

Operando VIII Schedule

ALL ORAL SESSIONS IN MERRILL HALL

Sunday, May 10

Plenary Session 7:00-8:15 PM

Session Chair: Janos Szanyi

7:00-7:15 PM | Simon R. Bare – *SLAC National Accelerator Laboratory*

Introduction and Welcome

7:15-8:15 PM | **Plenary Talk:** Davide Ferri – *Paul Scherrer Institute*

Seizing Materials Structure in the Act by Multi-Modal Spectroscopy

Monday, May 11

Plenary and Keynote Session 8:30-10:00 AM

Session Chair: Fan Yang

8:30-9:30 AM | **Plenary Talk:** Peter Crozier – *Arizona State University*

Spatiotemporal Analysis of Nanoparticle Surface Dynamics: Prospects for Atomic-Level *Operando* Characterization of Catalysts with Electron Microscopy

9:30-10:00 AM | **Keynote Talk:** Jungwon Park – *Seoul Nation University*

Operando Atomic-Scale Characterization of Catalysts in Liquid

10:00-10:30 AM | **Coffee Break**

Reactor Dynamics Session 10:30-11:50 AM

Session Chair: Linxiao Chen

10:30-10:50 AM | Lucy Costley-Wood – *University College London*

Mapping Reactive Zones in Magnetic Induction Reactors by XRDCT

10:50-11:10 AM | Donato Decarolis – *Diamond Light Source*

Understanding Localized Heat Transfer in Autothermal Reactions

11:10-11:30 AM | Aubrey Hepstall – *Georgia Institute of Technology*

Operando Analysis of Mechanocatalytic Reaction Environments

11:30-11:50 AM | Alireza Javanmard – *Penn State University*

Transient Pseudo-Random Binary Sequence (PRBS) *Operando* Reactor with Real-Time Adsorbate Monitoring for Mechanistic Identification

Dynamic Modulation Spectroscopy 1:00-2:50 PM

Session Chair: Maarten Nachtegaal

1:00-1:30 PM | **Keynote Talk:** Matteo Monai – *Utrecht University*

Introducing Stimulando Time-Resolved Infrared Spectroscopy to Study Intermittent Light-Stimulated CO₂ Hydrogenation

1:30-1:50 PM | Charlotte Vogt – *Technion*

From Modulation to Emergence: Dynamic Response Spectroscopy and the Nonlinear Dynamics of Catalytic Interfaces

1:50-2:10 PM | Arnaud Travert – *Universite de Caen Normandie*

Modulation Excitation Spectroscopy Beyond Phase-Sensitive Detection

2:10-2:30 PM | Miguel Banares – *CSIS Instituto de Catalisis*

Operando Raman and MES-DRIFTS Study on the Role of Gold and Vanadium in Ceria-Based Oxidation Catalysts

2:30-2:50 PM | Servaas Lipps – *University of Ghent*

Interpreting Non-Redox Responses in Modulation-Excitation XAS

2:50-3:20 AM | **Coffee Break**

Operando Spectroscopy 3:20-4:20 PM

Session Chair: Anatoly Frenkel

3:20–3:40 PM | Jingyi Chen – *University of Arkansas*

Understanding the Phase Transition of Nickel Hydroxide Using In-Situ X-Ray Absorption Spectroscopy

3:40-4:00 PM | Marcus Baer – *Helmholtz Zentrum Berlin*

Operando Studies of Energy Conversion Devices by HAXPES

4:00-4:20 PM | Merve Kurt – *Karlsruhe Institute of Technology*

Operando Insights into the Effect of Ceria Incorporation on the Oxygen Evolution Reaction Performance of Iridium-Based Catalysts

Session Chair: Adam Hoffman

4:20-6:00 PM | Poster Blitz

7:00-9:00 PM | Poster Session – Located in Nautilus Hall

Tuesday, May 12

Plenary and Keynote Session 8:30-10:00 AM

Session Chair: Phil Christopher

8:30-9:30 AM | **Plenary Talk:** Charlie Sykes – *Tufts University*

Single-Atom Alloy Catalysts: Born in a Vacuum, Tested in Reactors, and Understood in Silico

