SOLAR TECHNOLOGIES go HYBRID
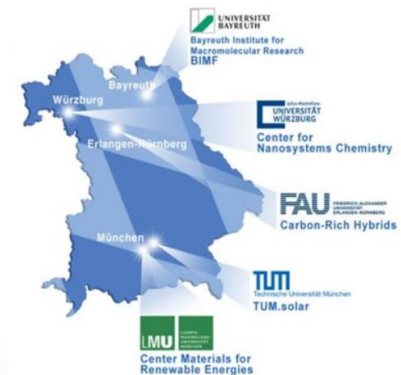
An Initiative of the Bavarian Ministry for Science and Arts

11th SolTech Conference

October 10-13, 2022

Nano-Institute @ LMU Munich

General Information

Chair

Prof. Dr. Jochen Feldmann

Organizing Team

Gerlinde Adam

Dr. Theobald Lohmüller

Stefan Niedermaier

Mariam Kurashvili

Viola Steidl

Nano-Institute Munich

Physics Department

Ludwig-Maximilians-Universität (LMU)

Königinstraße 10

80539 Munich

Contact

Viola Steidl

Steidl.Vio@physik.uni-muenchen.de

A warm welcome to the 11th SolTech Conference

"Solar Technologies Go Hybrid" (in short SolTech) is a Bavarian-based research network, in which five Bavarian universities (Key Labs) are joining forces to develop novel material systems for solar energy conversion and storage. This unique consortium began its collaborative research activities in 2012 as an important action within the framework of the "Energy Transition". After evaluations in 2016 and 2021 the SolTech network is now in its third phase of cooperative research efforts. Generous funding provided by the Free State of Bavaria enables the SolTech Key Labs to investigate novel scientific approaches. Importantly, SolTech has steadily developed its interaction with industry. In this conference reputed Key-Note speakers from academia and industry as well as KeyLab members are presenting their latest research results and novel technological solutions. Another important goal of the SolTech network is to promote intensive exchange of scientific and technological ideas between graduate students from the five Key Labs. To this end two poster sessions will provide opportunities for lively scientific discussions.

The extensive work carried out by the organizing team and in particular by Viola Steidl, is greatly acknowledged. Altogether, the 11th SolTech Workshop is planned as a stimulating scientific event initiating new collaborations and novel innovative ideas.

Thank you for attending, and again, welcome to Munich.

KeyNote Speakers

Marcella Bonchio, University of Padova

Maximilian Fleischer, Siemens Energy

Ferdinand Grozema, TU Delft

Marc Koper, University of Leiden

Achim Löffler, BASF SE

Sandra Luber, University of Zurich

Annamaria Petrozza, IIT Milano

Erwin Reisner, University of Cambridge

Have a look at the Book of Abstracts:

Link: https://www.soltech-go-hybrid.de/wp-content/uploads/2022/10/BookOfAbstracts.pdf (will be available soon)

Password: SolTech2022

QR-Code for Book of Abstracts

Monday Program

Monday, October 10, 2022	
13:00 - 14:00	Registration
14:00	Opening Remarks
14:10	Welcome address: Prof. Oliver Jahraus, Vice-President LMU
Session 1	
14:20	**KeyNote: Maximilian Fleischer (Siemens Energy)** The New Energy System and its Industrial Challenges
15:00	**Student Highlights** Elise Sirotti (TUM) Neeta Karjule (Univ. Würzburg) Harishankar Balakrishnan (LMU) René Weiß (FAU) Dennis Schröder (Univ. Bayreuth)
15:30	Questions & Discussions to Highlights
15:45	Coffee Break & Discussions
Session 2	
16:15	Bettina Lotsch (MPI-FKF Stuttgart) 2D Molecular Frameworks for Solar energy Conversion and Storage: From Design to Function
16:35	Meike Kuhn (Univ. Bayreuth) Controlling the Crystallization Process of MAPbI3 with Specifically Designed Supramolecular Additives
16:55	Jacek Stolarczyk (Jagiellonian Univ. Krakow) Light-Triggered Hydrogen Production from Alkaline Methanol
17:15	Poster Session 1 and Get Together

