particles: New Vistas on the Grand Old Lady of Zeolite Catalysis.
135. *ExxonMobil* (Clinton, NJ, USA), 04-12-2014, Micro-spectroscopic Characterization of Zeolite-based Catalyst Materials: Life and Death of a Single Catalyst Particle.
136. *Shell Technology Centre Amsterdam* Amsterdam (The Netherlands), 28.04.2015, Towards a Multiscale Science Approach in Heterogeneous Catalysis.
137. *BASF*, Ludwigshafen (Germany), 06.05.2015, Towards a Multiscale Science Approach in Heterogeneous Catalysis.
138. State Key Laboratory of Catalysis, Chinese Academy of Science, Dalian (China), 29.05.2015, Heterogeneities of individual catalyst particles in space and time as monitored by spectroscopy: Rational catalyst design within reach? (80th Lecture of the Catalysis Forum).
139. *Holland Research School of Molecular Chemistry,* Amsterdam (The Netherlands), 05.11.2015, Catalytic Materials studied at the Level of Single Particles, Molecules and Atoms (HRSMC symposium).
140. *University College London*, Research Complex at Harwell, Oxford (UK), 14.12.2015, Catalytic solids studied at the level of single particles, molecules and atoms.
141. *Imperial College London*, London (UK), 07.04.2016, Catalytic Solids studied at the Level of Single Particles, Molecules and Atoms.
142. *National Physical Laboratory*, London (UK), 08.04.2016, Catalytic Solids studied at the Level of Single Particles, Molecules and Atoms.
143. *ECUST,* Shanghai (China), 16.04.2016, Catalytic Materials studied at the Level of Single Particles, Molecules and Atoms.
144. *Solvay,* Shanghai (China), 17.04.2016, Catalytic Materials studied at the Level of Single Particles, Molecules and Atoms.
145. *Sinopec*, Shanghai (China), 17.04.2016, Catalytic Materials studied at the Level of Single Particles, Molecules and Atoms.
146. *Belgian Royal Academy of Sciences of Flanders*, Brussels (Belgium), 07.09.2016, Hoe geven we de eeuwige jeugd aan katalysatoren? & De Chemische Weg naar een CO2-neutrale Wereld.
147. *Assemblee,* Utrecht (The Netherlands), 05.10.2016, Naar een duurzamere samenleving met chemie.
148. *Oak Ridge National Laboratory*, Knoxville (USA), 11.11.2016, Operando Spectroscopy of a Catalytic Solid: Towards a Molecular Movie.
149. *Massasuchets Institute for Technology*, Boston (USA), 29.11.2016, Operando Spectroscopy of a Catalytic Solid: Towards a Molecular Movie.
150. *Brookhaven National Laboratory*, Brookhaven (USA), 30.11.2016, Operando Spectroscopy of a Catalytic Solid: Towards a Molecular Movie.
151. *Swiss Light Source*, Villigen (Switzerland), 11.04.2017, About Light, Apples and Catalyst Particles: Recent Strides in the Characterization of Solid Catalysts with Synchrotron Radiation.
152. *ExxonMobil*, Machelen (Belgium), 28.06.2017, Putting solid catalysts in the picture: Advances in nano-spectroscopy of catalysts at work.
153. *Shell*, Amsterdam (the Netherlands), 16.08.2017, Putting solid catalysts in the picture: Advances in nano-spectroscopy of catalysts at work.
154. *Leiden University*, Leiden (the Netherlands), 27.10.2017, Putting solid catalysts in the picture: Advances in nano-spectroscopy of catalysts at work.
155. *Shanghai Institute of Organic Chemistry of the Chinese Academy of Sciences*, Shanghai (China), 13.11.2017, Planet that runs on CO2.
156. *Fudan University*, Shanghai (China), 14.11.2017, Single molecular spectroscopy of a single catalyst particle.
157. *Peking University*, Beijng (China), 15.11.2017, Operando Spectroscopy of a Catalytic Solid: Towards a Molecular Movie.
158. *Institute of Chemistry of the Chinese Academy of Sciences*, Being (China), 15.11.2017, Planet that runs on CO2.
159. *Peking University*, Beijng (China), 17.11.2017, Putting solid catalysts in the picture: Advances in nano-spectroscopy of catalysts at work (Xing Da Lectureship).
160. *Wageningen University*, Wageningen (the Netherlands), 28.11.2017, Catalysis for the Production of Chemicals and Fuels from Biomass.
161. *Solvay*,Lyon (France), 22.01.2018, Hunting for the Hidden Chemistry in Solid Catalysts: Towards a Molecular Movie.
