

nanoGe Fall Meeting 2018 (FallMeeting18)

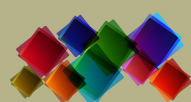
S2 Light Driven Water Splitting

Torremolinos, Spain, 2018 October 24th - 26th

Conference Chairs: Wolfram Jaegermann and Bernhard Kaiser

Conference Program

October 24th - Day 3 (Wednesday)	
	WatSpl S2.1 Chair: Christina Scheu Room: Mediterraneo ABC
14:30 - 15:00 S2.1-I1	Martin Rohloff, Björn Anke, Spark Zhang, Christina Scheu, Martin Lerch, <u>Anna Fischer</u> (<i>University Freiburg, IAAC, Germany</i>) Improving BiVO ₄ thin Film Photoanodes for Light-Induced Water Oxidation
15:00 - 15:15 S2.1-O1	<u>Luis I. Granone</u> (<i>Institute of Technical Chemistry, Gottfried Wilhelm Leibniz University Hannover, Callinstrasse 3, D-30167 Hannover, Germany</i>), Ralf Dillert, Detlef W. Bahnemann Effect of the Degree of Inversion on the Photocatalytic Activity of Spinel ZnFe ₂ O ₄
15:15 - 15:30 S2.1-O2	<u>Hamidreza Hajiyani</u> (<i>Department of Physics, Theoretical Physics and Center of Nanointegration (CENIDE), Universität Duisburg-Essen, Lotharstraße 1, 47057 Duisburg, Germany</i>), Alexander G. Hufnagel, Siyuan Zhang, Thomas Bein, Dina Fattakhova-Rohlfing, Christina Scheu, Rossitza Pentcheva Origin of Enhanced Efficiency of Tin-doped Ultrathin Hematite Photoanodes for Water-Splitting
15:30 - 15:45 S2.1-O3	<u>Sönke Müller</u> (<i>Institute for Solar Fuels, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Hahn-Meitner-Platz 1, 14109 Berlin, Germany</i>), James Hirst, Hannes Hempel, Daniel Peeters, Alexander Sadlo, Oliver Mendoza, Dariusz Mitoraj, Dennis Friedrich, Anjana Devi, Radim Beranek, Rainer Eichberger The Transport Pathways of Charge Carriers in CuWO ₄ for Photocatalysis
15:45 - 16:00	Discussion
16:00 - 16:30 S2.1-I2	<u>Vladimir Smirnov</u> (<i>IEK5-Photovoltaics, Forschungszentrum Jülich, 52425 Jülich, Germany</i>), Katharina Welter Multijunction Si Solar Cells for Integrated Photo-Electrochemical Devices
16:30 - 16:45 S2.1-O4	<u>Jens Melder</u> (<i>Institut für Anorganische und Analytische Chemie und Freiburger Materialforschungszentrum (FMF), Albert-Ludwigs-Universität Freiburg, Albertstraße 21, 79104 Freiburg</i>), Stefan Mebs, Philipp Heizmann, Holger Dau, Philipp Kurz Electrochemical Water Oxidation by MnOx/CFP – pH Dependence of the Catalytic Activity
16:45 - 17:00 S2.1-O5	<u>Alfred Ludwig</u> (<i>Institute for Materials, Ruhr-Universität Bochum, D-44801 Bochum, Germany</i>), Mona Nowak, Swati Kumari, Helge S. Stein, Ramona Gutkowski, Joao Junqueira, Wolfgang Schuhmann Combinatorial Fabrication and High-Throughput Characterization of Thin Film Metal Oxide Libraries for Solar water Splitting
October 25th - Day 4 (Thursday)	
	Plenary Session 5 Chair: Daniel Vanmaekelbergh Room: Torremolinos AB
09:00 - 09:30 5-K1	<u>Maksym Kovalenko</u> (<i>Institute of Inorganic Chemistry, Department of Chemistry and Applied Bioscience, ETH Zurich, 8093 Zurich, Switzerland</i>) Colloidal Nanocrystals of APbX ₃ Perovskites [A=Cs ⁺ , CH(NH ₂) ₂ ⁺ , X=Cl ⁻ , Br ⁻ , I ⁻]: Surface Chemistry, Self-Assembly and Potential Applications
	WatSpl S2.2 Chair: Laurence Peter Room: Mediterraneo ABC



