RSC INTEREST GROUP
ENERGY SECTOR

PROGRAMME

NEXT GENERATION MATERIALS FOR SOLAR PHOTOVOLTAICS

A 1-day Symposium Hosted by The Royal Society of Chemistry Energy Sector

The Chemistry Centre, Burlington House, London

15 January 2020

This meeting covers recent advances in Solar Photovoltaics with a focus on materials for organic, inorganic and hybrid thin film cells. The day will comprise presentations by six guest speakers and seven contributing speakers and poster presentations during the lunch and coffee breaks.

ORGANISING COMMITTEE

Prof Trystan Watson
Swansea University

Dr Petra Cameron
University of Bath

Prof Martin Heeney
Imperial College London

Dr Ross Hatton
University of Warwick

SPONSORS

This meeting has been underwritten by the RSC Energy Sector interest group.

Sponsors of student discount

Our thanks to RSC-ESED for financial support towards the cost of overseas speakers

Our thanks to SuperSolar for financing 10 student free tickets

Feedback please to t.m.watson@swansea.ac.uk

GUEST SPEAKERS

Dr Eva Unger

From lead-halide solution complexes to perovskite solar cell modules

Eva Unger is the young investigator group leader for hybrid materials formation and scaling at Helmholtz Zentrum Berlin. Originally from Germany, Eva undertook her PhD at Uppsala University, Sweden and carried out postdoctoral work at Stanford University and Lund University through a stipend from the Swedish Marcus and Amalia Wallenberg Foundation. One of the goals of her group is to develop and optimize scalable deposition methods for hybrid perovskite semiconductors.

Dr Theodoros Dimopoulos

Emerging PV technologies based on abundant and low-environmental-impact materials

Theodoros Dimopoulos is Senior Scientist at the Austrian Institute of Technology. His research involves solution and vacuum-based processing of transparent electrodes and solar absorbers, emerging photovoltaic materials and processes, in particular developing new materials, manufacturing processes and characterisation methods for thin-film solar cells. Theodoros carried out his PhD focused in Condensed Matter Physics from Institut de Physique et Chimie des Materiaux, Strasbourg.

Prof Jenny Nelson

Conjugated polymers for solar energy conversion and storage

Jenny Nelson is Professor of Physics at Imperial College London where she has researched novel varieties of material for use in solar cells since 1989. Her current research is focused on understanding the properties of molecular semiconductor materials and their application to organic solar cells. This work combines fundamental electrical, spectroscopic and structural studies of molecular electronic materials with numerical modelling and device studies, with the aim of optimising the performance of solar cells based on molecular and hybrid materials.

Prof David Lidzey

New deposition routes and device architectures for perovskite photovoltaics

David Lidzey is Professor of physics at the University of Sheffield. He leads the university's Electronic and Photonic Molecular Materials research group (EPMM). During his career, David has worked in both academic and technical environments, with his main areas of research including hybrid organic-inorganic semiconductor materials and devices, organic photonic devices and structures and solution processed photovoltaic devices. In 2009 he founded the materials and equipment supplier Ossila where he is currently Chairman.

Dr Elizabeth Gibson

Tandem Photoelectrochemical Solar Cells

Elizabeth Gibson is reader in energy materials at Newcastle University. She was awarded a Royal Society Dorothy Hodgkin Research Fellowship and a University of Nottingham Anne McLaren Research Fellowship in 2010. She spent 3 years as a post-doc at the Centre for Molecular Devices, Uppsala University, Sweden, developing dye-sensitized solar cells. Her group focuses on solar cell and solar fuel devices that function at a molecular level and challenge the conventional solid-state photovoltaic technologies.

Dr Hugo Bronstein

Synthetic control of interfaces in organic photovoltaics

Hugo Bronstein is lecturer at Cambridge University. Hugo was awarded an Imperial College Junior Research Fellowship in 2012 before being appointed as a lecturer at University College London in 2013. In 2015 he was awarded an ERC starting grant and in 2017 he was appointed as a lecturer at the University of Cambridge. His research involves the synthesis of novel conjugated materials for use in organic solar cells, light emitting diodes and transistors.

