

## nanoGe Fall Meeting19 (NGFM19)

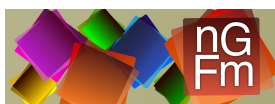
#SolCat19. (Photo)electrocatalysis for sustainable carbon utilization: mechanisms, methods, and reactor development

Berlin, Germany, 2019 November 6th - 8th

Conference Chairs: Matthew Mayer and Ludmilla Steier

### Conference Program

November 6th - Day 4 (Wednesday)	
08:45 - 09:00	<b>Announcement of the day &amp; Presentation of NFM20 /Plenum-Room B4</b>
	<b>Plenary Session 5 / Plenum</b> Chair: Jacky Even Room: Plenum
09:00 - 09:30	<u>David Mitzi</u> ( <i>Duke University</i> ) Plenum-K1 Organic-Inorganic Perovskites: Unrivaled Versatility for Semiconductor Design and Fabrication
	<b>Plenary Session 6 / Room B4</b> Chair: Erwin Reisner Room: Breakout 4
09:00 - 09:30	<u>Jenny Zhang</u> ( <i>Department of Chemistry, University of Cambridge - UK</i> ) B4-K1 Semi-artificial Photosynthesis: a Platform for Studying and Wiring Photosynthesis
	<b>SolCat 1.1 / Room B1</b> Chair: Ludmilla Steier Room: Breakout 1
09:30 - 10:00	<u>Csaba Janáky</u> ( <i>University of Szeged</i> ), Balázs Endrődi, Dorottya Hursán, Egon Kecsényi, Richard Jones B1-O1 Scaling-up Carbon-dioxide Electroreduction: from Novel Catalysts to Electrolyzer Development
10:00 - 10:30	<u>Víctor A. de la Peña O'Shea</u> ( <i>1 Photoactivated Processes Unit IMDEA Energy Institute</i> ) B1-I1 Multifunctional Materials for Solar Fuels Production by Artificial Photosynthesis
10:30 - 11:00	<b>Coffee Break</b>
	<b>SolCat 1.2 / Room B1</b> Chair: Karen Chan Room: Breakout 1
11:00 - 11:30	<u>Yogesh Surendranath</u> ( <i>Massachusetts Institute of Technology - USA</i> ) B1-I1 Mechanistic Insights Into Selective CO <sub>2</sub> -to-Fuels Catalysis
11:30 - 11:45	<u>Stefano Mezzavilla</u> ( <i>Department of Materials, Imperial College London, United Kingdom</i> ), Sebastian Horch, Ifan Stephens, Brian Seger, Ib Chorkendorff B1-O1 Active Sites for the Electrochemical Reduction of CO <sub>2</sub> on Gold Surfaces – a Structure-Sensitivity Study
11:45 - 12:00	<u>Wen Ju</u> ( <i>Technische Universität Berlin</i> ), Alexander Bagger, Frederic Jaouen, Jan Rossmeisl, Peter Strasser B1-O2 Mechanistic understanding of formaldehyde reduction on metals and M-N-C catalysts
12:00 - 13:30	<b>Lunch</b>
	<b>SolCat 1.3 / Room B1</b> Chair: Matthew Mayer Room: Breakout 1
13:30 - 13:45	<u>Paula Sebastian Pascual</u> ( <i>Department of Chemistry, Nano-Science Center, University of Copenhagen, Universitetsparken 5, DK-2100 Copenhagen, Denmark</i> ), Alexander Bagger, Jan Rossmeisl, Maria Escudero-Escribano B1-O1 Surface Sensitivity and Electrolyte Effects on Cu Single-crystalline Electrodes for CO Electroreduction