162. *Stanford University and SLAC Linear Accelerator*, Stanford (CA, USA), 12.03.2018, Catalysts Live and Up Close - The Clean Energy Transition.
163. *Albemarle Cooperation*, Pasadena (TX, USA), 14.03.2018, Catalysts Live and Up Close - The Clean Energy Transition.
164. *Umicore*,Hanau (Germany), 18.05.2018,Hunting for the Hidden Chemistry in Solid Catalysts: Towards a Molecular Movie.
165. *Chemelot, Brightlands Science Lecture*, Geleen (the Netherlands), 12.06.2018, Catalysts Live and Up Close - The Clean Energy Transition.
166. *University of Oslo*, Oslo (Norway), 15.06.2018, Hunting for the Hidden Chemistry in Solid Catalysts: Towards a Molecular Movie.
167. *Maastricht University*, Maastricht (the Netherlands), 27.09.2018, Catalysts Live and Up Close - The Clean Energy Transition.
168. *Danish Academy of Science*, Kopenhagen (Denmark), 08.10.2018, The Active Site in Catalysis.
169. *Royal institution of Great Britain* (London, United Kingdom), 02.11.2018, Catalysts and Chemistry: Building a Sustainable Future.
170. *Cardiff University*, Cardiff (United Kingdom), 15.01.2019, Hunting for the Hidden Chemistry in Solid Catalysts: Towards a Molecular Movie.
171. *Nouryon*, Deventer (the Netherlands), 27.02.2019, Hunting for the Hidden Chemistry in Solid Catalysts: Towards a Molecular Movie.
172. *Peking University*, Beijing (China), 19.03.2019, Catalysts Live and Up Close - The Clean Energy Transition.
173. *State Key Laboratory for Coal Research*, Tayuan (China), 20.03.2019, Hunting for the Hidden Chemistry in Solid Catalysts: Towards a Molecular Movie.
174. *Sinopec*, Beijing (China), 21.03.2019, Hunting for the Hidden Chemistry in Solid Catalysts: Towards a Molecular Movie & Advanced Characterization of Fluid Catalytic Cracking Catalysts.
175. *Albemarle*, Pasadena (TX, USA), 02.04.2019, Advanced Characterization of Fluid Catalytic Cracking Catalysts.
176. *Shell*, Houston (TX, USA), 03.04.2019, Hunting for the Hidden Chemistry in Solid Catalysts: Towards a Molecular Movie.
177. *Exxonmobil*, Baytown (TX, USA), 03.04.2019, Hunting for the Hidden Chemistry in Solid Catalysts: Towards a Molecular Movie.
178. *Sabic*, Houston (TX, USA), 04.04.2019, Catalysts Live and Up Close - The Clean Energy Transition.
179. *University of Houston*, Houston (TX, USA), 05.04.2019, Hunting for the Hidden Chemistry in Solid Catalysts: Towards a Molecular Movie.
180. *Swiss Light Source*, Villigen (Switzerland), 12.04.2019,Catalysts Live and Up Close - The Clean Energy Transition.
181. *University of Twente*, Enschede (the Netherlands), 17.05.2019, Advanced Characterization of Solid Catalysts under Operando Conditions: A Tutorial.
182. *BASF*, Utrecht (the Netherlands), 29.05.2019, Hunting for the Hidden Chemistry in Solid Catalysts: Towards a Molecular Movie.
183. *Hogeschool Utrecht*, Utrecht (the Netherlands), 17.09.2019, Plastics: Production, Waste and Chemical Recycling.
184. *ExxonMobil*, Machelen (Belgium), 02.10.2019, Catalyst Images, Imaging and Imagination.
185. *Max-Planck-Institut fur Kohlenforschung*, Mullheim (Germany), 28.10-30.10.2018, Hunting for the Hidden Chemistry in Solid Catalysts: Towards a Molecular Movie & Catalyst Images, Imaging and Imagination & Advanced Operando Characterization of Solid Catalysts: A Tutorial.
186. *Karlsruher Institute fur Technologie*, Karslruhe (Germany), 13.11.2019, Catalyst Images, Imaging and Imagination.
187. *Hebrew University of Jerusalem*, Jerusalem (Israel), 26.01.2020, Catalysts Live and Up Close: Recent Advances in Nano-Spectroscopy.
188. *Weizmann Institute for Science*, Rehovot (Israel), 27.01.2020, Pearlman Lectureship, Catalysts Live and Up Close: Hunting for the Hidden Chemistry in Catalysis.
