

# MSDG Summer 2017

## Research Meeting Programme

### TUESDAY JULY 4<sup>th</sup>

- 12:00-13:45 Coffee & Registration: ESLC Room A07
- 12:45-13:45 Buffet Lunch
- 13:50-14:00 Chairman's welcome by Dr Andrew Doherty
- 14:00-15:30 Technical Session 1 Chair Andrew Doherty
- 14:00-14:30 **Why we need to understand molten salt thermodynamics and phase equilibria to make widgets**  
**Stuart Mucklejohn**  
*Ceravision Ltd*  
Contact E-mail: <mailto:stuart.mucklejohn@ceravision.co.uk>
- 14:30-15:00 **Energy applications of black silicon by molten salt electrolysis**  
**Paul R. Coxon\***, **Hyun-Kung Kim**, **Derek J. Fray**  
*Dept of Materials Science & Metallurgy, University of Cambridge.*
- 15:00-15:30 **Molten salt preparation of graphene hybrid nanostructures and their applications**  
**A.R.Kamali<sup>1</sup> & D.J.Fray<sup>2</sup>**  
<sup>1</sup> *School of Metallurgy, Northeastern University, Shenyang, 110819, China*  
<sup>2</sup> *Departments of Materials Science and Metallurgy, University of Cambridge, Cambridge CB3 0FS, UK*  
Contact E-mail: <mailto:ali@smm.neu.edu.cn>
- 15:30-16:00 Tea break
- 16:00-17:00 Technical Session 2 Chair: Derek Fray
- 16:00-16:30 **Co-reduction of CO<sub>2</sub> and steam in molten electrolytes.**  
**Ossama Al-Juboori and George Z. Chen**  
*Department of Chemical and Environmental Engineering, University of Nottingham, NG7 2RD, United Kingdom.*
- 16:30-17:00 **Mechanism and Kinetics of Electrocarboxylations in Ionic liquid Media**  
**Andrew P. Doherty and Eunan Marley**  
*School of Chemistry and Chemical Engineering, The Queen's University of Belfast, Belfast, BT9 AG, UK*  
Contact E-mail: <mailto:a.p.doherty@qub.ac.uk>
- 18:00 – 20:00 Dinner at Mr Man's Chinese Restaurant (<http://www.mrmansrestaurant.co.uk>).

## WEDNESDAY JULY 5<sup>th</sup>: ESLC Room A07

- 09:00-10:30 Technical Sessions 3 Chair: Stuart Mucklejohn
- 09:00-09:30 **Direct electrochemical synthesis of Ti-35Nb-7.9Sn alloy from mixed oxide discs in CaCl<sub>2</sub> melt**  
**D. Sri Maha Vishnu<sup>1,2\*</sup>, Jagadeesh Sure<sup>1,2</sup>, R. Vasant Kumar<sup>2</sup> and Carsten Schwandt<sup>1,2</sup>**  
<sup>1</sup>*Department of Materials Science and Metallurgy, University of Nizwa, Birkat Al Mouz, 616 Nizwa, Sultanate of Oman*  
<sup>2</sup>*Department of Materials Science and Metallurgy, University of Cambridge, 27 Charles Babbage Road, Cambridge CB3 0FS, United Kingdom*  
*\*Contact E-mail: [smvd2@cam.ac.uk](mailto:smvd2@cam.ac.uk), [vishnu@unizwa.edu.om](mailto:vishnu@unizwa.edu.om)*
- 09:30-10:00 **Current Progress on Molten Salt Electrolysis in GLABAT**  
**Han Wang<sup>\*</sup>, Zhanglong Yu, Sheng Fang, Chunrong Zhao, BingYu, Ning Wang, and Juanyu Yang<sup>\*</sup>**  
*Department of Material R&D, China Automotive Battery Research Institute Co. Ltd., Beijing, China*
- 10:00-10:30 **Synthesis of Ti-5Ta-2Nb Alloy from Solid Oxides by Electro-reduction in Molten Salt and its Corrosion Behaviour in Concentrated Nitric Acid**  
**Jagadeesh Sure<sup>1,2\*</sup>, D. Sri Maha Vishnu<sup>1,2</sup>, R. Vasant Kumar<sup>2</sup> and Carsten Schwandt<sup>1,2</sup>**  
<sup>1</sup>*Department of Materials Science and Metallurgy, University of Nizwa, Nizwa, Birkat Al Mouz, 616 Nizwa, Sultanate of Oman*  
<sup>2</sup>*Department of Materials Science and Metallurgy, University of Cambridge, 27 Charles Babbage Road, Cambridge CB3 0FS, United Kingdom*  
*\*Contact E-mail: <mailto:js2195@cam.ac.uk>, <mailto:jagadeesh.sure@unizwa.edu.om>*
- 10:30-11:00 Coffee break
- 11:00-13:00 Technical Session 4 Chair: George Chen
- 11:00-11:30 **Towards understanding microscopic interactions in ionic liquids and their effects on S<sub>N</sub>2 processes**  
**Karin Schaffarczyk McHale,<sup>a</sup> Ron Haines<sup>a</sup> and Jason B. Harper<sup>a</sup>**  
<sup>a</sup>*School of Chemistry, The University of New South Wales, Sydney NSW, Australia*  
*\*[k.schaffarczyk-mchale@unsw.edu.au](mailto:k.schaffarczyk-mchale@unsw.edu.au)*
- 11:30-12:00 **Three Dimensional Printing of Biomaterial-Laden Ionic Liquids**  
**Deshani H. A. T. Gunasekera<sup>\*</sup>, Christopher Tuck<sup>\*</sup>, Anna K. Croft<sup>†</sup> and Ricky D. Wildman<sup>\*</sup>**  
*\*Centre for Additive Manufacturing (CfAM), Department of Mechanical, Materials & Manufacturing Engineering, University of Nottingham, Nottingham, NG7 2RD, United Kingdom.*  
*† Department of Chemical and Environmental Engineering, University of Nottingham, NG7 2RD, United Kingdom.*
- 12:00-12:30 **Molecular Interactions of Protein-based materials with Ionic Liquids**  
**Shafaq Muzammal<sup>a,\*</sup>**  
**Christof Jaeger<sup>a</sup>, Peter Licence<sup>b</sup>, Anna K. Croft<sup>a</sup>**  
<sup>a</sup>*Department of Chemical and Environmental Engineering, University of Nottingham, UK*  
<sup>b</sup>*School of Chemistry, University of Nottingham, UK*  
*\*[enxsm15@nottingham.ac.uk](mailto:enxsm15@nottingham.ac.uk)*

