

# ThursdayElectrochem 2024

Manchester Metropolitan University, 11<sup>th</sup> – 13<sup>th</sup> September

## Programme

### Wednesday 11<sup>th</sup> of September

Time	Event
From 17:00	<b>Registration Badge Pick Up</b> New John Dalton Building Ground Floor
18:00 – 20:00	<b>Welcome Reception</b> John Dalton Building Ground Floor – enter through the Chester Street entrance

### Thursday 12<sup>th</sup> of September

Time	<b>Symposium A Energy</b>	<b>Symposium B Sensors</b>	<b>Symposium C Corrosion Science</b>	<b>Symposium D Sustainability</b>	<b>Symposium E General Electrochemistry</b>
	<i>Main contact: Dr Ed Randviir</i>	<i>Main contact: Dr Robert Crapnell</i>	<i>Main contact: Dr Sam Rowley-Neale</i>	<i>Main contact: Dr Tengfei Li</i>	<i>Main contact: Dr Yagya Regmi</i>
	G.42	2.01	1.10	2.08	G.37
08:00 – 08:45	<b>Registration Badge Pick Up</b> New John Dalton Building Ground Floor				

08:45 – 09:00	<p><b>Opening Remarks</b></p> <p>G.42</p> <p><i>Prof Mark Sterling, Pro-Vice-Chancellor, Faculty of Science and Engineering, Manchester Metropolitan University</i></p>
09:00 – 09:50	<p><b><u>RSC Faraday Medal Award</u></b></p> <p>Lattice Dynamics to Uncover Fast Proton Conductors</p> <p><i>Prof Bilge Yildiz</i></p> <p>G.42</p> <p>Chair: Sarah Horswell</p>
09:50 – 10:10	<p><b>Exhibitor Presentations</b></p> <p>Alvatek, Biologic, Equilabrium and Metrohm</p> <p>G.42</p>
10:10 – 10:40	<p><b>Posters, Refreshments, and Exhibitions</b></p> <p>New John Dalton Building Ground Floor</p>

	<b>Novel Techniques for Energy Applications</b> <i>Chair: O Sel</i>	<b>Biosensors 1</b> <i>Chair: P Bartlett</i>	<b>Corrosion Implications on Nuclear Materials 1</b> <i>Chair: J Wharton</i>	<b>Electrochemical CO<sub>2</sub> Capture and Utilisation</b> <i>Chair: S Roy</i>	<b>Water Electrolysis 1</b> <i>Chair: J Goh</i>
	<b>A1 - O. Sel</b>	<b>B1 - A. Hewson</b>	<b>C1 - M. Zimina</b>	<b>D1 - S. Cobb</b>	<b>E1 - B. Sherin</b>
10:40 – 11:10	Double Layer Structuring of Metal-ion Battery Electrodes Investigated by Advanced Electrogravimetry	Harnessing Glycofluoroforms for Impedimetric Biosensing (10:40 – 11:00) <b>B2 – M. Weatherill</b> Novel Modification of Identity Repeat Tandem Protein for Biosensor Applications (11:00 – 11:20)	Effect of Zn on Corrosion Behaviour of A690 Nickel-based Alloy	Using Enzymes to Understand and Control the Local Environment of Catalysis	In Situ Reference Electrodes in Water Electrolysis (10:40 – 11:00)
	<b>A2 – B. Jagger</b>	<b>B3 – Y. Luo</b>	<b>C2 – H. Lane</b>	<b>D2 – A. Alyahya</b>	<b>E2 – N. Van Dijk</b>
11:10 – 11:30	Fundamental Investigations on the Ionic Transport and Thermodynamic Properties of Potassium-Ion Electrolytes	Development of a Sensitive Material, Carbon Particles and WS <sub>2</sub> Platelet for the Electrochemical Detection of the Anticancer Drug Flutamide (11:20 – 11:40)	Exploration of Electrochemical Corrosion Behaviour of AISI 304L ss-Steel in HNO <sub>3</sub> and MAGNOX Dissolver Simulant Changes with Molarity and Temperature	Modelling Cathodic Flow Field in Electrochemical CO <sub>2</sub> Reduction Flow Cell	High-Pressure, High-Performance Water Electrolysis (11:00 – 11:20)

