

nanoGe Fall Meeting19 (NGFM19)

#SolFuel19. Solar Fuel Synthesis: From Bio-inspired Catalysis to Devices

Berlin, Germany, 2019 November 4th - 6th
Conference Chairs: Roel van de Krol and Erwin Reisner

Conference Program

November 4th - Day 2 (Monday)	
	Plenary Session 1 Chair: Roel van de Krol Room: Plenum
09:00 - 09:30 1-K1	Daniel Nocera *(Harvard University)* Sustainable and Renewable Carbon and Nitrogen Cycles for Fuel and Crop Production
	Plenary Session 2 Chair: Cristiane Morais Smith Room: Breakout 1
09:00 - 09:30 2-K1	Efrat Lifshitz *(Schulich Faculty of Chemistry, Solid State Institute, Russell Berrie Nanotechnology Institute and the Helen Diller Quantum Information Center; Technion, Haifa, Israel)*, Maksym Kovalenko, Andrew Rappe The Effect of Magnetism on the Optical Properties of Bulk and Confined Perovskite Structures
	SolFuel 1.1 Chair: Erwin Reisner Room: Plenum
09:30 - 10:00 1.1-I1	Fred Listad *(Biosystems Technology, Institute of Life Sciences and Biomedical Technologies Technical University of Applied Sciences Wildau Hochschulring 1, 15745 Wildau, Germany)*, M. Riedel, D. Ciornii, A. Zouni 3D electrode materials for enhanced performance of photobioelectrodes based on photosystem I and II
10:00 - 10:15 1.1-O1	Ferdi Karadas *(Bilkent University, Turkey)* An Iron Chromophore-sensitized Photoanode for Water Oxidation
10:15 - 10:30 1.1-O2	Antonio Alfano *(CNST, Istituto Italiano di Tecnologia, Milano)*, Alessandro Mezzetti, Francesco Fumagalli, Chen Tao, Annamaria Petrozza, Fabio Di Fonzo Towards Stable and High Efficiency Hybrid Organic Photoelectrochemical Cell Based Artificial Leaf: the Role of Materials and Interfaces
10:30 - 11:00	**Coffee Break**
	SolFuel 1.2 Chair: Erwin Reisner Room: Plenum
11:00 - 11:30 1.2-I1	Osamu Ishitani *(Tokyo Institute of Technology)* Photocatalytic and Electrocatalytic Reduction of Low Concentration of CO2
11:30 - 11:45 1.2-O1	Constantin D. Sahm *(Christian Doppler Laboratory for Sustainable SynGas Chemistry, Department of Chemistry, University of Cambridge)*, Moritz F. Kuehnel, Gaia Neri, Jonathan R. Lee, Katherine Orchard, Alex J. Cowan, Erwin Reisner Surface Modification of ZnSe Nanocrystals with a Ni(cyclam) Catalyst Enables Visible Light-driven Photochemical CO2 Reduction in Water
11:45 - 12:00 1.2-O2	F. Pelayo Garcia de Arquer *(University of Toronto)*, Cao-Thang Dinh, David Sinton, Edward Sargent Catalyst Management for Multiampere Gas-Phase Electrolysis
12:00 - 12:30 1.2-I2	Marc Robert *(Laboratoire d'Electrochimie Moléculaire, Université Paris Diderot)* Running the Clock: Catalytic Reduction of CO2 with 2, 6 and 8 Electrons Using Co and Fe Molecular Complexes
12:30 - 14:00	**Lunch**