09:00 - 09:30 S2.2-I1	Sophia Betzler, Thomas Gänslar, Katharina Hengge, Anna Frank, Siyuan Zhang, <u>Christina Scheu</u> (<i>Max-Planck-Institut für Eisenforschung Düsseldorf</i>) Nb ₃ O ₇ OH Nanoarrays for Photocatalytic Water Splitting: Defects, Dopants, and Stability of co-Catalysts
09:30 - 09:45 S2.2-O3	<u>Emanuel Ronge</u> (<i>University of Goettingen</i>), Vladimir Roddatis, Jonas Ohms, Philipp Kurz, Christian Jooss In-Situ Transmission Electron Microscopy Analysis of a Calcium-Birnessite Water-Oxidation Catalyst
09:45 - 10:00 S2.2-O4	<u>Thorben Petersen</u> (<i>Carl von Ossietzky University Oldenburg</i>), Thorsten Klüner Quantum Chemical Investigation of Water Splitting on ideal TiO ₂ -Anatase(101)
10:00 - 10:15 S2.2-O1	<u>Sanjay Mathur</u> (<i>Department of Chemistry, Inorganic Chemistry, University of Cologne</i>), Lasse Jürgensen, Yakup Gönüllü, Jennifer Leduc, Thomas Fischer Oxide Bilayers as High Efficiency Water Oxidation Catalysts through Electronically Coupled Phase Boundaries
10:15 - 10:30 S2.2-O2	<u>Sasa Lukic</u> (<i>Nanoparticle Process Technology (NPPT), Institute for Combustion and Gas Dynamics, University of Duisburg-Essen, 47057 Duisburg, Germany</i>), Jasper Menze, Martin Muhler, Markus Winterer Generation of Zinc-Gallium-Oxynitride Nanoparticles from CVS Powders for Photocatalytic Water Splitting
10:30 - 11:00	Coffee Break
	WatSpl S2.3 Chair: Bruce Parkinson Room: Mediterraneo ABC
11:00 - 11:30 S2.3-I1	Kristin Kirchberg, <u>Roland Marschall</u> (<i>Justus Liebig University Giessen</i>) Nanostructured Spinel Ferrite Materials for Photoelectrochemical Water Splitting
11:30 - 11:45 S2.3-O1	<u>Hyo-Jin Ahn</u> (<i>University of Erlangen-Nürnberg</i>), Anandarup Goswami, Francesca Riboni, Stepan Kment, Alberto Naldoni, Radek Zboril, Patrik Schmuki A Strategy to Decrease the High Onset Potential of Hematite Photoanodes by Gradient Doping and Decoration with Zn-Co Layered Double Hydroxide
11:45 - 12:00 S2.3-O2	<u>Hong Nhan Nong</u> (<i>Dept. of Chemistry, Technical University Berlin, Strasse des 17. Juni 124, TC 03, 10623 Berlin, Germany</i>), Tobias Reier, Paul Paciok, Detre Teschner, Marc Heggen, Valeri Petkov, Robert Schlögl, Travis Jones, Peter Strasser Operando Studies of Hole-Doped IrNiOx core-shell electrocatalysts for Water Oxidation in acidic Environment
12:00 - 12:15 S2.3-O3	<u>Maria Eugenia Toimil-Molares</u> (<i>GSI Helmholtz Centre for Heavy Ion Research</i>), Florent Yang, Dimitri Korjakin, Christina Trautmann, Christopher Schröck Photoelectrochemical Performance of Arrays of Cu ₂ O/TiO ₂ and Au/Cu ₂ O/TiO ₂ Nanowires Fabricated by Electrodeposition
12:15 - 12:30 S2.3-O4	<u>Cora Bubeck</u> (<i>University of Stuttgart, Institute for Material Science, Heisenbergstraße 3, 70569 Stuttgart, Germany</i>), Marc Widenmeyer, Gunther Richter, Mauro Coduri, Eduardo Salas Colera, Songhak Yoon, Frank Osterloh, Anke Weidenkaff Perovskite-type Oxynitrides LaTaO ₂ N and LaTaON ₂ – Synthetic Strategies
12:30 - 14:30	Lunch
14:30 - 16:00	Internal Project Meeting
	WatSpl S2.4 Chair: Krishnan Rajeshwar Room: Mediterraneo ABC
16:00 - 16:30 S2.4-I1	<u>Matthias M. May</u> (<i>University of Heidelberg</i>) Challenges and Opportunities of Water Splitting with Multi-Junction Solar Absorbers
16:30 - 16:45 S2.4-O1	<u>Laurent Pedesseau</u> (<i>Univ Rennes, INSA Rennes, CNRS, Institut FOTON - UMR6082, F-35000 RENNES</i>), Ida Lucci, Simon Charbonnier, Maxime Vallet, Pascal Turban, Yoan Leger, Tony Rohel, Nicolas Bertru, Antoine Létoublon, Jean-Baptiste Rodriguez, Laurent Cerutti, Eric Tournié, Anne Ponchet, Gilles Patriarche, Charles Cornet GaP Template on Si for Solar Water Splitting: Surface Energy Engineering

