

CHALLENGES IN RENEWABLE ENERGY - ISACS4
KIRSCH AUDITORIUM, STATA CENTER, MIT, BOSTON, USA
PROGRAMME – 28 JUNE 2011

Tuesday 5 July

- 19:00 WELCOME RECEPTION, RD COMMON ROOM, 4TH FLOOR, STATA CENTER
20:00 CLOSE

Wednesday 6 July

- 08:00 REGISTRATION
08:45 OPENING COMMENTS
Daniel Nocera, *Massachusetts Institute of Technology, USA*
Dave Garner, *Immediate Past President, Royal Society of Chemistry*

MOLECULAR CATALYSIS (CHAIR, DANIEL NOCERA)

- 09:00 PLENARY: Integrating Photoconversion with Catalysis for Artificial Photosynthesis
PLEN1 **Michael Wasielewski**, *Northwestern University, USA*
09:40 Late Transition Metal Catalysts for the Activation of Small Molecules: Relevance to
O1 Renewable Energy Catalysis
Liviu Mirica, *Washington University, USA*
10:00 PLENARY: Electrochemical and Photoelectrochemical Reduction of CO₂ to CO, Formate, and
PLEN2 Beyond
Clifford Kubiak, *University of California, San Diego, USA*
10:40 COFFEE

BIOINSPIRED (CHAIR, MICHAEL STRANO)

- 11:10 PLENARY: Enzymes as Electrocatalysts: Highlights of Recent Studies on the Mechanisms of
PLEN3 Hydrogenases and Insights into the Principles of Electrocatalytic Efficiency
Fraser Armstrong, *University of Oxford, UK*
11:50 Photocatalytic H₂ Production with a Bio-inspired TiO₂ Nanoparticle System
O2 **Erwin Reisner**, *University of Cambridge, UK*
12:10 PLENARY: Revealing how Nature uses Sunlight to Split Water
PLEN4 **James Barber**, *Imperial College London, UK*
12:50 LUNCH AND POSTER VIEWING, STATA CENTER LOBBY
13:50 POSTER SESSION 1: P1-P59

PHOTOCATALYSIS (CHAIR, CHRISTOPHER CUMMINS)

- 14:50 PLENARY: Solar Water Splitting using Powdered Photocatalysts
PLEN5 **Akihiko Kudo**, *Tokyo University of Science, Tokyo, Japan*
15:30 Nanonet-Based Heteronanostructures for Efficient Solar Water Splitting
O3 **Dunwei Wang**, *Boston College, Chestnut Hill, USA*
15:50 PLENARY: Overall Water Splitting on Heterogeneous Photocatalysts
PLEN6 **Kazunari Domen**, *The University of Tokyo, Japan*
16:30 COFFEE

ELECTROCHEMISTRY (CHAIR, DEBRA ROLISON)

- 17:00 PLENARY: Photoelectrochemical Systems for Solar Energy Fuels The Application of
PLEN7 Scanning Electrochemical Microscopy to Photocatalyst Discovery
Allen J Bard, *The University of Texas at Austin, USA*
17:40 Hydrogen Evolution and Oxygen Reduction at Polarised Soft Interfaces
O4 **Hubert Girault**, *EPFL, Lausanne, Switzerland*
18:00 Close

Thursday 7 July

STORAGE (CHAIR, DUNWEI WANG)

- 09:00 PLENARY: Reshaping the Synthesis of Porous Crystals for Molecular Storage and Separations
Adam Matzger, *University of Michigan, USA*
- 09:40 The Key Compounds in a Viable Hydrogen Storage/Delivery System: Carbon Dioxide and Formic Acid
05 **Gabor Laurenczy**, *EPFL ISIC, Lausanne, Switzerland*
- 10:00 PLENARY: Designing Size- and Energy-scalable Multifunctional Nanoarchitectures in 3D
PLEN9 **Debra Rolison**, *US Naval Research Laboratory, Washington, DC, USA*
- 10:40 COFFEE

BATTERIES/STORAGE (CHAIR, HUBERT GIRAULT)

- 11:10 PLENARY: Synthetic Energy Carriers
PLEN10 **Andreas Züttel**, *EMPA Materials Science & Technology, Zurich, Switzerland*
- 11:50 Electrochemistry and Defect-Structure of Substituted Spinel Li-ion Battery Cathode Materials Synthesized by Hydrothermal Methods
06 **Bart Bartlett**, *University of Michigan, USA*
- 12:10 PLENARY: Energy Storage and Lithium Batteries
PLEN11 **Peter Bruce**, *University of St Andrews, UK*
- 12:50 LUNCH AND POSTER VIEWING, STATA CENTER LOBBY
- 13:50 POSTER SESSION 2: P60-P108

FUEL CELLS/STORAGE (CHAIR, BART BARTLETT)

- 14:50 PLENARY: Materials Advances for Electrical Energy Generation and Storage: Fuel Cells, Batteries and Super-caps
PLEN12 **Héctor Abruña**, *Cornell University, USA*
- 15:30 The Special Character of Water in Proton-Coupled Electron Transfers... in Water
07 **Julien Bonin**, *Université Paris Diderot, France*
- 15:50 PLENARY: Exciton Engineering with Carbon Nanotubes and Graphene for Solar Energy Conversion: From Exciton Antennae to Nano-Heterojunctions
PLEN13 **Michael Strano**, *Massachusetts Institute of Technology, USA*
- 16:30 COFFEE

ARTIFICIAL PHOTOSYNTHESIS (CHAIR, LEIF HAMMARSTRÖM)

- 17:00 PLENARY: Using Ingenuity to Improve Photosynthesis - Nature Left us Plenty of Room
PLEN14 **Thomas Moore**, *Arizona State University, USA*
- 17:40 Converting Photons to a Fuel
08 **Ally Aukauloo**, *Universite Paris Sud, France*
- 18:00 CLOSE

Friday 8 July

PHOTOVOLTAICS (CHAIR, ERWIN REISNER)

- 09:00 PLENARY: **Nanowire Photovoltaics: From Fundamental Limits to New Strategies for Efficient Ultra-Thin Solar Cells.**
Charles Lieber, *Harvard University*
- 09:40 Plasmon-based Energy Transfer in Au/Fe₂O₃ Photoelectrodes for Water Splitting
O9 **Scott Warren**, *Ecole Polytechnique Federale de Lausanne, Switzerland*
- 10:00 PLENARY: Dye-Sensitized Solar Cells Based on Earth-Abundant Materials: Fundamental
PLEN16 Issues and Applications
James McCusker, *Michigan State University, USA*
- 10:40 COFFEE

BIOMIMETIC TO ARTIFICIAL PHOTOSYNTHESIS (CHAIR, JAMES MCCUSKER)

- 11:10 PLENARY: Artificial Photosynthesis for Solar Fuel Production
PLEN17 **Leif Hammarström**, *Uppsala University, Sweden*
- 11:50 Proton Coupled Electron Transfer in Photosynthetic Oxygen Evolution and Biomimetic
O10 Peptide Maquettes
David Jenson, *Georgia Institute of Technology, USA*
- 12:10 CLOSING REMARKS
- 12:15 CLOSE