Tuesday Program

Tuesday, October 11, 2022	
Session 3	
09:00	**KeyNote: Marcella Bonchio (Univ. of Padova)** Supramolecular Quantasomes for Artificial Photosynthesis
09:40	Holger Braunschweig (Univ. Würzburg) Activation of Small Molecules: Can Boron act as a Transition Metal?
10:00	Lisa Günther (Univ. Bayreuth) Chlorosomes in the Light of Single-Molecule Spectroscopy
10:20	Thomas Fässler (TUM) Intermetallic Compounds Composed of Abundant Elements for Efficient Electrocatalytic Water-Splitting
10:40	Coffee Break & Discussions
Session 4	
11:10	**KeyNote: Ferdinand Grozema (TU Delft)** Tuning the Properties of Two-Dimensional Hybrid Halide Perovskites
11:50	Alexander Urban (LMU) Halide Perovskite Nanoplatelets: Shaping a New Generation of Light Emitters
12:10	Norbert Jux (FAU) Nanographene-Porphyrin Hybrids
12:30	Lunch Break & Discussions

Tuesday, October 11, 2022	
Session 5	
14:00	**KeyNote: Marc Koper (Univ. of Leiden)** Mechanisms of Electrochemical Hydrogen Evolution and CO_2 Reduction
14:40	Verena Streibel (TUM) Transition Metal Nitride and Oxynitride Thin Films for Photoelectrochemical Water Splitting
15:00	Tim Schlossarek (Univ. Würzburg) Self-assembled Ru(bda) Coordination Oligomers as Efficient Catalysts for Visible Light-Driven Water Oxidation in Water
15:20	Coffee Break & Discussions
Session 6	
15:50	Simon Biberger (Univ. Bayreuth) Influence of the Ionic Liquid BMIMBF4 on the Film Formation and Optoelectronic Properties of MAPbI3 Thin Films
16:10	Marcel Krug (FAU) Photophysics and Intervalence Charge Transfer Reactions of Nitrogen-Centered Polycyclic Aromatic Hydrocarbons
16:30	Huaying Zhong (TUM) Stacking Kinetics of PbS Quantum Dots Orientated by the Perovskite Matrix During Printing
16:50	End of Presentations
19:00	Dinner with KeyNote Speakers (on invitation)

Wednesday Program

Wednesday, October 12, 2022	
09:00 – 11:00	Free time (optional: Lab Tours in the Nano-Institute)
Session 7	
11:00	**KeyNote: Erwin Reisner (Univ. of Cambridge)** Wireless Thin Film Technologies for Solar-to-Chemical Conversion
11:40	Alejandro Cadranel (FAU) Photocatalytic Carbon Nanodots: Mechanisms and Structural Insights
12:00	Suvendu Karak (Univ. Würzburg) Ruthenium(bda)-based Covalent Organic Framework for Cooperative Water Oxidation
12:20	Lunch Break & Discussions
Session 8	
14:00	**KeyNote: Annamaria Petrozza (IIT Milano)** Defects Activity in Metal Halide Perovskite Semiconductors
14:40	**Student Highlights** Adrian Hochgesang (Univ. Bayreuth) Christoph Oleszak (FAU) Kilian Frank (LMU) Rebecca Fröhlich (Univ. Würzburg) Guangjiu Pan (TUM)
15:10	Questions & Discussions to Highlights
15:30	Coffee Break & Discussions

Wednesday, October 12, 2022	
Session 9	
16:00	Quinten Akkerman (LMU) Synthesis and Excitons in Spheroidal Perovskite Quantum Dots
16:20	Manuel Reus (TUM) In Situ GIWAXS Investigations of Printed Perovskite Thin Films
16:40	Stephan Kümmel (Univ. Bayreuth) Predicting and Visualizing Excitation Energy Transfer
17:00	Poster Session 2 and Get Together