- 12:30-13:00 **The role of  $C_{8}mimPF_6$  in miniemulsion stabilized by silica nanoparticles**  
**Yiyang Kong<sup>a</sup>, Rongmeihui Zheng<sup>a</sup> and Binjie Hu<sup>a,\*</sup>**  
*<sup>a</sup> Department of Chemical and Environmental Engineering, The University of Nottingham Ningbo China, 199 Taikang East Road, Ningbo 315100, China*
- 13:00-14:00 Lunch
- 14:00-17:00 Tour of the Industrial Museum at Wollaton Hall
- 18:00-19:00 Committee Meeting
- 19:00-19:30 Drinks reception at the University Council Room
- 19:30-21:00 Banquet at the University Council Room: After dinner speech: “**The Discovery of Black Snow and Other Adventures in the World of Molten Slag**” Some Recollections from a Jack of All Trades. Dr Fred Starr PhD, C.Eng, FIMMM, M.IMechE

## THURSDAY JULY 6<sup>th</sup>: ESLC Graduate Centre

- 09:00-10:30     Technical Session 5: Chair: George Chen
- 09:00-09:30     **High Seebeck Coefficient Thermocell with Molten Carbonate Electrolyte**  
**S. Kandhasamy<sup>1</sup>, O.S. Burheim<sup>2</sup>, A. Solheim<sup>3</sup>, S. Kjelstrup<sup>4</sup> & G.M. Haarberg<sup>1</sup>**  
*<sup>1</sup>Department of Materials Science and Engineering, Norwegian University of Science and Technology (NTNU), Trondheim, Norway*  
*<sup>2</sup>Department of Electrical Engineering and Renewable Energy, NTNU, Trondheim, Norway*  
*<sup>3</sup>SINTEF Materials and Chemistry, SINTEF, Trondheim, Norway*
- 09:30-10:00     **Carbon Capture in Molten Salts (CCMS)**  
**E. Olsen, H.S. Nygård and M. Hansen**  
*Norwegian University of Life Sciences*  
*Drøbakveien 31, N-1432 Ås, Norway*
- 10:00-10:30     **Electrochemical Analysis in Ultrahigh Temperature Molten Slags**  
**Y.M. Gao<sup>a,b</sup>, C.H. Yang<sup>a,b</sup>, C.L. Zhang<sup>a,b</sup>, Q.W. Qin<sup>a,b</sup>, and George Z. Chen<sup>a,b,c,\*</sup>**  
*<sup>a</sup>The State Key Laboratory of Refractories and Metallurgy, Wuhan University of Science and Technology, Wuhan 430081, China;*  
*<sup>b</sup>Key Laboratory for Ferrous Metallurgy and Resources Utilization of Ministry of Education, Wuhan University of Science and Technology, Wuhan 430081, China;*  
*<sup>c</sup>Department of Chemical and Environmental Engineering, and Energy Engineering Research Group, Faculty of Science Engineering, University of Nottingham Ningbo China, Ningbo 315100, China*
- 10:30-11:00     Tea break
- 11:00-12:00     Technical Session 6: Chair: Anna Croft
- 11:00-11:30     **A liquid sodium-zinc and molten chloride battery**  
**Geir Martin Haarberg<sup>1</sup>, Junli Xu<sup>2</sup>, Karen S. Osen<sup>3</sup>, and Ole S. Kjos<sup>3</sup>**  
*<sup>1</sup>Department of Materials Science and Engineering, Norwegian University of Science and Technology (NTNU), NO-7491 Trondheim, Norway*  
*<sup>2</sup>School of Science, Northeastern University, Shenyang 110004, China*  
*<sup>3</sup>SINTEF Materials and Chemistry, NO-7465 Trondheim, Norway*  
*Contact E-mail: [geir.martin.haarberg@ntnu.no](mailto:geir.martin.haarberg@ntnu.no)*
- 11:30-12:00     **Solid state production of a seven component niobium-silicide based alloy**  
**G.R.Doughty<sup>1</sup>**  
*<sup>1</sup>MetalYSIS Ltd. Advanced Manufacturing Park, Brinley Way, Catcliffe, Rotherham, S60 5FS*
- 12:00-13:00     Buffet Lunch
- 13:00             Close
- Posters:
- Electrochemical reduction of plutonium oxide**  
**Steven Wilcock**  
*AWE plc, Aldermaston, Reading, RG7 4PR, UK*  
*Contact E-mail: [mailto:steven.wilcock@awe.co.uk](mailto:mailto:steven.wilcock@awe.co.uk)*
- Solid State Manufacture of High Entropy Alloys: Preliminary Studies**  
**M B D Ellis and G Doughty**  
*MetalYSIS Ltd, Unit 2, Fairfeild Park, Manvers Way, Wath-upon-Deerne, Rotherham, S63 5DB, UK*  
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