	SolFuel 1.3 Chair: Marc Robert Room: Plenum
14:00 - 14:30 1.3-I1	Raffaella Buonsanti *(Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland)* Colloidal Synthesis for Controllable and Tunable Materials in Artificial Photosynthesis
14:30 - 15:00 1.3-O1	Roland Marschall *(University of Bayreuth, DE)* Nanostructured Spinel Ferrite Materials for Photoelectrochemical Water Splitting
15:00 - 15:15 1.3-O2	Michael Volokh *(Ben-Gurion University of the Negev, Israel)*, Menny Shalom Water-splitting Photoelectrochemical Cells Based on Carbon Nitride Materials: Progress through Improved Deposition Techniques
15:15 - 15:30 1.3-O3	Igor Krivtsov, Dariusz Mitoraj *(University of Ulm)*, Radim Beranek Water-Soluble Polymeric Carbon Nitride Colloidal Nanoparticles for Quasi-Homogeneous Photoredox Applications
15:30 - 16:00	**Coffee Break**
	SolFuel 1.4 Chair: Marc Robert Room: Plenum
16:00 - 16:15 1.4-O1	Liang Yao *(Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland)*, Kevin Sivula Catalyst-Free Synthesis of Robust Covalent Polymer Network Semiconducting Films and Application in Photoelectrochemical Water Splitting
16:15 - 16:30 1.4-O2	Thomas Emmler *(Helmholtz-Zentrum Geesthacht, Dep. Sustainable Energy Technology, Institute of Materials Research)*, Charline Wolpert, Mauricio Schieda, Maria T. Villa Vidaller, Stefen Fengler, Jun Akedo, Kentaro Shinoda, Thomas Klassen Kinetic Aerosol Spray Deposition of BiVO4 Powder for OER Photoelectrodes
16:30 - 16:45 1.4-O3	Elham Khorashadizade *(Department of Materials Science, WWIV-LKO, University of Erlangen-Nuremberg, Erlangen, Germany, Department of Physics, Sharif University of Technology, Azadi Avenue, Tehran, Iran)*, Shiva Mohajernia, Seyedsina Hejazi, Naimeh Naseri, Omran Moradlou, Patrik Schmuki, Alireza Z. Moshfegh Black Ru-doped TiO2 Nanotubes as Efficient Photoanode in Photoelectrochemical Water Splitting
16:45 - 17:00 1.4-O4	Shima Farhoosh, Behrooz Eftekharinia, Naimeh Naseri *(Department of Physics, Sharif University of Technology, Azadi Avenue, Tehran, Iran)* Solar Water Splitting on Ti-doped Hematite Nanostructured Photoanode Modified with FeOOH Electro-catalysts
November 5th - Day 3 (Tuesday)	
	Plenary Session 3 Chair: Marcus Scheele Room: Plenum
08:30 - 09:00 3-K1	William Tisdale *(Massachusetts Institute Of Technology)* Nonequilibrium Dynamics of Excitons and Charges in Semiconductor Nanomaterials
	Plenary Session 4 Chair: Pablo P. Boix Room: Breakout 4
08:30 - 09:00 4-K1	Juan Bisquert *(Universitat Jaume I, Institute of Advanced Materials (INAM) - Spain)* Understanding Time Scales of Ionic and Electronic Phenomena in Perovskite Solar Cells
	SolFuel 2.1 Chair: Roel van de Krol Room: Plenum
09:00 - 09:30 2.1-I1	Ian Sharp *(Walter Schottky Institute and Department of Physics, Technical University of Munich)* Identifying and Overcoming Loss Processes in Transition Metal Oxide Photoelectrodes
09:30 - 10:00 2.1-O1	Thomas Hamann *(Department of Chemistry, Michigan State University)* Electron Dynamics at Copper Tungstate / Catalyst Interfaces