11:30 – 11:50	<b>A3 – A. Winiwarter</b>	<b>B4 – O. Irving</b>	<b>C3 – T. King</b>	<b>D3 – C. Creissen</b>	<b>E3 – V. Krishnan</b>
	Quantitative Real-Time Analysis of Volatile Products in Electrocatalysis with Mass Spectrometry using Absolute Sensitivity Factors	Sterically Controlled Nuclease Enhanced DNA Assembly (11:40 – 12:00)	Investigating Molten Lead Corrosion of Steel and Other Nuclear Specification Alloys and Coatings	Low-Voltage Electrochemical CO <sub>2</sub> Conversion	Developing Robust Electrocatalysts for Oxygen Evolution in Alkaline Sea Water Electrolysers (ASWEs) (11:20 – 11:40)
11:50 – 12:10	<b>A4 – P. Zhao</b>	<b>B5 – L. Glennon</b>	<b>C4 – S. Byrne</b>	<b>D4 – J. Finn</b>	<b>E4 – E. Rasanani</b>
	Use of Boron Doped Diamond Membrane Electrodes as Combined Scanning Electrochemical Cell Microscopy-Transmission Electron Microscopy Platforms	Electrochemical Detection of Ornidazole by means of Copper-Iron nanoparticles and Carbon Black-modified electrode (12:00 – (12:20)	Electrogravimetric Studies of 20Cr-25Ni Austenitic Stainless Steel to Characterize Spent Nuclear Fuel Cladding Corrosion	Membrane Effects in, and in-situ insights into, Supercapacitive Swing Adsorption (SSA) for Electrochemical CO <sub>2</sub> Capture and Concentration	CuCo <sub>2</sub> O <sub>4</sub> as Catalyst for Oxygen Evolution Reaction in Anion Exchange Membranes Water Electrolysis (11:40 – 12:00)
12:10 – 13:40	<b>Lunch, Posters and Exhibitions</b> New John Dalton Building Ground Floor				

13:40 – 14:30	<b><u>iCORR UE Evans Award</u></b>
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	<p>The Corrosion of the Spent Fuel Waste-form and Engineered Barriers in a High-Level Nuclear Waste Repository</p> <p><i>Prof David Shoesmith</i></p> <p>G.42</p> <p>Prof Julian Wharton</p>				
14:30 – 14:50	<p><b>Exhibitor Presentations</b></p> <p>Ames, Hidden, Nikalyte, SciMed</p> <p>G.42</p>				
	<p><b>Advances in Solar Cell and Battery Technologies</b></p> <p><i>Chair: A El-Zoka</i></p>	<p><b>Development and Optimisation of New Methodologies 1</b></p> <p><i>Chair: P Lasserre</i></p>	<p><b>Corrosion Implications on Nuclear Materials 2</b></p> <p><i>Chair: M Zimina</i></p>	<p><b>Water Redox Process</b></p> <p><i>Chair: S Cobb</i></p>	<p><b>Energy and Fuels 1</b></p> <p><i>Chair: E Dempsey</i></p>
14:55 – 15:15	<p><b>A5 – S.T. Yussuf</b></p> <p>Group 3 (Al, Ga &amp; In) Substituted CZTS Kesterite Phase for Solar Cell Applications</p>	<p><b>B6 – K. Levey</b></p> <p>A Current Averaging Strategy for Maximizing Analyte and Minimizing Redox Interference Signals with Square Wave Voltammetry</p>	<p><b>C5 – L. Coghlan</b></p> <p>Corrosion of Advanced Materials Exposed to High Temperature Helium</p>	<p><b>D5 – C. Megarity</b></p> <p>Interactive, Electrochemical Control of Multi-Enzyme Cascades in a Retuned Electrochemical Leaf</p>	<p><b>E5 – N. Bramah</b></p> <p>Investigations into the effect of Insoluble <math>\epsilon</math>-Nanoparticles on the Electrochemical Generation of <math>\text{Ag}^{2+}</math> for the Dissolution of <math>\text{MOx}</math> fuel</p>