16:45 - 17:00 **Peter Cendula** (*University of Zilina*), Matthew T. Mayer, Jingshan Luo, Linfeng Pan, Michael Grätzel
 S2.4-O2 Elucidation of Photovoltage Enhancements and Charge Transport in Multijunction Cu₂O Photocathode through Semiconductor Simulations

17:30 - 19:00 **Poster session**

October 26th - Day 5 (Friday)

Plenary session 6

Chair: Sascha Sadewasser
 Room: Torremolinos AB

09:00 - 09:30 **Marina Leite** (*University of Maryland*)
 6-K1 Probing Solar Cells at the Nanoscale through Real-Time Functional Imaging

WatSpl S2.5

Chair: Roland Marschall
 Room: Mediterraneo ABC

09:30 - 10:00 **Laurence Peter** (*Department of Chemistry, University of Bath*), - Gurudayal, Lydia Helena Wong, Fatwa Abdi
 S2.5-O1 Understanding the Role of Nanostructuring in Photoelectrode Performance for Light-Driven Water Splitting

10:00 - 10:15 **Shababa Selim** (*Imperial College London, Department of Chemistry, South Kensington Campus, London, SW7*
 S2.5-O2 2AZ), Laia Francas, Camilo Mesa, Andreas Kafizas, Dongho Lee, Kyoung-Shin Choi, James R. Durrant
 Investigating the Influence of Nanostructuring on Photoanode Performance

10:15 - 10:30 **Fanxing Xi** (*Helmholtz Zentrum Berlin für Materialien und Energie GmbH*), Peter Bogdanoff, Sebastian Fiechter
 S2.5-O3 Activation of amorphous MoS_x as a hydrogen evolving catalyst in aqueous electrolysis

WatSpl S2.6

Chair: Matthias May
 Room: Mediterraneo ABC

11:00 - 11:30 **Krishnan Rajeshwar** (*The University of Texas at Arlington*)
 S2.6-O1 New Families of Ternary Rare Earth Chalcogenides for Photoelectrochemical Applications

11:30 - 11:45 **Wolfgang Schuhmann** (*Analytical Chemistry-Center for Electrochemical Sciences (CES), Ruhr-Universität*
 S2.6-O2 *Bochum, D-44801 Bochum, Germany*), Ramona Gutkowski, Joao Junqueira, Tim Bobrowski, Olga Krysiak
 Improving the Photoelectrocatalytic Activity of Metal-Doped BiVO₄-Based Photoabsorbers by Means of Oxygen Evolution Co-Catalysts

11:45 - 12:00 **Sixto Gimenez Julia** (*Institute of Advanced Materials (INAM), Universitat Jaume I, 12071 Castelló, Spain*), Miguel
 S2.6-O3 García-Tecedor, Drialy Cardenas-Moscoso, Roser Fernández-Climent
 Water oxidation with metal oxide semiconductor materials

12:00 - 12:30 **Bruce Parkinson** (*Department of Chemistry, University of Wyoming, Laramie, WY, USA*)
 S2.6-O4 The Past, Present and Future of Solar Fuels

Poster Contribution

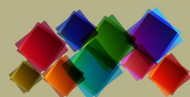
032 **Jonathan Kampmann** (*Ludwig-Maximilians-Universität (LMU) München*), Torben Sick, Alexander Hufnagel, Ilina
 Kondofersky, Markus Döblinger, Kristina Peters, Daniel Böhm, Dina Fattakhova-Rohlfing, Thomas Bein
 Conjugated 2D Covalent Organic Framework Thin Films as novel Absorber Material for Photoelectrochemical Hydrogen
 Evolution