- 13:45 - 14:00 Kai Liu (*Delft University of Technology, The Netherlands*), Nathan Nesbitt, Thomas Burdyny, Wilson Smith  
B1-O2 How Local Reaction and Process Conditions Influence CO<sub>2</sub> Reduction to Multicarbon Products on Copper Gas-Diffusion electrodes
- 14:00 - 14:30 Brian Seger (*Technical University of Denmark (DTU)*), Gaston Larrazabal, Ming Ma, Ib Chorkendorff, Kasper Therkildsen  
B1-O3 Analyzing the Complete Carbon Balance in High Current Density Electrochemical CO<sub>2</sub> Reduction Reactors
- 14:30 - 15:00 Beatriz Roldan Cuenya (*Department of Interface Science, Fritz-Haber-Institute of the Max Planck Society, 14195 Berlin Germany*)  
B1-I1 Size, Shape, Composition and Electrolyte Effect in CO<sub>2</sub> electroreduction
- 15:00 - 15:30 Paul Kenis (*University of Illinois at Urbana-Champaign*)  
B1-I2 Co-Electrolysis for Efficient Electroreduction of CO<sub>2</sub> to Intermediates Fuels or Chemicals

15:30 - 16:00 **Coffee Break**

**SolCat 1.4 / Room B1**

Chair: Beatriz Roldan Cuenya  
Room: Breakout 1

- 16:00 - 16:15 Shahid Rasul (*Northumbria University*), Eileen Yu  
B1-O3 Recycling CO<sub>2</sub> to Produce Renewable Fuels
- 16:15 - 16:30 Giorgio Giuffredi, Federica Arena, Hilmar Guzman, Cesare Cosentino, Simelys Hernandez, Fabio Di Fonzo (*Center for Nano Science and Technology, Istituto Italiano di Tecnologia*)  
B1-O4 Hierarchical, Quasi-1D CuO<sub>x</sub>-derived Nanostructured Copper Catalysts for CO<sub>2</sub> Reduction
- 16:30 - 16:45 Seyedehbehnaz Varandili (*Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland*)  
B1-O1 Interfacial Synergy in Cu/metal oxide Nanocrystalline Heterodimers for Enhanced CO<sub>2</sub> Electroreduction
- 16:45 - 17:00 Pranit Iyengar (*Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland*), Gian Luca De Gregorio, Raffaella Buonsanti  
B1-O2 Facet Dependent Reactivity of Copper Nanocrystals for Electrochemical CO<sub>2</sub> Reduction to Valuable Products

**November 7th - Day 5 (Thursday)**

**SolCat 2.1 / Room B4**

Chair: Matthew Mayer  
Room: Breakout 4

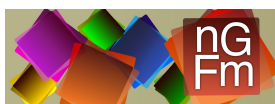
- 09:00 - 09:30 Erwin Reisner (*University of Cambridge - UK*)  
B4-I1 Solar-driven Utilization of CO<sub>2</sub> with Molecularly-Engineered Semiconductor Hybrid Systems
- 09:30 - 09:45 Ravi Shankar (*Barrer Centre, Department of Chemical Engineering, Imperial College London United Kingdom*), Michael Sachs, Laia Francàs, Daphné Lubert-Perquel, Gwilherm Kerherve, Anna Regoutz, Camille Petit  
B4-O1 Porous Boron Oxynitride for Combined CO<sub>2</sub> Capture and Photoreduction
- 09:45 - 10:00 Matthias May (*Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Germany*), Kira Rehfeld  
B4-O2 Beyond Solar Fuels: Photoelectrochemical Approaches to Negative Emissions
- 10:00 - 10:30 Elena Mas-Marzá (*Universitat Jaume I, Institute of Advanced Materials (INAM) - Spain*), Ramón Arcas-Martínez, Laxman Gouda, Francisco Fabregat-Santiago  
B4-O3 Photoelectrosynthesis of Imines

10:30 - 11:00 **Coffee Break**

**SolCat 2.2 / Room B4**

Chair: Matthew Mayer  
Room: Breakout 4

- 11:00 - 11:30 Joel Ager (*University of California at Berkeley and Lawrence Berkeley National Laboratory*)  
B4-I1 Cascade Catalysis Controls Selectivity in Electrochemical Carbon Dioxide Reduction
- 11:30 - 12:00 Laura C Pardo-Perez, Detre Teschner, Elena Willinger, Anna Fischer (*Institute for Inorganic and Analytical Chemistry, Inorganic Functional Materials Lab, University of Freiburg, Germany*)  
B4-O1 SnIn@InSnO<sub>x</sub> core@shell Nanoparticles as Electrocatalysts for CO<sub>2</sub> Electroreduction to Formate