POSTER PRESENTATIONS

1 High-Performance Cu Mesh Transparent Conductive Electrodes for Flexible Organic Photovoltaics
P. Bellchambers, S. Varagnolo and R. A. Hatton

2 Indacenodithiazole Ladder Type Bridged Di(thiophene)-Difluoro-Benzothiadiazole Conjugated Non-Fullerene Electron Acceptor
Mohammed Al-Hashimi, Hugo Bronstein, and Tobin J. Marks

3 Investigating the effects of second acceptor on the performance of non-fullerene acceptor based organic solar cells
Ravi Misra, K.D.G.I. Jayawardena and S. Ravi P. Silva

4 Enhancing C-PSCs performance using integrated metallic grids to improve carbon electrode conductivity
Dimitrios Raptis, V. Stoichkov, S. Meroni, A. Pockett, C. Worsley, M. Carnie, D. Worsley and T. Watson

5 Artificial Solar Concentrators for Renewable Energy Applications
Sara Waly, A Benniston, A Harriman

6 Stability Enhancement of OPV and PSC devices via Machine Learning and Data Analytics
Tudur David

7 Investigating charge carrier recombination in perovskite materials
Emmanuel V Péan, Stoichko Dimitrov, Catherine S. De Castro and Matthew L. Davies

8 Roll-to-roll slot die coating of P-I-N Perovskite Solar Cells
Rahul Patidar, Daniel Burkitt1 David Beynon, Peter Greenwood, James McGettrick, Katherine Hooper, David Richards, Vasil Stoichkov, Trystan Watson

9 Roll-to-roll compatible deposition of a tin oxide hole-blocking layer via slot-die coating
David Richards

10 Band Alignment Measurements of Sb_2Se_3 Solar Cells Using HAXPES
Huw Shiel, S. Hutter, J. E. N. Swallow, L. A. Jones, T. J. Featherstone, M. J. Smiles, P. K. Thakur, L. J. Phillips, K. Durose , J D. Major, V. R. Dhanak, T-L. Lee, T. D. Veal

11 GeSe properties for thin film photovoltaics
Matthew Smiles, P. A. E. Murgatroyd, J. E. N. Swallow, T. Shalvey, N. Fleck1, H. Shiel, L. A. H. Jones, T. J. Featherstone, J. Alaria, C. N. Savory, D. O. Scanlon, T. L. Lee, V. R. Dhanak, J. D. Major, T. D. Veal

15 Printed Carbon Electrodes for Planar P-I-N Perovskite Photovoltaics
David Beynon, Vasil Stoichkov, Cameron Woodgate, Trystan Watson

16 Construction of a chemical reactor for the production of mixed metal oxide p-type semiconductors
Susanna L. Stephens, Kaiyuan Gao, Elizabeth A. Gibson

17 A systematic study of strategies for the encapsulation of Perovskite solar cells
Vasil Stoichkov, Trystan Watson

18 High Figure-of-Merit Transparent Copper–Zinc Oxide Window Electrodes for Organic Photovoltaics
Jessica Pereira, Ross Hatton

19 Deep traps in antimony selenide
Samantha Hood, Sunghyun Kim, Aron Walsh

20 Radiation Hardness of Perovskite Solar Cells Based on Aluminium-Doped Zinc Oxide Electrode under Proton irradiation
Declan Hughes

21 Suppressing ion motion in lead-halide perovskites via passivating layers
Matt Cowley, Petra Cameron

22 The influence of polaronic behaviour on charge transport in $MAPbI_3$
Lewis A. D. Irvine, Matthew J. Wolf, Alison B. Walker

23 A novel approach to scalable silver nano-network electrode fabrication for high performance flexible organic photovoltaics
Jaemin Lee, Ross A. Hatton