10:00 - 10:15 2.1-O2	Shababa Selim *(Department of Chemistry, Imperial College London)*, Laia Francas, Camilo Mesa, Sacha Corby, Dongho Lee, Andreas Kafizas, Kyoung-Shin Choi, James Durrant Using Transient Spectroscopic Techniques to Investigate the Effect of Catalyst Overlayers and Morphology on the Water Oxidation Performance of Bismuth Vanadate
10:15 - 10:30 2.1-O3	Sixto Gimenez *(Universitat Jaume I, Institute of Advanced Materials (INAM) - Spain)*, Miguel García-Tecedor, Drialys Cárdenas-Morcoso, Roser Fernandez-Climent Mechanistic Insights on Solar Water Splitting with Metal Oxide Semiconductor Materials
10:30 - 11:00	**Coffee Break**
	SolFuel 2.2 Chair: Roel van de Krol Room: Plenum
11:00 - 11:30 2.2-I1	David E. Starr *(Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Institute for Solar Fuels, Germany)*, Marco Favaro, Pip Clark, Michael J. Sear, Fatwa F. Abdi, Ibbi Ahmet, Marlene Lamers, Roel van de Krol Shining Light on Bismuth Vanadate/Aqueous Electrolyte Interfaces
11:30 - 11:45 2.2-O1	Anirudh Venugopal *(Delft University of Technology (TU Delft))* The Dynamic Nature of the Semiconductor-liquid Junction under Operating Conditions
11:45 - 12:00 2.2-O2	Helene Magnan *(Service de Physique de l'Etat Condensé SPEC, UniversitéParis-Saclay, CEA Saclay)*, Pierre-Marie Deleuze, Bruno Domenichini, Antoine Barbier, Mathieu Silly Time Resolved Photoemission for a Fine Characterization of Oxide Photoanode
12:00 - 12:15 2.2-O3	Chiara Pasquini *(Freie Universität Berlin, Department of Physics, Arnimallee 14, 14195 Berlin)*, Holger Dau Redox Energetics and Kinetics of Water Oxidation in Neutral versus Alkaline Electrolyte: an In-Operando Time-Resolved X-Ray Absorption Study
12:15 - 12:30 2.2-O4	Sacha Corby *(Department of Chemistry, Imperial College London)*, Miguel Garcia-Tecedor, Laia Francas, Shababa Selim, Sven Tengeler, Dongho Lee, Camilo Mesa, Wolfram Jaegermann, Sixto Gimenez, Kyoung-Shin Choi, James Durrant Spectroscopic Analysis of NiOx Catalysts for Water Oxidation
12:30 - 14:00	**Lunch**
	SolFuel 2.3 Chair: Kevin Sivula Room: Plenum
14:00 - 14:30 2.3-I1	Emily Weiss *(Department of Chemistry, Northwestern University, Evanston, IL 60208, USA.)*, Shichen Lian, Mohamad Kodaimati, Kevin McClelland Colloidal Photocatalysis for Multi-Electron Redox Reactions
14:30 - 14:45 2.3-O1	Amedeo Agosti *(Department of Chemistry "G. Ciamician", University of Bologna, Italy)*, Yifat Nakibli, Lilac Amirav, Giacomo Bergamini Towards Solar Factories: Highly Efficient Photocatalytic H2 Generation and Organic Transformations
14:45 - 15:15 2.3-O2	Dennis Hetterscheid *(Leiden University)* Very Fast Oxygen Reduction Catalyzed by Cu(tmpa); Towards Hydrogen Peroxide as a Solar Fuel
15:15 - 15:30 2.3-O3	Kasper Wenderich *(Photocatalytic Synthesis Group, MESA+ Institute of Nanotechnology, University of Twente, P,O. box 217, 7500 AE Enschede, The Netherlands)*, Wouter Kwak, Alexa Grimm, Mats Wildlock, Guido Mul, Bastian Mei Towards (Photo)electrochemical Production of Hydrogen Peroxide by Water Oxidation as a Financial Attractive Alternative to Oxygen Evolution
15:30 - 16:00	**Coffee Break**
	SolFuel 2.4 Chair: Kevin Sivula Room: Plenum
16:00 - 16:30 2.4-I1	David Tilley *(Department of Chemistry, University of Zurich)* Operando Methods for a Deeper Understanding of Photoelectrochemical Water Splitting Systems

16:30 - 16:45 2.4-O1	Miguel García-Tecedor *(Universitat Jaume I, Institute of Advanced Materials (INAM) - Spain)*, Roser Fernández-Climent, Sixto Giménez Systematic Analysis of Earth-abundant Based Electrocatalysts for Energy Applications by Spectroscopic Techniques
16:45 - 17:00 2.4-O2	Ibbi Y. Ahmet, Yimeng Ma, Ronald R. Gutierrez, Roel van de Krol, Sophia Haussener, Fatwa F. Abdi *(Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Institute for Solar Fuels, Germany)* Overcoming Performance Losses in Scaling-up Metal Oxide-based Solar Water Splitting Devices
17:00 - 19:00	**Poster Session**
November 6th - Day 4 (Wednesday)	
	Plenary Session 5 Chair: Jacky Even Room: Plenum
09:00 - 09:30 5-K1	David Mitzi *(Duke University)* Organic-Inorganic Perovskites: Unrivaled Versatility for Semiconductor Design and Fabrication
	Plenary Session 6 Chair: Erwin Reisner Room: Breakout 4
09:00 - 09:30 6-K1	Jenny Zhang *(Department of Chemistry, University of Cambridge - UK)* Semi-artificial Photosynthesis: a Platform for Studying and Wiring Photosynthesis
	SolFuel 3.1 Chair: Ian Sharp Room: Plenum
09:30 - 10:00 3.1-I1	Paula Dias, Adelio Mendes *(LEPABE - Faculdade de Engenharia, Universidade do Porto, rua Dr. Roberto Frias, 4200-465 Porto, Portugal)* Towards solarchemistry: direct conversion of sunlight into fuels
10:00 - 10:15 3.1-O1	Isaac Holmes-Gentle *(EPFL, Institute of Mechanical Engineering, Station 9, 1015 Lausanne, Switzerland)*, Saurabh Tembhurne, Clemens Suter, Sophia Haussener Dynamic Process Simulation of a kW Scale Solar Hydrogen Producing System under Concentrated Irradiation
10:15 - 10:30 3.1-O2	Qingran Zhang *(The University of New South Wales)*, Xunyu Lu, Rose Amal A Fully Reversible Water Electrolyzer Cell made up from FeCoNi (Oxy)hydroxide Atomic Layers
10:30 - 11:00	**Coffee Break**
	SolFuel 3.2 Chair: Ian Sharp Room: Plenum
11:00 - 11:30 3.2-I1	Todd Deutsch *(Chemistry and Nanoscience Center, National Renewable Energy Laboratory)*, James Young, Walter Klein, Myles Steiner Photo-Electrochemical Hydrogen Production Systems using III-V Semiconductors: Challenges in Scaling-up from an Electrode to a Device
11:30 - 12:00 3.2-O1	Thomas Hannappel *(Ilmenau University of Technology, Institute of Physics, Dep. Fundamentals of Energy Materials, Germany)*, Supplie Oliver, Agnieszka Paszuk, Hans-Joachim Lewerenz, Matthias M. May, Lara Eggert, Andreas Bund, Wen-Hui Cheng, Matthias H. Richter, Frank Dimroth, Lackner David, Ohlmann Jens Epitaxial Si-based Tandem Device Structures for Efficient Solar Water Splitting
12:00 - 12:15 3.2-O2	Kayo Koike *(RIKEN Center for Advanced Photonics)*, Tevye R Kuykendall, Shaul Aloni, Satoshi Wada, Katsushi Fujii Photoelectrochemical and Electrochemical Properties of GaN Nanowires
12:15 - 12:30 3.2-O3	Drialys Cardenas-Morcoso *(Universitat Jaume I, Institute of Advanced Materials (INAM) - Spain)*, Tsvetelina Merdzhanova, Vladimir Smirnov, Friedhelm Finger, Bernhard Kaiser, Wolfram Jaegermann, Sixto Gimenez “Hybrid Tandem Device Based on Thin-Film Silicon Photovoltaics and Nanostructured Water Oxidation Catalysts for Solar Water Splitting”