9:30-10:00 AM | **Keynote Talk:** Elad Gross – *Hebrew University*

High Spatial Resolution Operando IR Nanospectroscopy Reveals Structure-Reactivity Correlation in Pd Nanoparticles

10:00-10:30 AM | **Coffee Break**

Oxide Catalysts 10:30-11:50 AM

Session Chair: Javier Ruiz Martinez

10:30-10:50 AM | Christian Hess – *TU Darmstadt*

Identifying Active Sites in Selective Oxidation Catalysts Using Combined *Operando* and Transient Analysis: from Supported to Bulk Systems

10:50-11:10 AM | Israel Wachs (presented by Neelesh Kumar) – *Lehigh University*

Redox Dynamics of Supported VO_x/CeO₂ During Methanol Oxidation Monitored with *Operando* UV-Vis-MS Spectroscopy

11:10-11:30 AM | Weixin Huang – *Univ. of Science Tech. of China*

Elementary Surface Reaction Kinetics Unveil Distinctly Different Active Sites of ZnO-ZrO₂ Catalysts in CO₂ and CO Hydrogenation to Methanol Reactions

11:30-11:50 AM | Michael Claeys – *University of Cape Town*

Crystallite Size Dependent Oxidation Captured Using *Operando* Magnetometry

Session Chair: Jiyun Hong

5:00- 6:00 PM | Poster Blitz

7:00-9:00 PM | Poster Session – Located in Nautilus Hall

Wednesday, May 13

Metal Ions in Zeolites 8:30-10:00 AM

Session Chair: Christian Hess

8:30-9:00 AM | **Keynote Talk:** Coleman Kronawitter – *University of California, Davis*

Reversible Changes to Active Sites during Co-Reactions of Ethane, Carbon Dioxide, and Hydrogen Measured through *Operando* X-ray Absorption Spectroscopy

9:00-9:20 AM | Simon Barth – *Karlsruhe Institute of Technology*

Design Of Copper Sites in Cu-SSZ-13 to Control HCN Formation and Conversion During NH₃-SCR in the Presence of HCHO

9:20-9:40 AM | Dhruva Deka – *Pacific Northwestern National Laboratory*

Linking Cu Ion Speciation to SCR Reactivity in Cu-CHA Catalysts via *Operando* EPR Spectroscopy

9:40-10:00 AM | Daniel Cano-Blanco – *Paul Scherrer Institute*

Fe Monomers at Work: *Operando* Multi-spectroscopy Approach Identifies the Fe²⁺/Fe³⁺ Pair Enabling N₂O-Assisted CH₄ Oxidation in Fe-Zeolites

10:00-10:30 AM | **Coffee Break**

Supported Metals 10:30-11:50 AM

Session Chair: Coleman Kronawitter

10:30-10:50 AM | Liqun Kang – *Max Planck Institute*

Seeing Nitrogen Differently: A New *Operando* Picture of Fe and FeCo Catalysts in Ammonia Decomposition

10:50-11:10 AM | Nikolay Kosinov – *Eindhoven University*

Determining Surface Coverage on Working Ni/SiO₂ Catalysts by Transient
Operando XANES at Ni K-Edge

11:10-11:30 AM | Melissandre Richard – *University of Lille*

A Journey from Rapid- to Step-Scan IR: Revealing Early Isotopic-Exchange
Dynamics in CO₂ Hydrogenation on Cu/ZrO₂

11:30-11:50 AM | Sumant Phadke – *Paul Scherrer Institute*

Unraveling Structure–Activity Relationships in Pd–Zn/C Catalysts for CO₂
Hydrogenation to Methanol