24 The Impact of Environmental Humidity on Ionic Transport and Impedance of Perovskite Solar Cells
William Fisher

25 Thermodynamic limit of photovoltaic efficiency
Sunghyun Kim, Aron Walsh

26 Towards Tandem Solar Cells- Building next generation devices with LEGO
Heather Flint, Elizabeth Gibson

27 Using Neutron Reflectitivty to Characterise Non-Fullerene Organic Photovoltaics
Rachel Kilbride, Emma LK Spooner, Andrew J Parnell, David G Lidzey, Richard AL Jones

28 Amide-based small-Molecules with non-conjugated backbones as a new generation of hole transporting materials for perovskite solar cells
Eman Alkhudhayr, P.Docampo, D.Sirbu

29 Halogenated indacenodithiophene acceptors for OPV
Petr Ufimkin, Martin Heeney, Agnieszka Pron

30 Understanding Ion Migration in Metal Halide Perovskites
Young-Won Woo, Young-Kwang Jung, Sunghyun Kim, Aron Walsh

31 Ab-initio Calculations of Tin-Halide Perovskite Solar Cells

Cameron Underwood, Zhuo Wang, Guosheng Shao, J. David Carey, and S. Ravi P. Silva

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If you are a member of the RSC then please join the Energy Sector interest group

(1 of the 3 free groups you can join with membership)

Public Websites www.rsc.org/energysector

Members Website http://my.rsc.org/groups/home/44

Delegates[1]

Dr	Firoz	Alam	University of Manchester
Miss	Eman	Alkhudhayr	Newcastle University
Dr	Angelika	Basch	Strömstad Academy
Mr	Samuel	Beddoe	University of Southampton
Mr	Philip	Bellchambers	University of Warwick
Mr	David	Beynon	SPECIFIC, Swansea University
Miss	Malavika	Bhide	University College London
Mrs	Rebecca	Bolton	Swansea University
Dr	Joe	Briscoe	Queen Mary University of London
Dr	Hugo	Bronstein	Cambridge University
Dr	Petra	Cameron	University of Bath
Miss	Elena	Cassella	The University of Sheffield
Mr	Rhys	Charles	Swansea University
Mr	Matt	Cowley	University of Bath
Mr	Tudur	David	Bangor University
Dr	Matthew	Davies	SPECIFIC, Swansea University
Dr	Theodoros	Dimopoulos	AIT Austrian Institute of Technology
Dr	Eric	Don	SemiMetrics Ltd
Dr	Flurin	Eisner	Imperial College London
Miss	Jayne	English	Newcastle University
Miss	Heather	Flint	Newcastle University
Mr	Kaiyuan	Gao	Newcastle University
Dr	Elizabeth	Gibson	Newcastle University
Dr	Robert	Gurney	Linkam Scientific Services Ltd
Dr	Ross	Hatton	University of Warwick
Prof	Martin	Heeney	Imperial College London
Mr	Charlie	Henderson	University of Warwick
Mr	David	Hoffman	University of Southampton
Dr	Samantha	Hood	Imperial College London
Mr	Declan	Hughes	Swansea University
Mr	Lewis	Irvine	University of Bath
Dr	Imalka	Jayawardena	University of Surrey
Dr	Joshua	Karlsson	Newcastle University
Dr	Sunghyun	Kim	Imperial College London
Miss	Kat	Lacey	Swansea University
Dr	Jaemin	Lee	University of Warwick
Mr	Bowei	Li	ATI University of Surrey
Prof	David	Lidzey	University of Sheffield
Miss	Xueping	Liu	ATI University of Surrey
Ms	Yan	Lui	Bruker Nano Surfaces

[1] Registered by 07 Jan 2020. 12 delegates elected not to be included in this list