15:15 – 15:35	<b>A6 – G. Nagaraju</b>	<b>B7 – J. Tully</b>	<b>C6 – I. Robertson</b>	<b>D6 – M. Kaewsen</b>	<b>E6 – V. Krishnan</b>
	Printed Aqueous Batteries for Wearable Sensors	The Development of Low-Cost Routes for Fabricating Rotating Ring Disk Electrodes	Electrochemical Measurement of the Corrosion Rates of Spent Nuclear Fuel Simulants	Electrochemical Production of Hydrogen Peroxide by Two-Electron Water Oxidation Using Boron Doped Diamond Electrodes	High Temperature Co-Electrolysis in ‘assisted’ mode – partial oxidation of bio-methane at the anode
15:35 – 15:55	<b>A7 – Z. Li</b>	<b>B8 – D. Commandeur</b>	<b>C7 – B. Pateman</b>	<b>D7 – S. Jang</b>	<b>E7 – R. Tort</b>
	Na <sub>2-x</sub> Mn[Fe(CN) <sub>6</sub> ] Prussian Blue Analog Cathodes for Na-ion Batteries – from fundamentals to practical demonstration	High Throughput Three Electrode Testing for Aqueous Sodium Ion Battery Development	Atmospheric Corrosion Testing in the Presence of Hydrogen Chloride: Implications for Nuclear Materials Container Integrity	Transition Metal Oxides catalyst for green hydrogen production from electrolysis of impure water	Power-to-Ammonia: How to Breach the Lithium Monopoly, Toward Energy Efficient Electrolysers
15:55 – 16:15	<b>Posters, Refreshments, and Exhibitions</b> New John Dalton Building Ground Floor				

	<b>Advances in Fuel Cell and Electrolyser Technologies</b> <i>Chair: A El-Zoka</i>	<b>Development and Optimisation of New Methodologies 2</b> <i>Chair: O Irving</i>	<b>Applying Machine Learning to Geothermal and Corrosion Electrochemistry</b> <i>Chair: S R-Neale</i>	<b>Anode Organic Oxidation</b> <i>Chair: C Megarity</i>	<b>Photo-electrochemical</b> <i>Chair: A Parkin</i>
16:15 – 16:35	<b>A8 – A. Pedersen</b>  Operando Fe Dissolution in Fe-N-C Electrocatalysts during Acidic Oxygen Reduction: Impact of Local pH Change	<b>B9 – R. Johnson</b>  The Detection of Trace Metal Contaminants and the Determination of Enantiomeric Purity in Confined Aprotic Solvent	<b>C8 – E. Proudlove</b>  The Application of Machine Learning to the Prediction of CO <sub>2</sub> Corrosion Rates in Geothermal Systems	<b>D8 – I. Khalek</b>  Understanding the Activity of La <sub>x</sub> Sr <sub>1-x</sub> CoO <sub>3-d</sub> for the Oxidation of Biomass derived 5-hydroxymethylfurfural	<b>E8 – J. Smith-Osorio</b>  Modelling Dynamic Photocurrent Responses of Self-Assembled Porphyrins at the Liquid Liquid Interfaces Using a One-Dimensional Approach
16:35 – 16:55	<b>A9 – R.J. Awan</b>  Synthesis of Multichannel Nickel Ferrites Nanofibers Using Expanded Waste Polystyrene as Efficient Electrocatalyst for H <sub>2</sub> Production	<b>B10 – A. Al-Waqfi</b>  Crowding Effects during DNA Translocation in Nanopipettes	<b>C9 – J. Thevakumar</b>  Material corrosion in sulphuric acid mixed geothermal environments	<b>D9 – K. Plub-in</b>  Electrochemical Oxidation of Glycerol on Platinum Electrode	<b>E9 – H. Muhammad</b>  Investigations on Cs/Zr-Incorporated TiO <sub>2</sub> Nanostructures to Enhance the Performance of Perovskite Solar Cells

	A10 – H. Burnett	B11 – A. Dale-Evans	C10 – V. Bongiorno	D10 - I. Bashir	E10 – G. Creasey
16:55 – 17:15	Electrochemical studies of anthraquinone in water-in-Salt	Tuning Sensitivity To Thermodynamic Dispersion With The Sinusoidal Amplitude In Fourier Transformed AC Voltammetry	An EIS and Machine Learning approach to assess the performance of organic coatings for corrosion protection	Sustainable Approach for Formate Synthesis by Integrating CO <sub>2</sub> Electroreduction with PET Derived Ethylene Glycol Oxidation using Redox-Stabilized Electrodes	Outdoor Testing of an up-scaled Photoelectrochemical Reactor in South Africa for Solar Water Splitting towards the 100 cm <sup>2</sup> scale
17:15 – 17:45	<b>RSC Electrochemistry Interest Group AGM: G.37</b> <b>SCI Electrochemical Technology Group AGM: G.42</b>				
17:45 – 18:15	<b>Joint RSC/SCI meeting: G.42</b>				
18:15 – 18:45	<b>SCI AGM: G.42</b>				
19:30	<b>Gala Dinner</b> <i>The Midlands Hotel</i> <i>Dress code: Casual and Comfortable</i>				