189. *University of Minnesota*, Minneapolis (MN, USA), 25.02.2020, Catalysts Live and Up Close: Hunting for the Hidden Chemistry in Catalysis.
190. *University of Madison at Wisconsin*, Madison (WI, USA), 27.02.2020, Casey Lectureship, Catalysts Live and Up Close: Hunting for the Hidden Chemistry in Catalysis.
191. *BASF* (online, Belgium, the Netherlands, Germany), 26.11.2020, Beyond Mechanical Recycling: Giving New Life ot Plastic Waste.
192. *University of Antwerp* (Antwerp, Belgium, online), 15.02.2021, Making Fuels and Chemicals with Renewable Electricity and CO2.
193. *Eindhoven University of Technology* (Eindhoven, the Netherlands, online), 11.03.2021, Making Fuels and Chemicals with Renewable Electricity and CO2.
194. *Eindhoven University of Technology* (Eindhoven, the Netherlands, online), 09.04.2021, Plastics and CO2: What Can We Do?
195. *Shell* (Amsterdam, the Netherlands, online), 12.05.2021, New Operando Insights in the Catalytic Chemistry of Small Molecules.
196. *University of Hong Kong* (Hong Kong, China, online), 06.05.2021, New Operando Insights in the Catalytic Chemistry of Small Molecules.
197. *University of Duisburg-Essen* (Duisburg-Essen, Germany, online), 21.09.2021, Plastics and CO2: What Can We Do?
198. *University of Manchester* (Manchester, United Kingdom, online), 06.12.2021, Advances in Operando Spectroscopy and its Role in the Refinery of the Future.
199. *Hogeschool Utrecht* (Utrecht, the Netherlands),21.01.2022, Chemistry at the Interface between Utrecht University and Hogeschool Utrecht: Some Perspectives on Circular Chemistry Science and Education
200. *ABB Lummus* (Nieuwegein, the Netherlands), 26.01.2022, Towards a Circular Society: Perspectives on Susstainable Chemistry, Materials Scarcity and Education
201. *University of Gent* (Gent, Belgium, online), 28.01.2022, Advances in Operando Spectroscopy and its Role in the Refinery of the Future.
202. *University of Washington* (Seattle, WA, USA, online), 17.02.2022, Advances in Time- and Space-Resolved X-ray Spectroscopy of Solid Catalysts.
203. *University of Rostock* (Rostock, Germany, online), 18.02.2022, Advances in *Operando* Spectroscopy and its Role in the Refinery of the Future.
204. *ETH Zürich* (Zürich, Switzerland), 22.02.2022, Advances in *Operando* Spectroscopy and its Role in the Refinery of the Future.
205. *EPFL* (Lausanne, Switzerland), 14.03.2022, Advances in *Operando* Spectroscopy and its Role in the Refinery of the Future.
206. *University of Amsterdam* (Amsterdam, the Netherlands), 05.04.2022, The Next Big Thing in Chemistry.
207. *University of Bern* (Bern, Switzerland, online), 05.04.2022, Advances in Time- and Space-Resolved X-ray Analysis of Solid Catalysts.
208. *SLS* (Villigen, Switzerland), 11.04.2022, Advances in *Operando* Spectroscopy and its Role in the Refinery of the Future.
209. *Max-Planck Institute for Energy Conversion*, Mullheim (Germany), 05.05.2022, Frontiers Award Lecture, Advances in Operando Spectroscopy to Foster the Transition Towards a More Sustainable Society.
210. *Shell* (Amsterdam, the Netherlands, online), 22.06.2022, From What Carbon Source Will We Make Our Products?
211. *Albemarle* (Pasadena, TX, USA), 24.08.2022, Progress in the Understanding of Fluid Catalytic Cracking Processes.
212. *BASF* (Ludwigshafen, Germany), 25.11.2022, Towards the Refinery of the Future: Recent Strides in the Field of Catalysis.
213. *Wuhan University of Technology* (Wuhan, China, online), 22.11.2022, Towards the Refinery of the Future: In situ and Operando Spectroscopy of Solid Catalysts.
214. *University College London* (London, UK), 01.02.2023, Towards the Refinery of the Future: Advanced in In situ and Operando Spectroscopy of Solid Catalysts.
215. *Tianjin University* (Tianjin, China, online), 21.02.2023, Towards the Refinery of the Future: Advanced in In situ and Operando Spectroscopy of Solid Catalysts.
216. *Stony Brook University* (Stony Brook, NY, USA, online), 02.03.2023, The World of Publishing: How to Publish with Impact*.*
217. *Utrecht University* (Utrecht, the Netherlands), Lecture related to the Opening of the New Institute for Sustainable and Circular Chemistry, On the Future of Sutainable and Circular Chemistry, 08.06.2023.
