MSDG Summer Newsletter 2015

Guest speaker Barry Snelson MBE (left) with Dr Ian Scott (right) at the MSDG Summer meeting dinner, Fitzwilliam College, Cambridge

Message from the Chairman, Professor George Chen

Dear Colleagues,

The 2015 Summer in Cambridge has witnessed another successful research meeting of the MSDG, but this year's summer meeting is unique in several ways. Firstly, it was held in the Department of Materials Science and Metallurgy, instead of the Fitzwilliam College, as in the past. Secondly, the meeting had an invited speaker, Prof. Hiroyuki Ohno from Japan, whilst in previous summer meetings, the invited speaker was always from one of the European Countries. Thirdly, the technical programme of the meeting included several presentations on molten salts in relation to nuclear energy, which was highlighted by the After Dinner Lecture from Dr. Barry Snelson MBE. It was also for the first time in the past 20 years that an Emergency General Meeting (EGM) was held to decide a change to the MSDG Constitution. Finally, this year's summer meeting missed two of its planned activities, the one-day student research meeting, and the half-day tour to the Imperial War Museum at Duxford, but these two losses were interconnected. I shall, on behalf of the MSDG committee, thank everyone for having attended the summer meeting, and all oral and poster presenters who had made the summer meeting interesting and stimulating. Last but not the least, I am grateful to my colleagues in the MSDG committee whose continuous efforts and support are the foundation of all successful MSDG events. I shall also specially thank Dr. Anna Croft for being our new editor of the MSDG Newsletters, which we have all missed in the past couple of years.

I look forward to seeing you again at the MSDG Christmas Meeting in London.

George Chen

ROYAL SOCIETY OF CHEMISTRY | MOLTEN SALTS DISCUSSION GROUP

Upcoming Meetings:

- ***14th December 2015*** *MSDG Christmas meeting, Imperial College, London*
- ***10th-14th May 2016*** *Faraday discussion on Liquid Salts for Energy and Materials, Ningbo, China*
- ***3rd-8th July 2016*** *EUCHEM2016 on Molten Salts and Ionic Liquids, Vienna, Austria*
- ***10th-14th July 2016*** *Ti Round Table, Hokkaido, Japan*
- ***2nd-7th October 2016*** *Electrochemical Society meeting, Honolulu, Hawaii*
- ***24th-30th June 2017*** *COIL-7, Quebec, Canada*

MSDG support

Members are reminded that bursary support to attend IL and molten salt meetings is available through application, by contacting the MSDG secretary Andrew Doherty: A.P.Doherty@qub.ac.uk

Honoured Guest Professor Hiroyuki Ohno who spoke about innovative room-temperature ionic liquids.

Coffee and posters were enjoyed by all.

Summer Meeting 2015

The MSDG Summer meeting was hosted by Professor Derek Fray at Fitzwilliam College and the Department of Materials Science and Metallurgy at the University of Cambridge on the 3rd and 4th of August 2015. The meeting was well attended by delegates from the fields of both high-temperature molten salts and room-temperature ionic liquids.

Highlights included the honoured guest lecturer Professor Hiroyuki Ohno from the Tokyo University of Agriculture and Technology, who opened the meeting after lunch on Monday. His talk centred around water-ionic liquid mixtures and their unusual and useful properties. It is an area that has until now been mostly avoided - as nobody wants contamination in their solvent. Professor Ohno expertly showed how properties could be manipulated, including shifting proteins between aqueous and ionic liquid phases by only gentle heating, resulting in clean separations. This led to interesting discussions during question time and beyond, a primary role of the meeting.

There was a good contribution from industrially-focused talks, including new discoveries in aluminium electrolysis and control of metal corrosion in molten salt nuclear reactors. Other key application areas were also discussed on day two, covering solar cell production,

The first day finished with a talk on uranium production before a well-earned dinner and discussion back at the college.

The second day had two talks on reactivity in ionic liquids and one looking at the exciting phenomenon of nanostructuring, interspersed by updates on graphene production, high-purity metal and alloy production, alongside further developments in nuclear reactor design involving molten salts.

Heading back for Pimms and the banquet, with excellent after dinner speech by Barry Snelson, MBE, was certainly a fine end to an excellent programme of events.

Presentations at the Summer Meeting

Some unique properties of ionic liquid/water mixtures
Hiroyuki Ohno

Effects of impurities on the current efficiency in aluminium electrolysis
Geir Martin Haarberg

Control of metal corrosion in molten salt nuclear reactors with sacrificial zirconium
Ian R. Scott

Uranium Metal Production by Direct Electrodeoxidation of Uranium Dioxide in Molten Salts
D. Sri Maha Vishnu, K.S. Mohandas and K. Nagarajan

Probing Reactions in Ionic Liquids: Experiment meets Theory
Sinead T. Keaveney, Hon Man Yau, Jason B. Harper & Anna K. Croft

The International Current Situation Concerning Molten Salt Nuclear Reactors and the Results of a Government Sponsored UK Feasibility Study
Trevor R. Griffiths, Rory O'Sullivan & Jasper Tomlinson

PuCl3 – ZnCl2 Phase Diagram
Jagadeesh Sure, D. Sri Maha Vishnu

A full set of abstracts is available from the website: http://msdg.org.uk under the summer meeting section.

Towards Understanding Reactivity in Ionic Liquids
Richard M. Fogarty, Robert G. Palgrave, Richard A. Bourne, Thomas W. Chamberlain, Nick A. Besley, Josephina Werner, Gunnar Öhrwall, Olle Björneholm, Patricia A. Hunt, Kevin R. J. Lovelock

Electrochemical Production of High Purity Tantalum by the FFC Cambridge Process
Greg Doughty, James Deane, Ian Mellor

Molten salt preparation of graphene and its potential applications
Ali Reza Kamali & Derek J. Fray

Fission gas composition in the Stable Salt Reactor
Ian R. Scott

Solid State Extraction and Consolidation of Titanium Alloys Direct from Synthetic Rutile
Lyndsey L Benson, Ian Mellor & Martin Jackson

Further progress in black silicon for solar photovoltaics
P. R. Coxon, E. Juzeliunas & D. J. Fray

Investigating nano-segregation and structuring in the bulk-phase and surface of ionic liquid mixtures
Lucía D'Andrea, Duncan W. Bruce, Christopher P. Cabry, John M. Slattery, Matthew L. Costen, Kenneth G. McKendrick, Simon M. Purcell, María A. Tesa-Serrate, Brooks Marshall, Timothy K. Minton, Eric Smoll, George C. Schatz, José N. Canongia Lopes, Karina Shimizu & Sarah Rogers