037 **Dennis Zywitzki** (*Inorganic Materials Chemistry, Ruhr-University Bochum, 44801 Bochum, Germany*), Dereje Taffa, Jiyeon
 Kim, Michael Wark, Radim Beranek, Anjana Devi
 Vapor Phase Deposited Cobalt Oxide: A Highly Versatile Material System for Photoelectrochemical Water Splitting

045 **Katharina Welter** (*Forschungszentrum Jülich GmbH, Institute of Energy and Climate Research – 5 Photovoltaics, 52425*
Jülich (Germany)), Niloofar Hamzelui, Vladimir Smirnov, Jan-Philipp Becker, Wolfram Jaegermann, Friedhelm Finger
 Catalysts from Earth Abundant Materials in a Scalable, Stand-Alone Photovoltaic-Electrochemical Module for Solar Water
 Splitting

048	<u>Ting Zhang</u> (<i>Catalan Institute of Nanoscience and Nanotechnology (ICN2), CSIC and BIST, Campus UAB, Bellaterra, 08193 Barcelona, Spain</i>), PengYi Tang, JunShan Li, ZhiShan Luo, Yong Zuo, JunFeng Liu, Jordi Llorca, Andreu Cabot, Jordi Arbiol NiSn Bimetallic Nanoparticles as Stable Electrocatalysts for Methanol Oxidation Reaction
053	<u>Thomas Teusch</u> (<i>Carl von Ossietzky University Oldenburg</i>), Thorsten Klüner Adsorption and Dissociation of Water on Tungsten Trioxide (001)
057	<u>Dereje Taffa</u> (<i>Institute of Chemistry, Chemical Technology 1, Carl von Ossietzky University Oldenburg, Carl-von-Ossietzky-Str. 9-11, 26129 Oldenburg, Germany</i>), Sven Warfsmann, Michael Wark Stoichiometrically Varied Electrodeposited Ferrite Films for Photoelectrocatalytic Oxidation of Water
063	<u>Swati Kumari</u> (<i>Chair for MEMS Materials, Institute for Materials, Ruhr-Universität Bochum</i>), João R. C. Junqueira, Ramona Gutkowski, Aleksander Kostka, Katharina Hengge, Mona Nowak, Christina Scheu, Wolfgang Schuhmann, Alfred Ludwig Investigation of Vanadate-Metal-Oxide Thin Film Systems for Solar Water Splitting
072	Hamidreza Hajiyani, <u>Rossitza Pentcheva</u> (<i>Department of Physics, University of Duisburg-Essen, Germany</i>) Role of surface orientation, termination and composition on the activity of $\text{Co}_x\text{Ni}_{1-x}\text{Fe}_2\text{O}_4$ as an anode material for OER: insights from DFT+U calculations
101	<u>João Ricardo Coelho Junqueira</u> (<i>Analytical Chemistry – Center for Electrochemical Sciences (CES), Ruhr-Universität Bochum, Universitätsstr. 150, D-44780 Bochum, Germany</i>), Tim Bobrowski, Olga Anna Krysiak, Ramona Gutkowski, Wolfgang Schuhmann A Simple Method for Preparation and Optimisation of Mo-Modified BiVO_4 Photoabsorbers and the Influence of Oxygen Evolution Catalyst Addition on the PEC Performance
102	<u>Iwona Grądzka</u> (<i>Faculty of Physics, Adam Mickiewicz University in Poznań, Umultowska 85, 61-614 Poznań, Poland</i>), Mateusz Gierszewski, Marcin Ziólek Studies of Charge Transfers on TiO_2 Surface Sensitized with Ruthenium Complexes in Light-Driven Water Splitting Systems
113	<u>Prince Bassi</u> (<i>Institute for Solar Fuels, Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Hahn-Meitner-Platz 1, 14109 Berlin, Germany</i>), Sebastian Fiechter Accessing the Performance of Fe_2TiO_5 Based Photoelectrocatalyst Films Deposited through Different Synthesis Routes
121	<u>Siyuan Zhang</u> (<i>Max-Planck-Institut für Eisenforschung GmbH, Max-Planck-Straße 1, 40237 Düsseldorf, Germany</i>), Leo Diehl, Bettina Lotsch, Christina Scheu NiO_x Cocatalysts on Nanosheets for Photocatalytic Water Splitting
216	<u>Martin Rohloff</u> (<i>Institut für Anorganische und Analytische Chemie und Freiburger Materialforschungszentrum (FMF), Albert-Ludwigs-Universität Freiburg, Albertstraße 21, 79104 Freiburg</i>), Björn Anke, Anna C. Ulpe, Thomas Bredow, Martin Lerch, Anna Fischer Fluorinated BiVO_4 Powder and BiVO_4 Thin Films – Fluorine Incorporation Yields Improved Light-Induced Water Oxidation Performance
237	<u>Alexander Sadlo</u> (<i>Inorganic Materials Chemistry, Ruhr University Bochum, Germany</i>), Anjana Devi Fabrication of $\text{Ga}(\text{Sbx})\text{N}_{1-x}$ Photoanodes - A Potential Visible Light Absorber Material for Solar Water Splitting
244	<u>Katarzyna Skorupska</u> (<i>Department of Inorganic Chemistry, Fritz-Haber-Institut der Max-Planck-Gesellschaft, Faradayweg 4-6, Berlin, 14195, Germany</i>), Travis E. Jones, Rik Mom, Detre Teschner, Michael Hävecker, Thomas Lunkenbein, Jens Melder, Philipp Kurz, Cheng-Hao Chuang, Axel Knop-Gericke, Robert Robert Schlögl Approaches to In-Situ Measurements of Manganese Oxides Under OER
253	<u>Francesca Maria Toma</u> (<i>Joint Center for Artificial Photosynthesis and Chemical Sciences Division, Lawrence Berkeley National Laboratory, Berkeley, CA 94720, USA</i>), Guiji Liu Accelerated Discovery of Functional Light Absorber/Catalyst Interfaces
269	<u>Hoang Phi Tran</u> (<i>AK Strasser, TU Berlin</i>) Influence of Doped Tin Oxide Support on the Formation, Stability and Activity of Core – Shell Nanoparticles $\text{IrCo}@\text{IrO}_x$ Catalyst for Water Splitting.