218. *Utrecht Science Campus* (Utrecht, the Netherlands), Towards a Sustainable Way of Cooperation to Foster a More Circular Economy, 2nd Utrecht Science Lecture, 06.10.2023.
219. *Wuhan University of Technology* (Wuhan, China, online) Towards the Refinery of the Future: Spectroscopy and Microscopy of Catalysts at Work, 20.10.2023.
220. *Sinopec* (Beijing, China), Towards the Refinery of the Future: Advances in *Operando* Spectroscopy and Microscopy of Solid Catalysts, 13.11.2023.
221. *Peking University* (Beijing, China), Catalysis at the Level of Single Particles, Single Molecules and Single Atoms: Seeing is Believing?, 13.11.2023.
222. *Tianjin University* (Tianjin, China), Peiyang Lectureship, Advances in *Operando* Spectroscopy and Microscopy of Catalysts to Foster the Transition Towards a More Sustainable Society, 14.11.2023.
223. *Nanjing University* (Nanjing, China), Catalysis at the Level of Single Particles, Single Molecules and Single Atoms: Seeing is Believing?, 15.11.2023.
224. *Fudan University* (Shanghai, China), Advances in Heterogeneous Catalysis Research: What Can We Do With Plastics, Biomass and CO2?, 16.11.2023.
225. *East China University of Science and Technology* (Shanghai, China), Advances in *Operando* Spectroscopy and Microscopy of Catalysts to Foster the Transition Towards a More Sustainable Society, 17.11.2023.
226. *Technical University of Denmark* (Lyngby, Denmark, online), Towards the Refinery of the Future: Advances in *Operando* Spectroscopy and Microscopy of Solid Catalysts 21.11.2023,
227. *Sasol* (Sasolburg, South Africa, online),Towards the Refinery of the Future: Advances in *Operando* Spectroscopy and Microscopy of Solid Catalysts, 22.11.2023.
228. *Utrecht University*, Leru-Ente Conference, Making our Society Greener and More Sustainable through Chemistry and Catalysis, (Utrecht, the Netherlands), 29.11.2023.
229. *Technical University Munich* (Garching, Germany),Towards the Refinery of the Future: Advances in *Operando* Spectroscopy and Microscopy of Solid Catalysts, 30.01.2024.
230. *BASF* (Ludwigshafen, Germany),Advances in *Operando* Spectroscopy and Microscopy of Catalysts to Foster the Transition Towards a More Sustainable Society, 31.01.2024.
231. *University of Stuttgart* (Stuttgart, Germany), Towards the Refinery of the Future: Advances in *Operando* Spectroscopy and Microscopy of Solid Catalysts, 01.02.2024.
232. *Koning Willem I Kring* (Den Haag, the Netherlands), Innovatie en Innovatiebeleid in Nederland: Wat Doen We Goed en Wat Kan Beter?, 07.02.2024.

Enclosure 8: Scientific Awards, Elected Memberships and Other Honours

1. *The 1991 Water Research Award* for the best engineering thesis in the field of water treatment and pollution control. Organization: vzw Water, Energie en Leefmilieu (WEL). The award comprises an honorary certificate and a prize of 50,000 BEF.
2. *The 1994 Exxon-VJC Lecture Award* for the best oral presentation at the 2th Flemish Jouth Congres of Chemistry (Antwerp (Belgium), 9 March 1994). Organisation: Royal Flemisch Chemical Society (KVCV). The award comprises an honorary certificate and a prize of 5,000 BEF.
3. *The 1998 KULeuven Research Council Award 1998* for the best young researcher of the Catholic University of Leuven. Organization: Research Council of Leuven University. The award comprises an honorary certificate and a price of 200,000 BEF.
4. *The 2004 EFCATS School Lecturer Award* for the best lecturer of the 3rd EFCATS School on Catalysis, 21.09-26.09.04 (Ustron, Poland). Organisation: The European Federation of Catalysis Societies (EFCATS). The award comprises an honorary certificate.
5. *Elected as Member of the Young Academy* (DJA; https://www.dejongeakademie.nl/nl) (2005).
6. *The 2006 KNCV Gold Medal* for the best researcher in the entire field of chemistry in the Netherlands. Organization: Royal Dutch Chemical Society (KNCV). The award comprises an honorary certificate, a gold medal and a unique art object.
