

Molten Salt Discussion Group

July 2013

Presentation at MSDG Summer 2013 Meeting

An Electro-Supramolecular Study of the Dielectric Property of Ionic Liquids.

Shan Jin, Linpo Yu and George Z Chen

Electrochemical Synthesis of AB5-type RE-Ni Based Alloys via FFC Cambridge Process

Qian Xu, Xue Kang, Shuang Li, Ximei Yang, Qiushi Song

Lanthanide-Alkali Metal Halide Systems: Characterisation, Phase Diagram Calculation and Prediction of Phase Diagram Topology

I. Chojnacka, B. Salamon, B. Pilarek, L. Rycerz, J. Kapala, S. Gadzuric, W. Gong, M. Gaune-Escard

Molten Salts, Ionic Liquids, Energy Efficiency and the Need for Behaviour Change

S.A.Mucklejohn, J.Porritt and S.Tulej

Understanding the Decomposition of Ionic Liquids: A Combined Experimental and Theoretical Approach

M. T. Clough, P. A. Hunt and T. Welton

The MSDG at 50; a life story!

Doug Inman

A Word from the Chairman

by *Andy Abbott*

The Molten Salts Discussion Group (MSDG) is proud to have reached the milestone of 50 years of service to the community and there was a fitting meeting held at Fitzwilliam College, Cambridge in July 2013. The theme of the meeting was to review the last 50 years and look forward to the future and there is a report in this meeting in the newsletter.

Correspondence with the community has suffered recently through the lack of a Newsletter Editor but we are pleased to announce that Dr Rohit Bhagat from Warwick University has volunteered to pull together the news from the community so if you have any information that you would like to include in forthcoming issues please contact Rohit at r.bhagat@warwick.ac.uk

With the lack of a newsletter many of you may also not know that I have taken over as Chair of the MSDG. I would like to extend my sincere thanks to Prof Derek Fray for his many years of excellent service chairing the committee and organising numerous events. We are very pleased that he is still helping on the committee. I would also like to thank Dr Robert Watson who has been the MSDGs Treasurer for many years. He has passed the baton to Dr John Slattery from York University who has already introduced such new-fangled things as internet banking and PayPal payment for meetings.

I too would like to introduce changes into the way the Group works. The committee has decided to emphasise the work of young researchers and to this end we held the first postgraduate meeting on Ionic Liquids at the University of

Selective Electrochemical Reduction and Anodic Dissolution of Ni from CeO₂- NiO in Molten CaCl₂ via the FFC-Cambridge Process

D. Hu, A. J. Stevenson and G. Z. Chen

Carbon Capture by CaO in Molten

V. Tomkute, A. Solheim, E. Olsen

Ionic Liquids – Non-Crystalline Ball Gazing

Andrew Abbott

The Thermodynamic Properties of Solution Metal Oxides in Molten Alkali

Igor N. Skryptun, Iaroslav Fedorov and Sergiy Korobko

Carbonate Oxidation and Salt Distillation of PuCl₃-NaCl-KCl

R A Pierce, T Caldwell, T Paget, R Watson

High Energy Capacity Supercapacitors Based on Ionic Liquids Electrolytes

Linpo Yu and George Z. Chen

Influence of Process Variables on the Electrolytic Conversion of CO₂ to Carbon

Happiness V. Ijije, Ossama Al-juboori and George Z. Chen

Investigation of the Microstructure and Dynamics of LiCl/KCl Molten Salts by In-Situ NMR Spectroscopy

H. Zhang and I. Farnan

Electrodeposition of Lead, Tin and Indium from Chloride Melts

Geir Martin Haarberg, Bo Qin and Ana Maria Martinez

Actinide Molten Salt Processing -The Next 50 years?

Tim Paget

Full abstracts can be downloaded from the MSDG website:-

http://www.msdg.org.uk/documents/2013_07-programme.pdf

Leicester in January 2013. This had 50 researchers in attendance. The standard of the presentations was excellent and the award for best presentation went to Matthew Clough from Tom Welton's group at Imperial College. Matthew gave his presentation at the summer meeting in Cambridge and he wrote the report on the meeting that appears in this Newsletter. We hope to create a stronger collaboration between researchers and we hope this is just the start of many new initiatives

We aim in future to promote student presentations at meetings. There will be bursaries for students who present at meetings and we aim to repeat the postgraduate event in 2014. Next year also sees the EUCHEM2014 conference and the committee would like to encourage a strong presence from its members. To this end it will not be hosting a summer meeting and we hope to announce soon a new structure of meetings, which will encourage a wider participation in events.