12:00 - 13:30	<b>Lunch</b>
	<b>SolCat 2.3 / Room B4</b> Chair: Joel Ager Room: Breakout 4
13:30 - 14:00 B4-11	<u>Peter Strasser</u> ( <i>Dept. of Chemistry, Technical University Berlin, Strasse des 17. Juni 124, TC 03, 10623 Berlin, Germany</i> ) Mechanistic Studies of the Electrochemical CO <sub>2</sub> Reduction on Single Site, Metallic and Hybrid Electrocatalysts
14:00 - 14:30 B4-12	<u>Karen Chan</u> ( <i>Technical University of Denmark (DTU)</i> ) The Effect of the Electrolyte on Electrochemical CO <sub>2</sub> Reduction
14:30 - 14:45 B4-O1	<u>Khoa Hoang Ly</u> ( <i>Fakultät für Chemie und Lebensmittelchemie, Technische Universität Dresden</i> ) Operando Vibrational Spectroelectrochemistry for Studying CO <sub>2</sub> Reduction Catalysis Promoted by Molecularly-defined Electrocatalysts
14:45 - 15:15 B4-O3	<u>Juan J. Velasco Vélez</u> ( <i>Fritz Haber Institute of the Max Planck Society</i> ), Cheng-Hao Chuang, Dunfeng Gao, Qingjun Zhu, Travis Jones, Emilia Carbonio, Peter Strasser, Beatriz Roldán-Cuenya, Robert Schlögl, Axel Knop-Gericke In situ X-ray Spectroscopy Investigation of the Cathodic Electroreduction of CO <sub>2</sub> into Valuable Chemical Feedstocks onto Copper Based Catalysts
15:15 - 15:30 B4-O2	<u>Andreas Wagner</u> ( <i>Christian Doppler Laboratory for Sustainable SynGas Chemistry, Department of Chemistry, University of Cambridge</i> ), Khoa Ly, Nina Heidary, István Szabó, Tamás Földes, Khaleel Assaf, Steven Barrow, Kamil Sokołowski, Nikolay Kornienko, Moritz Kuehnel, Edina Rosta, Ingo Zebger, Werner Nau, Oren Scherman, Erwin Reisner Host-guest Chemistry Meets Electrocatalysis: Cucurbit[6]uril on a Au Surface as Hybrid System in CO <sub>2</sub> Reduction
15:30 - 16:00	<b>Coffee Break</b>
	<b>SolCat 2.4 / Room B4</b> Chair: Víctor A. de la Peña O'Shea Room: Breakout 4
16:00 - 16:30 B4-O1	<u>Idan Hod</u> ( <i>Ben-Gurion University of the Negev, Israel</i> ), Ran Shimoni, Itamar Liberman, Raya Ifraemov, Wenhui He, Chanderpratap Singh Metal-Organic Frameworks as a Heterogeneous Platform for (Photo)-Electrocatalytic CO <sub>2</sub> Reduction
16:30 - 16:45 B4-O2	<u>Yannick T. Guntern</u> ( <i>Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland</i> ), James R. Pankhurst, Raffaella Buonsanti Nanocrystal/Metal-Organic Framework Hybrids as Electrocatalytic Platform for CO <sub>2</sub> Conversion
16:45 - 17:00 B4-O3	<u>Federica Arena</u> ( <i>National Center for Nanoscience and Technology</i> ), Giorgio Giuffredi, Stefano Donini, Emilio Parisini, Fabio Di Fonzo Bioelectrochemical TiN FDH Catalyst for CO <sub>2</sub> Reduction to HCOOH
17:00 - 19:00	<b>Poster Session</b>
<b>November 8th - Day 6 (Friday)</b>	
08:45 - 09:00	<b>Announcement of the day / Plenum-Room B4</b>
	<b>Plenary Session 7 / Plenum</b> Chair: Wolfgang Tress Room: Plenum
09:00 - 09:30 Plenum-K1	<u>Xiaoyang Zhu</u> ( <i>Department of Chemistry, Columbia University, New York, New York 10027, United States</i> ) Ferroelectric Polarons in Lead Halide Perovskites
	<b>Plenary Session 8 / Room B4</b> Chair: Ivan Infante Room: Breakout 4