7. *The 2007 DECHEMA Award* in recognition of excellent contributions to the development of combined in situ spectroscopic methods and their application to industrial catalytic processes. The award comprises an honorary certificate, a gold medal and a prize of 20,000 Euro. Organization: The Max Buchner Research Foundation of the German Organization of Chemical Engineering and Biotechnology.
8. *Elected as Fellow of the Royal Society of Chemistry* (RSC; https://www.rsc.org) (2009).
9. *The 2009 CATSA Eminent Visitor Award* for his contributions to catalysis in particular those aimed to characterize catalysts at working conditions. Organization: The Catalysis Society of South Africa (CATSA). The award, given to distinguished researchers in the field of catalysis, consists of an honorary certificate and the opening plenary lecture at the yearly CATSA conference, as well as giving a series of lectures at major South-African universities and institutes involved in catalysis research (i.e., Universities of Cape Town, Stellenbosch, Johannesburg, Witwatersrand and Kwazulu Natal and Sasol).
10. *Elected as Member of the Netherlands Academy of Technology and Innovation* (NATI; https://www.acti-nl.org) (2009).
11. *The 2009 Netherlands Catalysis and Chemistry Award*. This 5-yearly award is given for outstanding contributions to the fundamental understanding and use of catalysis in the Netherlands and Belgium in the preceding 10 years. Organization: The Organization of Dutch Catalysis Industries (VIRAN) and the Catalysis Section of the Royal Dutch Chemical Society (KNCV). The award consists of a plaque and a prize of 10,000 Euro.
12. *Elected as Member of the Royal Holland Society of Sciences* (KHMW; https://khmw.nl) (2010).
13. *Elected as Member of the European Academy of Science* (Academia Europaea; https://www.ae-info.org) (2010).
14. *The 2011 Paul H. Emmett Award in Fundamental Catalysis.* This 2-yearly award is given in recognition for the pioneering development and use of in-situ spectroscopic methods to probe catalytic solids at the micrometer and nanometer scale during their activation and function. Organization: The North American Catalysis Society (NACS). The award consists of a plaque and a prize of 5,000 USD.
15. *Elected as Member of the Royal Dutch Academy of Sciences* (KNAW; https://knaw.nl/nl) (2011).
16. *The 2012 International Catalysis Award.* This 4-yearly award is given in recognition for the pioneering development and use of in-situ micro- and nano-spectroscopy to probe catalytic solids at work. Organization: International Association of Catalysis Societies (IACS). The award consists of a plaque and a prize of 5,000 Euro.
17. *The 2013 Vladimir N. Ipatieff Lectureship in Catalysis*. This named lectureship, established in 1988 by Northwestern University (USA), aims to enhance the educational experience of graduate students and postdoctoral researchers by sponsoring extended, up to one month, visits by internationally distinguished researchers in catalysis. This recognition consists of a plaque, a prize of 5,000 USD and 5,000 USD for covering travel and housing costs.
18. *The 2013 Bourke Award* for his highly innovative contributions to the understanding of the functioning of catalytic solids using spectroscopic methods. Organization: The Royal Society of Chemistry (RSC). The award consists of £ 2000 and a medal. Also a lectureship is associated with the Award.
19. *The 2013 Spinoza Award* for his inspiring and breakthrough research in the field of catalysis*.* Organization: Netherlands Organization for Scientific Research (NWO). The award consists of a plaque, art object and research grant of 2.5 million euros. The Spinoza Award is the highest scientific award within the Netherlands.
20. *Elected as Fellow of the American Association for the Advancement of Science.* (2014) Organization: American Association for the Advancement of Science (AAAS). For his distinguished contributions to the understanding of catalytic phenomena through the delelopment and use of spatiotemporal spectroscopy methods, and their application to catalyst design.
21. *Elected as Member of the The Royal Flemish Academy of Belgium for Sciences and Arts* (KVAB) (2015).
22. *Elected as Fellow of ChemPubSoc Europe*. (2015)(https://www.chemistryviews.org/details/ezine/5933071/ ChemPubSoc\_Europe\_Fellows\_Program.html).
23. *Appointed as Knight in the Order of the Netherlands Lion.* (2015).Highest civil Royal distinction for service to science and society within the Netherlands.
24. *The 2017 Tanabe Prize for Acid-Base Catalysis*. The award, named after the prominent Japane scientist Kozo Tanabe, is awarded every 4 years and consists of a plaque, an honorarium of 2000 USD and a travel budget to give a plenary lecture at the 8th International Symposium on Acid-Base Catalysis in Rio de Janeiro. The prize is awarded for “groundbreaking work on chemical imaging of Brønsted acid sites and related catalytic chemistry within zeolite-based materials, a research field that paves the way towards the rational design of new and improved chemical processes.”
