

Telluride Workshop
Solar Solutions to Energy and Environmental Problems

Aug. 3-7, 2015

Telluride Elementary School @ 447 W Columbia Ave, Telluride CO

Co-Organizers: Jao van de Lagemaat and Ksenija Glusac

TSRC Host: Mark Kozak, 970-708-4426

Sunday August 2nd

6:30 – 8:30 pm Join the organizers at the Arroyo Wine Bar. Badges can be collected from TSRC representatives in the Sheridan bar across the street 6-9 pm.

Monday August 3rd

8:00 – 8:30 Breakfast at the TSRC meeting site for participants only

8:30 Welcome and Introductory remarks - Jao van de Lagemaat and Ksenija Glusac

Singlet Fission and Other Molecular Multiexciton Processes

9:00 – 9:45 *Structural Design Rules for Singlet Fission Materials*

Josef Michl, UC Boulder

9:45 – 10:05 *Singlet-Based Cooperative Energy Pooling for Photon Upconversion*

Daniel Weingarten, UC Boulder

10:05 – 10:50 *Theory of Singlet Fission in Carotenoid and Acene Crystals, and in Low Band Gap Donor-Acceptor Polymers*

Sumit Mazumdar, U of Arizona

10:50 – 11:35 *Singlet Fission & Solar Energy Conversion Beyond the Limit*

Xiaoyang Zhu, Columbia

11:35 – 1:00 Catered Lunch Provided at the TSRC Meeting Site

1:00 – 2:00 Discussion: *Inexpensive ways of exceeding the Shockley-Queisser limit (singlet fission, MEG, hot carriers, photon pooling).*

Molecular Catalysis

2:00 – 2:45 *Thermodynamic Considerations in the Design of Molecular Electrocatalysts for Efficient H⁺ and CO₂ Reduction*

Jenny Yang, UC Irvine

2:45 – 3:30 *New Systems for the Conversion of CO₂ to Fuels using Sunlight*

Joel Rosenthal, U of Delaware

3:30 – 4:30 Discussion: (a) *How to capture CO₂ that is already dispersed in air?* (b) *Stability of molecular catalysts.*

Tuesday August 4th

8:00 – 8:30 Breakfast at the TSRC meeting site for participants only

Dye Sensitization and Photoelectrodes

8:30 – 9:15 *Dye-Sensitized Solar Fuels and Solar Batteries*

Yiying Wu, OSU

9:15 – 10:00 *Merging Dye Sensitization and Catalysis: Photochemical Fuel Forming Reactions Using p-GaP Photoelectrode and Biomimetic NAD⁺/NADH Analogs*

Ksenija Glusac, BGSU

10:00 – 10:45 *Designing Chemically Robust Solar-Responsive Oxide Materials for Photoelectrochemical Oxidation Reactions*

Bart Bartlett, U of Michigan

10:45– 11:45 Discussion: *Benchmarks for assessing solar energy-to-chemical energy conversion*

11:45– 1:00 Catered Lunch Provided at the TSRC Meeting Site

1:00 – 1:45 *Dye-Sensitized Photoelectrosynthesis Cells*

Gerald J. Meyer, Chapel Hill

1:45 – 2:30 *Semiconductor Systems and Catalysis for Photoelectrochemical Water Splitting*

John Turner, NREL

2:30 – 3:15 *TBA*

Garry Moore, ASU

3:15 – 4:00 *Protons: The Other Charge Carrier in Solar Fuels Reactions*

Shane Ardo, UC Irvine

4:00 – 5:00 Discussion: *1) Transparent electrodes; 2) Economic, environmental impact, and competitiveness of future generation PV and solar fuels compared to Si and other present day technologies.*

6:00 - 7:15 pm: TSRC town talk: [Forest Rohwer](#), Professor of Biology, San Diego State University: *Personalized Medicine for Coral Reefs*, Sheridan Opera House

Wednesday August 5th

7:30 - 8:00 am breakfast at the TSRC meeting site for participants only

8 am – 3 pm Via Ferrata/Free time

12:00– 1:00 Catered Lunch Provided at the TSRC Meeting Site

Metal-Organic Frameworks and Proton Transport

4:00 – 4:45 *AIM-ing for Catalyst Discovery*
Joseph Hupp, Northwestern

4:45 – 5:30 *Exploring Metal Organic Frameworks for Use as Integrated Artificial Photosynthetic Assemblies*
Amanda Morris, Virginia Tech

5:30 – 6:15 Discussion: *a) Ideal architectures for photoelectrochemical devices (wireless vs. wired devices; pH effects)*

6:00 – 9:00 TSRC picnic: Telluride Elementary School at 447 W Columbia Ave (under the tent - family welcome)

Thursday August 6:

Perovskites

8:00 – 8:30 Breakfast at the TSRC meeting site for participants only

8:30 – 9:15 *Perovskite Solar Cells: Materials, Devices and R&D Opportunities*
Kai Zhu, NREL

9:15 – 10:00 *Interfacial Energetics and Ultrafast Dynamics of Excitons and Charge Carriers in Perovskites*

Jaou van de Lagemaat, NREL

10:00 – 10:45 *Prospects for Future Generation Solar Photon Conversion to PV and Fuels: Multiple Exciton Generation in Quantum Dot Solar Cells, Organic PV and Singlet Fission, and Perovskites*

Arthur Nozik, UC Boulder

10:45 – 11:45 Discussion: *Perovskites (their effect on dye-sensitized cells and organic photovoltaics; what makes the charge separation in perovskites so efficient)*

11:45 – 1:00 Catered Lunch Provided at the TSRC Meeting Site

Organic PVs

1:00 – 1:45 *Redox Potentials Without Electrolyte and Charge Transport Along Conjugated Chains*

John Miller, Brookhaven

1:45 – 2:30 *The Prospects of Using Spectrum Splitting as a Feasible Route to Exceeding the Shockley Queisser Limit*

Sean Shaheen, UC Boulder

2:30 – 2:50 *CELIV Measurements of Charge Transport Properties and Their Dependence on Polymer Packing in Organic Photovoltaics*

Alexander Dixon, UC Boulder

2:50 – 3:50 Discussion: *1. Charge Transport in disordered Systems; 2. What are the necessary steps towards a commercial solar water splitting device? 3. What are the prospects for 3rd generation conversion mechanisms - are they relevant for the future with the rapid drop of PV prices.*

6:00 – 8:00 Closing dinner, location TBD

Friday August 7:

7:30 - 8:00 am breakfast at the TSRC meeting site for participants only