Telluride Workshop

**Solar Solutions to Energy and Environmental Problems**

Aug. 5-9, 2013

Telluride Intermediate School 725 W. Colorado, Telluride CO

Co-Organizers: Jeanne McHale and Bruce Parkinson

**TSRC Hosts:** Exec Director, Nana Naisbitt 970-708-0004

Asst Director Rory Sullivan, 970-708-0004

Schedule

**Sunday PM August 4th**

6:00 - 9:00 PM Welcome Reception for all scientists, New Sheridan Bar, 231 W Colorado Ave, in Telluride. Drink specials, free pool games, no food. TSRC employee on hand at the bar to pass out badges and assist with questions (6:00 to ~ 8:00pm).

**Monday August 5th**

7:30 – 8:00 Breakfast at the TSRC meeting site for participants only

8:00 Welcome and Introductory Remarks - Bruce Parkinson and Jeanne McHale

Presentation and Discussion Topic: **Enhanced efficiency:** Can the practical and Shockley-Queisser limits on solar cell efficiencies be overcome with phenomena such as multiple exciton generation or singlet fission and/or heterojunction cell configurations to produce devices that can be manufactured cheaply and on a huge scale?

Chair Jeanne McHale

8:15 Art Nozik “Multiple Exciton Generation in Quantum Dots, Quantum Dot Arrays, Quantum Dot Solar Cells, and via Molecular Singlet Fission: Application to Next Generation Solar Photon Conversion”

9:00 Prashant Kamat “Emerging Strategies for Boosting Light Harvesting Efficiency in Quantum Dot Solar Cells”

9:45 Sean Shaheen “Exciton Dynamics in Multi-Chromophore Systems: Biomimetic Pathways for Higher Efficiencies in Organic Photovoltaics.”

10:30 Fritz Knorr “Organic Sensitizers with Potential for Simultaneous Two-Electron Excited State Injection into TiO2.”

11:30 Catered Lunch Provided at the TSRC Meeting Site

Chair Wolfram Jaegermann

12:30 Jao van de Lagemaat “(Multiple) Excitons and Plasmons – tradeoffs and limits”

1:15 Garry Rumbles “Optimizing the driving force of photoinduced electron transfer in organic photovoltaics”

2:00 Andriy Zakutayev, ““Golden mean” solar solutions for energy generation problems”

Presentation and Discussion Topic: **Solar Fuels**: Can photoelectrochemical water splitting, or other photoelectrochemical fuel producing reactions such as CO2 reduction, be economically, environmentally and technologically viable and solve the problem of solar energy storage?

2:45 John Turner “Hydrogen price and environmental considerations for photoelectrochemical solar fuels production."

3:30 Kohei Uosaki "Does direct photocatalytic/photoelectrochemical CO2 reduction eventually become practical?"

**Tuesday August 6th**

**Solar Fuels** Continued

7:30 – 8:00 Breakfast at the TSRC meeting site for participants only

Chair Gerald Meyer

8:00 Ronny Neumann “Ideas and Strategies for the photoreduction of CO2,”

8:45 Wolfram Jaegermann “Thin Film Device Structure Prerequisites for Solar Cells and Solar Fuel Production.”

9:30 Joseph Hupp “New Cluster based Electrocatalysts and Photocatalysts for Solar Fuels: Some Ideas and Some Early Results”

10:15 Achim Lewerenz “On Development Horizons in Solar Fuel Generation”

11:30 Catered Lunch Provided at TSRC Meeting Site

Chair Kohei Uosaki

12:30 Ksenija Glusac “Electrocatalytic Water Oxidation by Flavin-Based Derivatives.”

1:15 Upul Wijayantha “What are the limiting factors in PEC water splitting - Water oxidation at illuminated α-Fe2O3/electrolyte interface: energetics, kinetics and mechanisms.”

2:00 Carrick M. Eggleston, “Iron minerals and solar fuels: Balancing between nature and technology”

2:45 Gordana Dukovic “Compositionally complex semiconductors as light harvesters for solar fuel generation”

3:30 Bruce Parkinson “A realistic view of the potential of photoelectrochemistry in the energy future”

Tuesday 6:00PM – “Town Talk” given by Joe Hupp at Historic Sheridan Opera House at 110 N. Oak, Telluride

**Wednesday August 7th**

Presentation and Discussion Topic: **Stability:** Can solar cells made from molecular or polymeric materials be made efficient and stable enough to be a viable future photovoltaic technology?

7:30 – 8:00 Breakfast at the TSRC meeting site for participants only

Chair Devens Gust

8:00 David Ginger “Aging of Organic Solar Cells: More than Just Contacts and Chemistry”

8:45 Gerald Meyer “Mechanisms of Sensitization and Regeneration in Dye-Sensitized Solar cells.”

9:15 Naomi Ginsberg “Impact of solution processing on exciton transport in organic semiconductor films in solar cells.”

10:00 Gerko Oskam “Transport and recombination processes in the dye-sensitized solar cell”

11:30 Catered Lunch Provided at TSRC Meeting Site

Wednesday afternoon free

Group Picnic 6:00 – 9:00 @ Ah Haa School for the Arts at 300 S. Townsend

**Thursday , August 8th**

**Stability Continued**

7:30 – 8:00 Breakfast at the TSRC meeting site for participants only

Chair David Ginger

8:00 Iris Visoloy-Fisher “Accelerated stability testing of organic photovoltaic materials using ‎concentrated ‎sunlight‎.”

8:45 Jeanne McHale “Betalain plant pigments for dye-sensitized solar energy conversion”

9:30 Luping Yu “Establishing structure/property relationship of low bandgap polymers for OPV solar cells.”

10:15 Devens Gust “Mimicking photosynthetic photoprotective mechanisms for organic solar energy systems.”

11:30 Catered Lunch at TSRC Meeting Site

**Scalability:** How can the technological, economic, sociological and political challenges of employing and quickly scaling up the manufacture and deployment of solar energy converting devices be met?

Chair Bruce Parkinson

12:30 Carl Koval “Towards Scalably Manufacturable Solar-fuels Generators”

1:15 Stephen Maldonado “Electrodeposition of Crystalline Groups IV and III-V Semiconductors.”

2:00 Brian Gregg “Reflections of a Recovering Organic Semiconductor and Dye Cell Researcher”

2:45 – 5:00 Cross cutting discussions to connect the four topics considered at the meeting. Short presentations can be given to emphasize points and provide more data relevant to the meeting. Inform Jeanne or Bruce in advance of your intention to present and the topic and time needed.

**Friday, August 9th**

7:30 – 8:00 Breakfast at the TSRC meeting site for participants only

8:00 Continued discussion and meeting wrap up.