Metal-Support Interactions and Dynamics 1:00-3:00 PM

Session Chair: Charlotte Vogt

1:00-1:20 PM | Anatoly Frenkel – *Stonybrook University*

Reaction–Driven Redispersion: A Low-Temperature Route to Catalyst Stability

1:20-1:40 PM | Linxiao Chen – *University of North Texas*

In-Situ Support-Wetting of Metal Cluster Regulates Catalytic Activity

1:40-2:00 PM | Jeong Park – *Korea Advanced Institute of Science & Technology*

Operando Microscopic and Spectroscopic Investigation of Metal–Oxide
Interfaces in Mixed and Bimetallic Nanocatalysts

2:00-2:20 PM | Marlon da Silva – *Laboratório Nacional de Luz Síncrotron-CNPEM*

Spatio-Temporal Insights into Supported Pd Nanoparticles Dynamics Using Full-
Field Hyperspectral XAS imaging

2:20-2:40 PM | Steven Chavez – *University of California, Los Angeles*

Metal-Support Interactions Govern Restructuring Dynamics in Bimetallic Pt
Oxidation Catalysts

2:40-3:00 PM | Anastasiya Khan – *SLAC National Accelerator Laboratory*

Revealing Methanation-Induced Sintering in Rh/TiO₂ Catalysts via *Operando* X-
Ray Thermometry

3:00-3:30 AM | **Coffee Break**

Liquid Environments 3:30-5:30 PM

Session Chair: Elad Gross

3:30-3:50 PM | Arun Asundi – *SLAC National Accelerator Laboratory*

Operando XAS Characterization of Aerobic Oxidation Catalysts for Plastic Deconstruction

3:50-4:10 PM | Vaishnavi Ganesh – *Utrecht University*

Operando Raman Spectroscopy with Online UV-Vis Analysis of Carbon-based Catalysis under Harsh Reaction Conditions

4:10-4:30 PM | Angel Garcia-Esparza – *SLAC National Accelerator Laboratory*

Access to Study the Electrode-Electrolyte Interface with Modulation Excitation X-Ray Spectroscopy

4:30-4:50 PM | Christoph Kubis – *Leibnitz Institute*

In-Situ / Operando Spectroscopic Investigations on Kinetic and Mechanistic Aspects of Homogeneously Catalyzed Hydroformylation

4:50-5:10 PM | Maarten Nachtegaal – *Paul Scherrer Institute*

Operando XAS in Flow: Identification of Active Sites for the Conversion of Methane to Oxygenates in Water

5:10-5:30 PM | Javier Ruiz-Martinez – *King Abdullah University of Science and Technology*

In situ MAS NMR Reveals Insights into Hierarchical Zeolite Formation during Post-Synthetic Base Leaching

Thursday, May 14

Plenary and Keynote Session 8:30-10:00 AM

Session Chair: Miguel Banares

8:30-9:30 AM | **Plenary Talk:** Bingjun Xu – *Peking University*

Understanding Cu-Catalyzed CO₂ Electrochemical Reduction via *Operando* Spectroscopies: Mechanism, Cation Effect and Devices

9:30-10:00 AM | **Keynote Talk:** Fan Yang – *Shanghai Tech University*

Dynamic Catalytic Sites for Selective CO/CO₂ Conversion

10:00-10:30 AM | Coffee Break

Frontiers in operando spectroscopy 10:30-11:50 AM

Session Chair: Matteo Monai

10:30-10:50 AM | Hanya Spoelstra – *Utrecht University*

Exploring Carbon Growth Dynamics during Catalytic Methane Pyrolysis with
Operando Raman Spectroscopy

10:50-11:10 AM | Damian Vico van Berkel – *Delft University*

Far-IR Spectroscopy as a Direct Coordination Environment Probe in Catalysis

11:10-11:30 AM | Yu Wang – *Shanghai Syn. Radiation Facility*

Time-Resolved XAFS/XRD Combined Technique for *Operando* Simultaneous
Measurements

11:30-11:50 AM | Gabriele Deplano – *Max Planck Institute*

Operando Spectroscopic Investigation to Explain Reactivity in LPMO-Mimic Cu
Complexes in Solution