25. *The 2017 Xing Da Lectureship of Peking University*. The award, worth an honorarium of 5000 USD and a travel budget, is awarded to a distinguished scholar in the field of chemistry and molecular engineering. The lecture entitled “Hunting for the Hidden Chemistry in Solid Catalysts: Towards a Molecular Movie” was given on November 17, and was accompanied by a lecture tour through different academic institutions in Shanghai and Beijing.
26. *The 2018 Certificate for Achievements* *of the Christoffel Plantin fund* (Belgium) for his contributions to the prestige and appeal of Belgium in foreign countries from the Belgian Ambassador in the Netherlands.
27. *The 2018 Robert B. Anderson Award of the Canadian Catalysis Society.* The award, named after the prominent Canadian catalysis researcher, is awarded every two years and consists of a travel budget of 5000 CDND to give two plenary lectures and an honorarium of 1500 CDND. The award is given for “for his excellent contributions to the fundamental understanding of the functioning of solid catalysts and the related development of advanced microscopy and spectroscopy methods”.
28. *The 2019 Karl Ziegler Lectureship Award of the The Max-Planck Institut für Kohlenforschung*. The “Karl Ziegler Gastprofessur” is named after the Nobel laureate who shared together with Giulio Natta the prize for the discovery for polypropylene and the related catalysts to produce these plastics. The prize consists of a certificate and a monetary award of 5.000 Euro. The award is accompanied by giving a public lecture and two lectures for PhD students, postdoctoral students as well as academic staff.
29. *The 2019-2020 Charles Casey Lecturship Award in Inorganic and Organometallic Chemistry of the University of Madison at Wisconsin.* This annual award is given to international sholars with great visibility in inorganic and organometallic chemistry. The prize consists of a certificate and a monetary award of 5.000 USD. The award is accompanied by giving two lectures for PhD students, postdoctoral students as well as academic staff of the department of chemistry of the University of Madison at Wisconsin.
30. *Honorary Fellow of the Chinese Chemical Society (2020).* This lifetime appointment is the highest honor of the Chinese Chemical Society (CCS) bestowed upon an individual and is granted to the most distinguished chemists from around the world, who have made significant contributions to the advancement of chemistry, as well as to the development of chemistry in China and the Society.
31. *Frontiers Award of the Max-Planck Institute for Chemical Energy Conversion (2022)*. This annual award is given to an internationally outstanding and renowned scientist. The prize used to be awarded for excellent research work in the field of "Bioinorganic Chemistry". After the Max-Planck Institute was renamed in 2012, the prize was and is still given for achievements in the research area of "Chemical Energy Conversion". The award is accompanied by giving a public lecture.
32. *Chemistry Europe Award* (2023). This inaugural award is given “for outstanding achievements and leadership in the field of sustainable chemistry and catalysis research.” The award is initiated by *Chemistry Europe*, an association of 16 chemical societies from 15 European countries, to recognize outstanding contributions to chemistry. The award includes prize money of EUR 10,000 and a certificate.
33. *Honorary Professorship* and *Peiyang Lectureship* at Tianjin University (Tianjin, China) (2023). On November 14, 2023, Bert Weckhuysen, was appointed as an Honorary Professor at the School of Chemical Engineering of Tianjin University (China). Gong Jinlong, Vice President of Tianjin University, Professor Fan Xiaobin, Dean of the School of Chemical Engineering, and representatives of teachers and students attended the awarding ceremony.
34. *Honorary Professorship* at East China University of Science & Technology (Shanghai, China) (2023). On November 17, 2023, Professor Bert Weckhuysen was appointed as an Honorary Professor at the School of Chemical Engineering of East China University of Science & Technology (ECUST). Professor Xuan Fuzhen, President of ECUST, attended and awarded the Honorary Professorship.
35. *Doctor Honoris Causa* from Ghent University (Ghent, Belgium) (2024). On March 22, 2024, Professor Bert Weckhuysen will receive an honorary doctorate for his contribution in the field of chemistry, catalysis and analytical sciences. Promotores are professors Veronique Van Speybroeck and professor Kevin Van Geem.

Enclosure 9: Organization of Conferences and Workshops

1. Symposium *“Fourth Meeting of the Benelux EPR Society”* (24 Mei 1996, Arenbergkasteel, Heverlee, Belgium) (Chairmen: B. Weckhuysen and R. Schoonheydt).
