HENRY ROYCE INSTITUTE

THE FARADAY INSTITUTION

FutureCat

NEXT GENERATION LI-ION CATHODE MATERIALS

Advanced Characterisation of Energy Materials

21 April 2021

Agenda & Programme

Welcome by Prof Pam Thomas

CEO, The Faraday Institution

'I am delighted to welcome you to the 2021 Advanced Characterisation of Energy Materials on behalf of the Faraday Institution.

I hope that you'll enjoy the day, and have the opportunity to develop further contacts within this research community.'

The Faraday Institution is the UK's independent institute for electrochemical energy storage research, skills development, market analysis, and early-stage commercialisation. It brings together research scientists and industry partners on projects with commercial potential that will reduce battery cost, weight, and volume; improve performance and reliability, and develop whole-life strategies including recycling and reuse.

Professor Pam Thomas is Chief Executive Officer of the Faraday Institution and her biography can be found here.

Welcome by Prof Serena Corr

'I'd like to warmly welcome you on behalf of FutureCat to the Advanced Characterisation of Energy Materials event. This event is co-hosted by FutureCat and Henry Royce Institute at the University of Sheffield and follows on from successful events held in Sheffield over the past two years.

The aim of this 2021 virtual event is to showcase Advanced Characterisation facilities and expertise, sparking collaboration opportunities for the future.'

The Faraday Institution's collaborative FutureCat project has set out to develop cathode materialsto drive the transition towards electric vehicles. FutureCat is a consortium of 5 academic institu- tions (Universities of Sheffield, Oxford, Lancaster, Cambridge, and UCL) together with 9 industry partners.
About Us

Prof Serena Corr (Principal Investigator of FutureCat) is Chair of Functional Nano-materials and Director of Research at the Department of Chemical & Biological Engineering at the University of Sheffield and leads the Energy Storage Research Centre. Her research addresses the rational design and morphology control of energy storage materials, particu-larly their structure-performance interplay (including high Ni-content cathodes and high ca-pacity electrodes). She is an international leader in the battery community, directing several multi-institutional research programmes, serving on international advisory boards, publish-ing in high-impact journals and proactively engaging public interest in next-generation bat-teries.

The Henry Royce Institute at the University of Sheffield

Dr Nik Reeves-McLaren, Senior Lecturer in Energy Materials, University of Sheffield welcomes you all on behalf of the Henry Royce Institute at the University of Sheffield.

'Henry Royce Institute at the University of Sheffield are delighted to co-host this2021 event with FutureCat, and look forward to developing further networks amongst the Advanced Characterisation research community.'

The University of Sheffield is a partner of the Henry Royce Institute for advanced materials, which has been established to develop and capitalise on the UK's world-leading excellence in advanced materials research.

The Henry Royce Institute at the University of Sheffield has developed capabilities to deliver a step-change in the discovery and making of new material systems, enabling concepts development from early, fundamental research right through to translation to industry and covering Technology Readiness Levels (TRL) one to six.

Our strengths include alloy development, powder processing, post production powder optimisation, additive manufactured part design and build, and materials characterisation and testing.

Henry Royce Institute at the University of Sheffield

Advanced Characterisation of Energy Materials Workshop

Wednesday 21 April 2021

Agenda

9.20	Greetings/Log in	
9.30	Welcome by **Professor Pam Thomas**	CEO, The Faraday Institution
9.35	Professor Louis Piper	University of Warwick
10.05	Professor Beverley Inkson	University of Sheffield
10.35	Flash Presentations PhD/Post Doctoral Researchers	
11.05	Refreshment break	
11.20	Professor Nigel Browning	University of Liverpool
11.50	Dr Siân Dutton	University of Cambridge
12.20	Focus on Capability (Parallel sessions)	Bruker & Malvern Panalytical
13.00	Lunch break	
14.00	Panel session, chaired by Professor Serena Corr	Professor Andy Beale, Finden Gareth Hinds, NPL Paolo Melgari, CPI Professor Andrea Russell, Southampton University
15.00	Dr Christina Bock	National Research Council Canada
15.30	Close	

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Guidelines for the event

Please ask questions via the Chat box in Zoom or ask

questions in advance or after the meeting in Slack.