Thursday Program

Thursday, October 13, 2022	
Session 10	
09:00	**KeyNote: Achim Löffler (BASF SE)** How to Create Chemistry for a Sustainable Future
09:40	Wolfgang Brütting (Univ. Augsburg) Controlling Spontaneous Orientation Polarization in Organic Semiconductors
10:00	Julian Hungenberg (Univ. Bayreuth) Synthesis of Stable Self-Doped, Hydrophilic, and Conjugated Polymers
10:20	Dana Medina (LMU) TBA
10:40	Coffee Break & Discussions
Session 11	
11:10	**KeyNote: Sandra Luber (Univ. of Zurich)** Insight into Solar Light-Driven Water Splitting by Forefront Simulations
11:50	Tobias Osterrieder (FAU) Multi-Parameter and Multi-Objective Optimization of Ternary and Quaternary Composites on Automated Research Lines
12:10	Emiliano Cortés (LMU) Plasmonics and Photonics for Solar Energy Conversion
12:30	Lunch Break & Discussions

Thursday, October 13, 2022	
Session 12	
14:00	Jürgen Schatz (FAU) Supramolcular Hybrids Based on Stable Organic Cations and Electron-rich Pillarerens as Macrocyclic Binding Sites
14:20	Xiangzhou Zhu (TUM) Inspecting Anharmonicity and Intensified Band-To-Band Transitions in Halide Perovskites from First-Principles
14:40	Maximilian Frank (Univ. Würzburg) Tuning Electronic and Ionic Thermoelectric Transport Properties in Solid Polymer Electrolytes by Carbon Based Additives
15:00	Frank Würthner (Univ. Würzburg) Electron-poor Nanographenes: Synthesis, Supramolecular Chemistry and Applications in Photovoltaics
15:20	Closing Remarks and End of Conference

Poster Session 1

P1	Elucidating the Roles of Nafion/Solvent Formulations in Copper Catalyzed CO_2 Electrolysis	Pan Ding (TUM)
P2	Identifying the Signatures of Short Range Order in Blends of PM6 with Y6 and N4 using Absorption Spectroscopy	Daniel Kroh (Univ. Bayreuth)
P3	Characterization of Carbon Dioxide Reduction on Gold Using a Nanophotonic-Electrochemical Platform for SEIRAS	Malo Duportal (TUM)
P4	Structure-Stability Relationship in Y-Series Electron Acceptors for Stable Organic Solar Cells under Real-World Climates	Jianhua Han (Univ. Würzburg)
P5	Novel π-extended Near-Infrared Materials Based on Conjugated BODIPY-Anthracenes	Swathi Krishna (FAU)
P6	Pt/g-CN Loaded Hydrogel Films as a H_2 Production Device	Morgan Le Dû (TUM)
P7	Charge Carrier Dynamics in Lead Free Perovskites and Wurster Type COFs	Alexander Biewald (LMU)
P8	Selective Synthesis of GNR-Porphyrin Conjugates	Filip Božinović (FAU)
P9	Deriving a Robust Atomistic Model of Light-Harvesting Antennea in Biological Chlorosomes	Michael Bühler (Univ. Würzburg)
P10	Band Gap Tuning in Double Salts Bearing Germanium Clusters and Metal Oxides	Dominik Dankert (TUM)
P11	Precursor Optimization of Covalent Organic Frameworks for Efficient CO_2 Reduction Electrocatalysis	Kenichi Endo (MPI-FKF Stuttgart))
P12	CO_2 Binding and Functionalization Using Diborenes	Maximilian Eyßelein (Univ. Würzburg)