2. Workshop *“Surface chemistry and spectroscopy of transition metal ions and defect sites in solids, with special emphasis on electron spin resonance”* (21-23 March 1999, Nieuwpoort, Belgium) (Chairmen: B. Weckhuysen, R. Schoonheydt, P. Van Der Voort and E. Vansant).
3. EXAFS-XANES workshop in the frame of the FWO-Wetenschappelijke Onderzoeksgemeenschap “The active site: from catalyst to reactor” (2-4 May 2000, Leuven, Belgium) (Chairman: B. Weckhuysen).
4. American Chemical Society Fall 2000 Symposium *“Metal oxide catalysts: active sites and reaction intermediates”* (20-24 August 2000, Washington, D.C., USA) (Chairmen: B. Weckhuysen, C. Klug and G. Mestl).
5. Operando-I: International Symposium on the Characterization of Catalysts in Action (2-6 March 2003, Lunteren, The Netherlands) (Chairmen: B. Weckhuysen, G. Mestl, E. Gaigneau and M. Banares).
6. Microporous and mesoporous materials as catalytic hosts for Fe, Co and Cu, An international workshop organized by the Dutch-speaking Zeolite Association (1-4 March 2005, Scheveningen, The Netherlands) (Chairmen: F. Kapteijn, B. Weckhuysen, P. Kooyman, E. Hensen and S. van Donk).
7. Operando-II: International Symposium on the Characterization of Catalysts in Action (23-27 April 2006, Toledo, Spain) (Chairmen: M. Banares, F. Thibault-Starzyk, A. Bruckner, E. Gaigneaux and B. Weckhuysen).
8. Onzekerheidssymposium van De Jonge Academie (KNAW) (1 April 2008, Amsterdam, The Netherlands), (Chairmen: M. Van Asselt, E. Dusseldorp, J. Abbring, K. Henrard, B. Penninx, O. Gelderblom, B. Weckhuysen).
9. Operando-III: International Symposium on the Characterization of Catalysts in Action (19-23 April 2009, Rostock-Warnemunde, Germany) (Chairmen: M. Banares, F. Thibault-Starzyk, A. Bruckner, E. Gaigneaux, I.E. Wachs, S. Bare and B. Weckhuysen).
10. KNAW Symposium: Catalysis for the Future (12 November 2013, Amsterdam, the Netherlands) (Chairman: B. Weckhuysen).
11. 17th International Symposium on the Relationships between Homogeneous and Heterogeneous Catalysis (ISHHC-17) (12-15 July 2015, Utrecht, the Netherlands) (Chairmen: B. Weckhuysen, B. Klein Gebbink and P. Bruijnincx).
12. MCEC-KNAW Symposium “Fuelling the Future: How Catalysis may Contribute to a more Sustainable Society” (14 December, Utrecht, the Netherlands, Chairman: B. Weckhuysen).
13. 14th European Congress on Catalysis (Europacat2019) (18-23 August 2019, Aachen, Germany) (Chairmen: W. Leitner; Co-chairs: B. Weckhuysen, V. Van Speybroeck and R. Palkovits).
14. Catalysis Connected, a post-conference to Europacat2019 (24-27 August 2019, Utrecht, the Netherlands) (Chairmen: B.M. Weckhuysen & J.H. Bitter).
15. 25th Solvay Conference on Chemistry “Computational Modeling: From Chemistry to Materials to Biology” (16-19 October 2019, Brussels, Belgium) (Chair: K. Wuthrich; Co-chair: B.M. Weckhuysen).
16. *Operando* Characterization of Catalysts at Work (OperCat) (17-18 December 2020, Online) (Chairmen: B.M. Weckhuysen, F. Meirer, W. van der Stam).
17. “Sustainable Approaches for Renewable Energy Conversion to Fuels and Chemicals” Symposium, European Materials Research Society (E-MRS) 2022 Spring Meeting (30 May 2022-3 June 2022, Online) (Chairmen: A. Magnuson, B. Weckhuysen, F. Fabreyat-Santiago, F. Chandezon).