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| 280 | <p><u>natav yatom</u> (<i>Department of Materials Science and Engineering, Technion – Israel Institute of Technology, Haifa 3200003, Israel</i>), Maytal Caspary Toroker
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| 283 | <p><u>Thorsten Cottre</u> (<i>Institute of Material Science, Technische Universität Darmstadt, 64287 Darmstadt, Germany</i>), Melanie Kranz, Katharina Welter, Emanuel Ronge, Vladimir Smirnov, Friedhelm Finger, Christian Jooss, Bernhard Kaiser, Wolfram Jaegermann
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| 284 | <p><u>Marc Widenmeyer</u> (<i>University of Stuttgart, Institute for Material Science, Heisenbergstraße 3, 70569 Stuttgart, Germany</i>), Cora Bubeck, Alexandra T. De Denko, Frank Osterloh, Songhak Yoon, Anke Weidenkaff
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| 286 | <p><u>Daniel Böhm</u> (<i>Department of Chemistry and Center for NanoScience (CeNS), University of Munich (LMU), Butenandtstraße 5-13 (E), 81377 Munich, Germany</i>), Michael Beetz, Christopher Kutz, Dina Fattakhova-Rohlfing, Thomas Bein
Structure-Activity Relations in Transition Metal Doped Nickel Oxide-Based Nanocatalysts for Electrochemical Water Oxidation</p> |
| 291 | <p><u>Marie-Luise Grutza</u> (<i>Institut für Anorganische und Analytische Chemie and Freiburger Materialforschungszentrum (FMF), Albert-Ludwigs-Universität Freiburg, Albertstraße 21, 79104 Freiburg, Germany</i>), Philipp Kurz
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| 327 | <u>Luis Granone</u> (<i>Institute of Technical Chemistry, Gottfried Wilhelm Leibniz University Hannover, Callinstrasse 3, D-30167 Hannover, Germany</i>), Ralf Dillert, Detlef Bahnemann
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| 329 | <u>Florian Neuberger</u> (<i>Eduard-Zintl-Institut für Anorganische und Physikalische Chemie, Technische Universität Darmstadt, Alarich-Weiss-Straße 8, 64287 Darmstadt, Germany</i>), Thorsten Cottre, Bernhard Kaiser, Wolfram Jaegermann, Rolf Schäfer
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| 333 | Radim Beranek, <u>Dariusz Mitoraj</u> (<i>Institute of Electrochemistry, Ulm University, Albert-Einstein-Allee 47, 89069 Ulm, Germany</i>)
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Sustained Water Oxidation by Direct Electrosynthesis of Ultrathin Organic Protection Films on Silicon |