## Friday 13<sup>th</sup> of September

Time	Symposium A Energy	Symposium B Sensors	Symposium C Corrosion Science	Symposium D Sustainability	Symposium D General Electrochemistry
	<i>Main contact: Dr Ed Randviir</i>	<i>Main contact: Dr Robert Crapnell</i>	<i>Main contact: Dr Sam Rowley-Neale</i>	<i>Main contact: Dr Tengfei Li</i>	<i>Main contact: Dr Yagya Regmi</i>
	G.42	2.01	1.10	2.08	G.37
08:00 – 08:45	Arrival				
08:45 – 09:40	<p><b><u>Fleischmann Lecture</u></b></p> <p><b>In situ to Operando: an XAS journey to understand electrocatalysts.</b></p> <p><i>Prof Andrea E. Russell</i></p> <p>G.42</p> <p>Chair: Sarah Horswell</p>				
09:40 – 10:00	<p><b>Posters, Refreshments, and Exhibitions</b></p> <p>New John Dalton Building Ground Floor</p>				

	<b>Electrocatalysts for Oxygen and Hydrogen Evolution 1</b> <i>Chair: C Zalis</i>	<b>Biosensors 2 and Utilising Biomaterials and Biomimics 1</b> <i>Chair: R Johnson</i>	<b>Corrosion Electrochemistry of Metallic Interfaces 1</b> <i>Chair: J Wharton</i>	<b>Electrochemistry for the Circular Economy</b> <i>Chair: E Yu</i>	<b>Materials</b> <i>Chair: V Krishnan</i>
	<b>A11 – S.K. Sampangi</b>	<b>B12 – P. Lasserre</b>	<b>C11 – V. Thangaraj</b>	<b>D11 – J. Xuan</b>	<b>E11 -X. Liu</b>
10:00 – 10:30	Designing the next generation of AEM-WE for green hydrogen production applications. 10:00 – 10:20	Enhancing NanoMIP-based electrochemical detection of biomarkers present in saliva 10:00 – 10:20	Sustainable Electro Pickling Surface Treatment for Steel	Electrochemical Approach for a Circular Chemical Economy	<b><u>Sheelagh Campbell Award:</u></b> Structural Disorder Determines Capacitance in Nanoporous Carbons
	<b>A12 – A. Altaf</b>	<b>B13 – K. Pandiaraj</b>	<b>C12 – S. Tripathy</b>	<b>D12 – M. Khan</b>	<b>E12 – J. Diaz-Reyes</b>
10:30 – 10:50	Surface Reconstruction of La <sub>0.95</sub> Pr <sub>1.05</sub> CuO <sub>4+x</sub> for Enhanced Water Oxidation 10:20 – 10:40	Polymelamine-Modified Carbon Nanomaterial Electrodes for Claudin18.2 Detection in Gastric Cancer 10:20 – 10:40	Pitting corrosion behaviour of 2304 duplex stainless steels in simulated drinking water with single inorganic ionic species (Cl <sup>-</sup> , SO <sub>4</sub> <sup>2-</sup> , HCO <sub>3</sub> <sup>-</sup> )	Microbial Fuel Cells and Microbial Electrosynthesis: Transforming Glycerol-rich Wastewater and CO <sub>2</sub> into Valuable Products with Future Integration Potential	Catalysed Electrosynthesis of PEDOT Thin Films Mediated by Weak Oxidants

10:50 – 11:10	<b>A13 – A. Lozano-Roche</b>	<b>B14 – S. Milne</b>	<b>C13 – A. Black</b>	<b>D13 – B. Siritanaraktul</b>	<b>E13 – Z. Zhu</b>
	Fine-Tuning the Size and Electrocatalytic activity of Ru NPs for HER Using 2,2'-Bipyridine 11:40 – 11:00	Producing low-cost chips for biomarker detection using carbon pastes 10:40 – 11:00	Exploring Boron Doped Diamond as an Electrocatalyst Support Material for Alkaline Water Splitting	Carbon-efficient CO <sub>2</sub> electrolyzers using molecular catalysts and bipolar membranes	Carbon Nanotube Production from Molten Li <sub>2</sub> CO <sub>3</sub> via High Temperature Electrolysis
11:10 – 11:30	<b>Posters, and Refreshments</b> New John Dalton Building Ground Floor				