18. “Nanoplastics: Origin, Structure and Fate” Symposium (20-21 November 2023, Utrecht, the Netherlands) (Chairmen: B.M. Weckhuysen, F. Meirer, I. Groot, E. van Sebille, L. Amaral-Zettler)

Enclosure 10: Editorial and International Advisory Board of Scientific Journals

1. *Physical Chemistry Chemical Physics* (2003-to date; chairman of the editorial board 2006-2008)
2. *Applied Catalysis A: General* (2005-2007)
3. *Catalysis Today* (2007-to date)
4. *Topics in Catalysis* (2006-to date)
5. *Catalysis Letters* (2006-to date)
6. *Journal of Nanoscience and Nanotechnology* (2004-to date)
7. *Journal of Applied Chemistry* (2005-to date)
8. *Vibrational Spectroscopy* (2002-2006)
9. *Chemical Society Reviews* (2010-to date)
10. *ChemCatChem* (2009-to date, co-chairman of the editorial board 2009-2016)
11. *ChemPhysChem* (2014-to date, co-chairman of the editorial board 2018-2022)
12. *Faraday Discussions* (2015-to date)
13. *Chem* (2016-2018)
14. *The Journal of Catalysis* (2017-2022; editor)
15. *Angewandte Chemie International Edition* (2018-to date)
16. *Chemistry-Methods* (2020-to date)
17. *Chemical and Biomedical Imaging* (2022-to date)
18. *Chem Catalysis* (2023-to date)
19. *Catalysis Science and Technology* (2023-to date; editor-in-chief)

Enclosure 11: Active Participation in National and International Boards

Weckhuysen serves on many boards and panels for national and international research. More specifically he is/was:

* Chairman of the commission, established by the Ministry of Science, Education and Art (OCW), to advice on the roll-out of the “starters- en stimuleringsbeurzen) (2022-2024).
* Chairman of the commission, established by the Netherlands Royal Academy of Sciences (KNAW), providing an advice to the Ministry of Science, Education and Art on the concept of rolling grants to strengthen the curiosity-driven research at Dutch Universities (2020).
* Chairman of the commission, established by the Netherlands Royal Academy of Sciences (KNAW), providing an advice to the Ministry of Science, Education and Art on the optimal division between strategic, thematic and talent subsidies within the Netherlands Organisation for Scientific Research (NWO) (2019).
* Board member of CW-NWO, the main Dutch funding organization (<http://www.nwo.nl>) (2012-2016). Chairman of the ‘Tafel Chemie’ of NWO (2018-2020).
* ‘Chief Science Officer’ of Topteam of the Topsector Chemistry, 2014-2023 (before member Topteam Chemie, 2011-2014), established by the Ministry of Economy, Agriculture and Innovation http://www.top-sectoren.nl/chemie/topteam, member of the Regiegroep Chemie (http://www.regiegroepchemie.nl) (2011-2023), chairman of the board of the TopConsortium voor Kennis en Innovatie ‘Nieuwe Chemische Innovaties’ (2012-2023), executive board member of ACTS (<http://www.nwo.nl>) (2003-2011) and member of the ‘Spelregels Commissie NWO’ (2013).
* Member of TWINS (Raad voor Technische Wetenschappen, Wiskunde en Informatica, Natuur- en Sterrenkunde en Scheikunde) of the Netherlands Royal Academy of Sciences (KNAW; http://www.knaw.nl) (2013-2016).
* Board member of the European Federation of Catalysis Societies (EFCATS) (2003-2023; treasurer in the period 2011-2017 and president in the period 2017-2023), the International Association of Catalysis Societies (IACS) (2003-2016) and the International Zeolite Association (IZA) (2013-2023).
* Board member of the Stichting Hoogewerff-Fonds (2015-2022).
* Scientific Advisory Board member of Scientific Advisory Board member of inGAP (<http://www.ingap.uio.no>) (2008-2015); CASE (http://www.case.dtu.dk) (2009-present); SusChem Nederland (http://www.vnci.nl) (2009-2012); EaStCHEM (http://www.eastchem.ac.uk) (2013-2016), the Chemical Research Center of the Hungarian Academy of Sciences (2009-present), State Key Laboratory of Catalysis (Dalian, China) (2014-onwards), Cardiff Catalysis Institute (Cardiff, UK) (2017-onwards), the Center for Catalysis and Surface Science of Northwestern University in Evanston (USA) (2017-onwards) and the Max Planck Institute for Chemical Energy Conversion in Mulheim/Ruhr (2017-onwards).
* Directorship of the European initiative, SUNERGY (https://www.sunergy-initiative.eu), to foster the science and technology to produce fossil-free fuels and chemicals to create a circular society.
* Member of the TNO Strategic Advisory Board Circular Economy and Environment (2022-2023).
* Member of the Solvay Scientific Committee for Chemistry (2017-2025).
* Titular Member of the Physical and Biophysical Chemistry Division of the International Union of Pure and Applied Chemistry (IUPAC) (2016-2019).
* Member of “HERCulES” (Higher Education, Research and Culture in European Societies) of Academia Europaea (2015-2022).