Delegates

Mr	Leslie	Lyons	Bentham Instruments Ltd
Miss	Xinyi	Ma	University of Surrey
Dr	Luigi	Martiradonna	Nature Materials - Nature Publishing Group
Dr	Nigel	Mason	PV Consulting Ltd
Dr	Ravi	Misra	University of Surrey
Dr	Asim	Mumtaz	University of Liverpool
Mr	Matthew	Naylor	Northumbria University
Miss	Amy	Neild	Newcastle University
Prof	Jenny	Nelson	Imperial College London
Dr	Teresa	Ortner	Springer Nature
Mr	Emmanuel	Péan	SPECIFIC - Swansea University
Dr	Jessica	Pereira	University of Warwick
Mr	Matthew	Pilot	University of Bath
Mr	Steve	Ransome	SRCL
Mr	Dimitrios	Raptis	Swansea University
Mr	Joshua	Reding	ATI University of Surrey
Mr	Martyn	Rush	Polysolar Ltd
Miss	Kezia	Sasitharan	University of Sheffield
Prof	Brian	Saunders	University of Manchester
Miss	Abigail	Seddon	Newcastle University
Mr	Huw	Shiel	University of Liverpool
Miss	Shashini	Silva	University of Surrey
Mr	Matthew	Smiles	University of Liverpool
Mr	Matthew	Smith	ATI University of Surrey
Miss	Emma	Spooner	University of Sheffield
Dr	Susanna	Stephens	Newcastle University
Dr	Vasil	Stoichkov	SPECIFIC, Swansea University
Dr	Karen	Stroobants	Royal Society of Chemistry
Mr	Cameron	Underwood	ATI University of Surrey
Dr	Eva	Unger	Helmholtz Zentrum Berlin
Dr	Silvia	Varagnolo	University of Warwick
Mr	Nektarios	Verykokkos	Newcastle University
Mrs	Sara	Waly	Newcastle university
Miss	Yun	Wang	University of Surrey
Prof	Trystan	Watson	SPECIFIC, Swansea University
Mr	Thomas	Webb	University of Surrey
Miss	Anjana	Wijesekara	University of Warwick
Dr	Yuren	Xiang	University of Surrey
Dr	Mozhgan	Yavari	ATI University of Surrey
Dr	Sahar	Zamani	Bentham Instruments Ltd

SCHEDULE

10.00	Registration and coffee
10.20	Welcome and opening remarks
10.30	New deposition routes and device architectures for perovskite photovoltaics David Lidzey, Sheffield University
11.00	From lead-halide solution complexes to perovskite solar cell modules Eva Unger, Helmholtz-Zentrum, Berlin, Germany
11.30	Emerging PV technologies based on abundant and low-environmental-impact materials Theodoros Dimopoulos, AIT, Austria
12.00	Selective deposition of silver and copper films by condensation coefficient modulation Silvia Varagnolo, University of Warwick
12.15	Towards Sustainable Perovskite Photovoltaics Matthew Davies, Swansea University
12.30	Lunch & Posters *see pages 4-5*
14.00	Synthetic control of interfaces in organic photovoltaics Hugo Bronstein, University of Cambridge
14.30	Conjugated polymers for photovoltaic and photocatalytic solar energy conversion Jenny Nelson, Imperial College London
15.00	Modulating crystallisation in semi-transparent perovskite films using sponge-like polymer colloid particles to improve solar cell efficiency Brian Saunders, University of Manchester
15.15	GaAsSbN for Multi-Junction Solar Cells Asim Mumtaz, University of Liverpool
15.30	Coffee & Posters
16.15	Tandem Photoelectrochemical Solar Cells Elizabeth Gibson, Newcastle University
16.45	Large area perovskite solar cells with low-capital cost Simone Meroni, Swansea University
17.00	Intramolecular Charge Transfer States for Reduced Non-Radiative Voltage Losses in Organic Photovoltaics Flurin Eisner, Imperial College London
17.15	Enhanced performance of bulk heterojunction solar cells by ultrathin metal-organic framework nanosheets Kezia Sasitharan, Sheffield University
17.30	Closing remarks