P13	In Situ GISAXS Printing of Hybrid Organic-Inorganic Nanostructures Based on Biopolymer Templating	Linus Fidelis Huber (TUM)
P14	Single Crystal Growth and Characterisation of Complex Double Cation – Double Halide Perovskites	Julian Höcker (LMU)
P15	Tunable Iridium(III) Complexes as Sensitizers for Organic Photocatalysis via Triplet-Triplet Energy Transfer	Lukas Mai (FAU)
P16	Transition Metal Complexes as Tools for Solar Fuel Generation	Michaela Reil (FAU)
P17	Tetracene Dimers: A Platform for Balancing Intramolecular Up- and Down-Conversion	René Weiß (FAU)
P18	Heterogeneous Electrochemical Water Oxidation Catalysis with Linear Ru(bda) Oligomers	Tilman Schneider (Univ. Würzburg)
P19	Using a Dynamic Tight-Binding Model to Calculate the Temperature-dependent Electronic Structure of Semiconductors	Martin Schwade (TUM)
P20	Towards CD-Spectroscopy of Single Chlorosomes	Stefan Goppelt (Univ. Bayreuth)
P21	Facilitated Triplet Decoherence Through Spatial Separation of Triplet Excitons in a Pentacene Hexamer	Dominik Thiel (FAU)
P22	Model Hamiltonian Generator for Calculating Singlet Fission Rates in Dye Aggregates	Anurag Singh (Univ. Würzburg)
P23	Homoleptic Complexes of Bis(4-Carboxylpyrazol-1-yl)acetate: Defined Building Blocks for Metal-Organic Frameworks (MOFs)	Wintana Tzegai (FAU)

Poster Session 1   Notes

P24	Post-Synthetic Modification of Porphyrinic Covalent Organic Frameworks for Electrochemical Carbon Dioxide Reduction	Samuel Van Gele (MPI-FKF Stuttgart))
P25	Metalloporphyrin Integrated Covalent Organic Frameworks for Photocatalytic CO_2 reduction	Liang Yao (MPI-FKF Stuttgart))
P26	Direct Band Gap Semiconductors in Ternary Alkali Metal Phosphides	Sabine Zeitz (TUM)
P27	Self-Assembly and Photocatalytic Activity of Heptazine-based Supramolecular Nanofibers	Dennis Schröder (Univ. Bayreuth)
P28	Understanding Phtalocyanine-Molybdenum Disulfide Charge Transfer Nanohybrids	Elena Mack (FAU)
P29	Optical Stability and Degradation in BDTW-COF Material	Zehua Xu (LMU)
P30	A 'Binary'-System Based on Interchromophore Couplings in Diamantane Linked Pentacene Dimers	Phillip Greißel (FAU)
P31	Passivated Powder Aerosol Deposited Perovskite Films for Optoelectronic Devices	Philipp Ramming (Univ. Bayreuth)
P32	In-Situ Observation of Growth Mechanism During Printing of 2D Perovskite Films	Kun Sun (TUM)
P33	Truxenone Triimide: Two-Dimensional Molecular Arrangements of Triangular Molecules for Air Stable n-Type Semiconductors	Sharvan Kumar (Univ. Würzburg)
P34	Investigating the Impact of Surfactants on Perovskite Film Formation Using In Situ Optical Spectroscopy	Tobias Siegert (Univ. Bayreuth)
P35	With the Effect of Solvents and Additives on the Aggregation Behavior of Y6	Isabel Erhard (Univ. Bayreuth)

Poster Session 2

P1	Exploring the Use of mGGAs in TDDFT	Rian Richter (Univ. Bayreuth)
P2	Integration of Yolk-Shell Nanocatalyst into Hollow Porous Elelctrospun Nanofibers for Photocatalytic Applications	Labeesh Kumar (Univ. Bayreuth)
P3	Defect-Engineered Atomic Layer Deposited Tantalum Oxide Protection Layers for Photoelectrochemistry	Tim Rieth (TUM)
P4	Brightening Organic Triplet States via Heavy Metal-π-Interaction Induced Intersystem Crossing	Meng-Jia Sun (Univ. Würzburg)
P5	Unraveling Single-Particle Dynamics of Energy Conversion Nanomaterials with Interferometric Scattering Microscopy	Christoph Gruber (LMU)
P6	Electrocatalytic CO_2-Reduction Using a New Cobalt-Porphyrin.	Christian Wilhelm (LMU)
P7	Single Particle Thermometry in Bimetallic Plasmonic Materials	Julian Gargiulo (LMU)
P8	Semi-Automated Synthesis and Autonomous Optimization of Molecular Materials for Photovoltaic Applications	Jianchang Wu (FAU)
P9	Enhanced Air Stability of Green-Solvent Polymer Solar Cells with Green-Fluorescent Polymer (GFP)	Zerui Li (TUM)
P10	Importance of Vibrational Anharmonicity for the Band Gap of the Halide Perovskite $CsPbBr_3$	Stefan Seidl (TUM)
P11	Förster Resonance Energy Transfer in BODIPY-Pentacene Dimer Conjugates	Anna-Sophie Wollny (FAU)