Slack link: Join Slack

- To help keep background noise to a minimum, make sure you mute your microphone when you are not speaking.
- You can make it easier to focus on the meeting by turning off notifications, closing or minimizing running apps, and muting your smartphone.
- Remain on mute, unless you're invited to speak.
- We encourage you to use your camera but turn off if you would prefer not to be seen.
- If you have joined via the web version of Zoom some functions may not be available.
- You can switch between speaker and gallery view in the top right hand corner of the Zoom screen.
- Change the name your name is displayed by clicking 'Participants' ,find your name, select 'more' then 'rename'.
- Trouble shooting - If your connection is poor, close other applications, turn off your camera to see if that helps. If you lose connection log back in again. If you need specific help contact the host through 1:1 chat function.
- Please note that we may take some screenshots during the Zoom meeting for publicity purposes. Please let us know if you do not want us to use a screenshot with your image in it by messaging the host via the chat function.
- We have an Otter AI transcript available. This can be found on the top left of the screen if you wish to see the transcript in a separate window. You can close if you wish for your screen. There is also live captioning available which you can turn off (at the bottom of the screen next to reactions button) if you wish to do so. Both captioning/transcript may not give you an exact replica of the words spoken.

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Speakers

Professor Louis Piper, Professor of Electrochemical materials at University of Warwick

'Shining (Synchrotron) Light on Oxygen in Li-Rich Battery Cathodes: What can RIXS and HAXPES tell us?'

Professor Beverley Inkson, Professor of Nanostructured Materials and Director of the Sheffield NanoLAB and a Research Theme Leader onthe FutureCat project at the University of Sheffield

'3D Batteries – Challenges of through the length-scales microscopy and analysis'

Professor Nigel Browning, Director of the Albert Crewe Centre for Electron Microscopy at the University of Liverpool

'Imaging Nanoscale Battery Materials and Processes by Atomic Resolution and Operando Scanning Transmission Electron Microscopy'.

Full abstracts can be found on the FutureCat website

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Speakers

Dr Siân Dutton, University of Cambridge, Reader in Physics and SolidState Chemistry at the Cavendish Laboratory, and a Research Theme leader on the FutureCat project.

'Orientation Glass Formation and its role in Photo-Induced Halide Segregation in CH3NH3Pb(ClxBr1-x)3'

Dr Christina Bock, National Research Council, Canada

'Research on NMC cathodes'

Full abstracts can be found on the FutureCat website

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Capability sessions

BRUKER

'How AFMs are used for characterisation of next generation energy and storage materials.'

The Bruker practical session will explore the application of atomic force microscopy based techniques in characterisation of next generation energy and storage materials. The Bruker AFM application scientist will perform a live demonstration on the electrical con-ductivity of graphene based structures using the Dimension IconXR AFM, as well as cover a range of techniques used for electrical and electrochemical characterisation of energy and storage materials.

Malvern Panalytical
a spectris company

Live demonstration of high-quality in oper-ando X-ray diffraction analysis of pouch cell lithium-ion batteries

In this session Malvern Panalytical will give an introduction and live demonstration of in situ and in operando measurements with our Empyrean X-ray diffraction system. Pouch cell batteries can be used in combination with hard X-rays in transmission geometry to perform in situ and in operando studies during charge/discharge cycles and for aging studies. It is then possible to correlate variations in the crystallographic structure of the elements in the cell directly with the amount of Lithium incorporated in the electrodes. Moreover, the efficiency of the GaliPIX3D detector can considerably improve data quality.

Please note: If you have NOT already registered for either of these sessions, you will be able to attend, but please be aware that your contact name and email address will be shared with Bruker/Malvern Panalytical depending on which session you attend. You will be able to unsubscribe from their mailing list at any time in the future. If you do not wish to attend either session, please take an extended lunch break.

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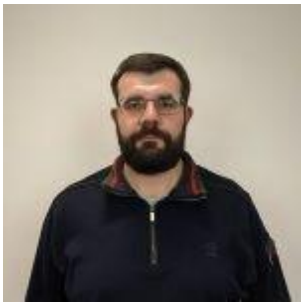
Panel Members

Panel Chair: Prof Serena Corr

Our special guests for a panel discussion include:

Professor Andy Beale,
Chief Scientific Officer
Finden



Paolo Melgari,
Principal Scientist
Centre for Process Innovation (CPI)

Gareth Hinds,
Science Area Leader in Electrochemistry
NPL

Professor Andrea Russell,
Professor of Physical Electrochemistry,
University of Southampton

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Zoom Details for the Advanced Characterisation 2021

We are asking you to complete a short registration via Zoom with your name and email address to enable us to keep track of attendance at the event.

Once you have registered via Zoom you will receive the joining link for the event.

Please contact futurecat@sheffield.ac.uk.

Main session (9.20 a.m. - 3.30 p.m.)

Zoom Registration

Meeting ID: 932 7962 5836

Passcode: AdvChem21

Bruker Capability session (12.20 - 13.00 p.m.)

Zoom Registration

Meeting ID: 995 4704 1838

Passcode: BrukerAd21

Malvern Panalytical Capability session (12.20 - 13.00 p.m.)

Zoom Registration

Meeting ID: 846 5745 8651
Passcode: MalPan21