09:00 - 09:30 B4-K1	<u>Dmitri Talapin</u> ( <i>Department of Chemistry, University of Chicago, Chicago, Illinois 60637, USA</i> ) Self-organization of Electrostatically and Sterically Stabilized Colloidal Nanocrystals: The Roles of Topology, Image Charges and Non-classical Nucleation
<b>SolCat 3.1 / Room B4</b> Chair: Ifan Stephens Room: Breakout 4	
09:30 - 10:00 B4-O1	<u>Todd Deutsch</u> ( <i>Chemistry and Nanoscience Center, National Renewable Energy Laboratory</i> ), Yingying Chen, Ashlee Vise, Walter Klein, Guido Bender, KC Neyerlin Electrocatalytic Reduction of Carbon Dioxide at a Triple Phase Boundary in Flow Reactors
10:00 - 10:30 B4-I1	<u>Sophia Haussener</u> ( <i>Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland</i> ) Transport Effects on CO <sub>2</sub> Reduction Selectivity and Activity in Mesostructured Electrodes
10:30 - 11:00	<b>Coffee Break</b>
<b>SolCat 3.2 / Room B4</b> Chair: Sophia Haussener Room: Breakout 4	
11:00 - 11:30 B4-I1	<u>Matthew Kanan</u> ( <i>Chemistry, Stanford University</i> ) Structure–Activity Relationships and Gas Diffusion Cell Engineering for CO <sub>2</sub> and CO Electrolysis
11:30 - 11:45 B4-O1	<u>Wenbo Ju</u> ( <i>Empa, Swiss Federal Laboratories for Materials Science and Technology</i> ), Corsin Battaglia Electrocatalytic Reduction of Gaseous CO <sub>2</sub> to CO on Sn/Cu-Nanofiber-Based Gas Diffusion Electrodes
11:45 - 12:00 B4-O2	<u>Tim Möller</u> ( <i>The Electrochemical Energy, Catalysis, and Materials Science Laboratory, Department of Chemistry, Chemical Engineering Division, Technical University Berlin, Berlin, Germany</i> ), Trung Ngo Thanh, Zarko Jovanov, Peter Strasser Electrochemical Conversion of CO <sub>2</sub> into Hydrocarbons at Industrial Current Densities on Shaped Copper-oxide Gas Diffusion Electrodes
12:00 - 12:15 B4-O3	<u>Xingli Wang</u> ( <i>Technical University of Berlin (TU)</i> ), Tim Möller, Henrike Schmies, Jorge Ferreira de Araújo, Peter Strasser 2-Dimensional Copper Oxides with Stable and Selective Ethylene Production for Direct CO <sub>2</sub> Electroreduction from H-cell to Flow Cell
12:15 - 12:30 B4-O4	<u>Kailun Yang</u> ( <i>Delft University of Technology (TU Delft), The Netherlands</i> ), Recep Kas, Wilson Smith Existence of Persistent High Local pH during Electrochemical CO <sub>2</sub> Reduction in Densely Buffered Neutral Medium
12:30 - 14:00	<b>Lunch</b>
<b>SolCat 3.3 / Room B4</b> Chair: Ludmilla Steier Room: Breakout 4	
14:00 - 14:30 B4-I1	<u>Ifan Stephens</u> ( <i>Department of Materials, Imperial College London, United Kingdom</i> ) Pathways to energy dense fuels via CO <sub>2</sub> electroreduction on Cu surfaces
14:30 - 15:00 B4-O1	<u>Thomas Burdyny</u> ( <i>Delft University of Technology (TU Delft), The Netherlands</i> ), Wilson Smith Making Fuel Out of Thin Air: Visualizing an Endgame for CO <sub>2</sub> Electrolyzers
15:30 - 16:00	<b>Coffee Break</b>
16:00 - 17:00	<b>SolCat 3.4 / Room B4</b>