P12	Optical Properties of $Cs_2NaFeCl_6$ Reveal Low Exciton Binding Energies	Melina Armer (Univ. Würzburg)
P13	Non-Covalent Functionalization of Graphene Nanosheets with Electron Donor-Acceptor Conjugate	Giovanni Beneventi (FAU)
P14	UV/Vis Spectroscopic Binding Studies by Using Triangulenes	Michael Böck (FAU)
P15	Sharp Optical Absorption Profiles Enabled by Large Transversal Halide Motion	Sebastian Caicedo Dávila (TUM)
P16	Slot-Die Printing of Inverse Opal Structured Germanium	Christian Fajman (TUM)
P17	Differential Cyclic Plasmo-Voltammetry on Macroscopic Gold Nano Arrays	Moritz Feil (TUM)
P20	Photocatalytic Proton Reduction with Biomimetic [FeFe]-Hydrogenase Complexes	Jan Schäfer (Univ. Würzburg)
P21	Optical Characterization of Perovskite Nanocrystals	Andreas Singldinger
P22	Electrocatalytic Activity of Au/Titanium Oxide Nanostructures for The Hydrogen Evolution Reaction	Andrea Sterr (TUM)
P23	Supramolecular Receptors Based on Pillararenes	Lucas Teichgräber (FAU)
P24	Decoding the Self-Assembled Plasmonic Interface Structure in PbS Colloidal Quantum Dot Solids for Photodetector	Tianfu Guan (TUM)
P25	Understanding Defects in Ta_3N_5 Thin Film Photoelectrodes	Lukas Wolz (TUM)

Poster Session 2

Notes

P26	Highly Crystalline 2D Conjugated Dibenzo[g,p] Chrysene-Based Large-Pore Kagome Covalent Organic Frameworks	Tianhao Xue (LMU)
P27	Designing Covalent Organic Frameworks Through Active Machine Learning	Yuxuan Yao (Univ. Bayreuth)
P28	Automated Synthesis and Characterization of Lead-Free halide Perovskites: Case of $Cs_2Ag_xNa_{1-x}Bi_yIn_{1-y}Cl_6$ (CANBIC)	Marina Günthert (FAU)
P29	Heterovalent Tin Alloying in Layered $MA_3Sb_2I_9$ Thin Films: Assessing the Origin of Enhanced Absorption and Self-Stabilizing Charge States	Andreas Weis (LMU)
P30	Spin Polarization Dynamics in Perovskite Nanocrystals	Amrita Dey (LMU)
P31	Zethrene-Based Chiral Biradicaloids	Johannes Hennemann (Univ. Würzburg)
P32	CuSe, FeSi and $CaFe_6Ge_6$ as (Pre)catalysts for Electrocatalytic Water Splitting	Viktor Hlukhyy (TUM)
P33	Silver-Bismuth Based 2D Double Perovskites $(4FPEA)_4AgBiX_8$ (X = Cl, Br, I): Highly Oriented Thin Films with Large Domain Sizes and Ultrafast Charge-Carrier Localization	Rik Hooijer (LMU)
P34	Nanographene-Fused Porphyrins	Christoph Oleszak (FAU)
P35	Thin Film Surface Phonon Polariton Dispersion in Free-Standing Silicon Carbide Membranes	Andrea Mancini (LMU)
P36	Random Lasing with dye-doped Fluorescent Aerogels	Matthias Kestler (LMU)