If you have any ideas for the types of activities that the group should take part in the please feel free to contact me.

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Summer Meeting 2013 and 50th Anniversary Celebration

by *Matthew T. Clough*

Delegates of the Royal Society of Chemistry's Molten Salts Discussion Group (MSDG) assembled at Fitzwilliam College, Cambridge, on the 9th-11th July 2013 for the Summer Meeting. The occasion marked 50 years since the conception of the group in 1963. The group has a strong track record of promoting rigorous science in the field of molten salts and room-temperature ionic liquids (RTILs). Accordingly the meeting was themed around *review* and *preview*. Academic talks were interspersed with presentations by senior members of the Group, highlighting advances in the field over the past 50 years, and offering insights into future directions of research within molten salts.

The opening lecture, by Prof. George Chen (Nottingham University), called into question previously held conceptions about the polarity of RTILs, and highlighted a novel method for determining the dielectric constant of ionic liquids. It sparked significant discussion, usefully setting the tone for the remainder of the meeting. A presentation by Stuart Mucklejohn (Ceravision Ltd.) explained the difficulties associated with commercialising lighting products, whilst technical limitations are often easier to address.

Forthcoming Meetings

Battery Manufacturing 2013

24th October 2013

University of Warwick

http://www.the-mia.com/assets/Battery_Workshop_Flye39474.pdf

MSDG Christmas Meeting

16th December 2013

Royal Society of Chemistry, Burlington House Piccadilly, London.

<http://www.msdg.org.uk>

EUCHEM2014 Conference on Molten Salts and Ionic Liquids

6-11 July 2014

Radisson Blu Hotel Olümpia, Tallin, Estonia

<http://euchem2014.ttu.ee/>

MSDG Support

Members are reminded that bursaries to help towards the cost of attending meetings on molten salts and/or ionic liquids are available from the MSDG. Those interested in applying for a bursary should contact the Secretary, Andrew Doherty

(E-mail: A.P.Doherty@qub.ac.uk).



From left to right: Profs. Derek Fray, Douglas Inman and Andrew Abbot

A highlight of the meeting was a presentation by Emeritus Prof. Doug Inman (UCL, London), who was the 1st chairman of the MSDG in 1963. He reviewed 50 years of research activity in the field of molten salts, in an entertaining lecture that was replete with photos and anecdotes. Many of the themes identified by the Group at its outset are still areas it is actively trying to address today. Interestingly, the promising potential for low-melting air/moisture-stable salts (or RTILs as they are now known) was recognised as early as December 1984, in an MSDG Christmas Meeting. After his lecture, Doug cut the 50-year anniversary cake, and discussion continued into dinner.

The second morning of the conference featured a quartet of presentations by members of research groups from universities in Cambridge, Nottingham, Leicester and Drøbakveien (Norway). The conference was well attended by members of the REFINE consortium, a project investigating the closed-loop processing of spent nuclear fuels. A talk by Dr. Hu (Nottingham University) demonstrated the ability to separate mixtures of nickel and cerium in molten CaCl_2 , via the established FFC-Cambridge process. In addition, Vikorija Tomtuke (Norwegian University of Life Sciences) and Happiness Ijije (Nottingham University) discussed the carbon-capture potential of molten salts. An open discussion led by Prof. Andy Abbott (Leicester University) focused the attention of the group on RTILs, in particular the ability to formulate liquids comprising biologically-active cations and anions. Conversation then turned to the economics of large-scale synthesis of molecular ionic liquids, and the high costs associated with the preferred fluorinated anions. In the afternoon, the delegates enjoyed a visit to the Imperial War Museum Duxford, followed by a sumptuous conference banquet back at Fitzwilliam College! The third and final day of the conference featured four lectures. Dr. Huixing Zhang (Cambridge University) presented her research investigating the microstructure of LiCl/KCl molten salts using ^{35}Cl and ^6Li NMR techniques. Later, Prof. Derek Fray (Cambridge University) discussed the future of actinide processing using molten salts. The Summer Meeting concluded with a second open discussion session, led by Prof. George Chen. Herein, the conversation turned to improving the academic and industrial impact and readership of molten salt literature. Good suggestions were put forward, including establishing a journal dedicated to the science of molten salts/ionic liquids.

In conclusion, members of the MSDG community enjoyed an outstanding Summer Meeting and 50th Anniversary celebration. They can be proud of the advances made in the field of molten salts over the last 50 years, and can look forward to further success in the years ahead!