12:30 - 14:00	**Lunch**
	SolFuel 3.3 Chair: David Tilley Room: Plenum
14:00 - 14:30 3.3-I1	Kevin Sivula *(Institute of Chemical Sciences and Engineering, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland)* Materials for Robust, Inexpensive and High Performance Photoelectrochemical Fuel Production
14:30 - 15:00 3.3-I2	Alfred Ludwig *(Chair for Materials Discovery and Interfaces, Institute for Materials, Ruhr University Bochum, D-44801 Bochum)*, Swati Kumari, Helge Stein, Mona Nowak, Chinmay Khare, Kirill Sliozberg, Ramona Gutkowski, Joao Junqueira, Wolfgang Schuhmann Discovery of Solar Water Splitting Materials in Multinary Metal Oxide Systems by Combinatorial Synthesis and High-Throughput Characterization of Thin-Film Materials Libraries
15:00 - 15:15 3.3-O1	Virgil Andrei *(Department of Chemistry, University of Cambridge - UK)*, Haijiao Lu, Sebastian D. Pike, Robert L. Z. Hoye, Bertrand Reuillard, Shahab Ahmad, Dominic S. Wright, Michael De Volder, Richard Friend, Erwin Reisner Scalable Photoelectrochemical Perovskite-BiVO4 Tandem Devices for Solar Fuel Synthesis
15:15 - 15:30 3.3-O2	Ibbi Ahmet *(Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Institute for Solar Fuels, Germany)*, Sean Berglund, Abdelkrim Chemseddine, Peter Bogdanoff, Raphael Präg, Roel van de Krol Planar and Nanostructured n-Si/Metal-Oxide/WO3/BiVO4 Monolithic Tandem Devices for Unassisted Solar Water Splitting
15:30 - 16:00	**Coffee Break**
	SolFuel 3.4 Chair: David Tilley Room: Plenum
16:00 - 16:15 3.4-O1	Min-Kyu Son *(International Institute for Carbon-Neutral Energy Research(I2CNER), Kyushu University)*, Tatsumi Ishihara Investigation on Characterization of Sputtered Lanthanum Iron Oxide Film for Durable Photoelectrochemical Water Splitting
16:15 - 16:30 3.4-O2	Ronen Gottesman *(Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Germany)*, Angang Song, Roel van de Krol, Abdelkrim Chemseddine High-quality Stable CuBi2O4 Photoelectrodes by Combining Pulsed Laser Deposition and Rapid Thermal Processing
16:30 - 16:45 3.4-O3	Anna Wilson *(Department of Chemistry, Imperial College London)*, Sacha Corby, Laia Francás, James Durrant, Andreas Kafizas Investigating the Enhanced Performance of WO3 Photoanodes from the Addition of Pd Co-catalysts
16:45 - 17:00 3.4-O4	Rowshanak Irani *(Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Germany)*, Paul Plate, Peter Bogdanoff, Fatwa Firdaus Abdi, Roel van de Krol, Karsten Harbauer Interface Energetics and Photoelectrochemistry of MnOx-modified Ta-O-N Photoanodes