	<b>Electrocatalysts for Oxygen and Hydrogen Evolution 2</b> <i>Chair: C Zalitis</i>	<b>Electrocatalysts for Oxygen and Hydrogen Evolution 3</b> <i>Chair: E Randviir</i>	<b>Corrosion Electrochemistry of Metallic Interfaces 1</b> <i>Chair: V Thangaraj</i>	<b>Nitrogen Redox Process</b> <i>Chair: Jin Xuan</i>	<b>Electrodeposition</b> <i>Chair: J Goh</i>
	<b>A14 – C. Tseng</b>	<b>A20 – H. Basharat</b>	<b>C14 – A. Skyes</b>	<b>D14 – T. Li</b>	<b>E14 – S. Thomas</b>
11:30 – 11:50	Investigating the Role of Mixed Oxides for Oxygen Evolution Reaction on Iridium Oxide Electrocatalysts	Anisotropy of Proton Migration in Hexagonal Perovskite Ba <sub>5</sub> Er <sub>2</sub> Al <sub>2</sub> ZrO <sub>13</sub>	Investigating the Influence of Porous FeCO <sub>3</sub> Layers on the CO <sub>2</sub> Corrosion Rate of Carbon Steel	Sustainable Electrosynthesis of Cyclohexanone Oxime through Nitrate Reduction on a Zn-Cu Alloy Catalyst	Electrodeposition of WSe <sub>2</sub> Thin Films Using a Single Source Precursor
	<b>A15 – M. Kraft</b>	<b>A21 – N. Iqbal</b>	<b>C15 – A. Keogh</b>	<b>D15 – J. Rietbrock</b>	<b>E15 – U. Roy</b>
11:50 – 12:10	Ru Nanoparticles with a Negatively Charged Ligand to Enhance HER Activity at pH 7	ZIF/MOF derived nanoporous carbon-based bifunctional oxygen electrode catalyst for metal air batteries	Effect of Ageing Temperature and Chloride Concentration on the Atmospheric Stress Corrosion Cracking of 15-5ph	Gaining Insights into Electrolyte Oxidation during Electrochemical Ammonia Synthesis using Surface Enhanced Infra-red Spectroscopy	Electrodeposition of Zinc from ZnO formic acid-based Deep Eutectic Solvent

	<b>A16 – S. Li</b>	<b>A22 - E. Christie</b>	<b>C16 – B. Guedes</b>	<b>D16 – A. Khobnya</b>	<b>E16 – L. Shao</b>
12:10 – 12:30	Size effect investigation of Co nanoparticles for OER	Advancement of Resistive Pulse Sensing for Particle Identification and Use on Environmental Samples	Probing the Cation Effect at the Electrochemical Interface of Au (001) in Alkaline Solution	Effect of Proton Activity on Performance and Stability in Lithium-Mediated Nitrogen Reduction	Templated Electrodeposition of Nanostructured Materials
12:30 – 13:30	<b>Lunch, Posters and Exhibitions</b> New John Dalton Building Ground Floor				
13:30 – 14:30	<b><u>Castner Medal and Lecture</u></b> From Bench to Business: Innovations in Electrochemical Technology for the Low Carbon Energy Transition <i>Prof Nigel Brandon</i> G.42 Chair: Prof Sudipta Roy				
14:30 – 14:50	<b>Posters, Refreshments, and Exhibitions</b> New John Dalton Building Ground Floor				

	<b>Novel Electrolytes for Energy Applications</b> <i>Chair: A Parkin</i>	<b>Sensors with Energy Conversion</b> <i>Chair: D Commandeur</i>	<b>Frontiers of Corrosion Electrochemistry</b> <i>Chair: S R-Neale</i>	<b>Electrochemical CO<sub>2</sub> Reduction</b> <i>Chair: C Creissen</i>	<b>Metal Interfaces</b> <i>Chair: V Krishnan</i>
	<b>A17 – S. Maitra</b>	<b>B15 – G. Yang</b>	<b>C17 – A. El-Zoka</b>	<b>D17 – S. Roy</b>	<b>E17 – A. Macili</b>
14:50 – 15:10	Understanding the Role of Crystal Phase in Triggering Lattice Oxygen-Mediated Oxygen Evolution in Perovskite Oxides Using X-Ray Spectroscopy	Probing conductivity changes of the supports for iridium oxide water oxidation catalysts in-situ with the interdigitated electrodes	Making Novel Nanostructures via Inner-pore Electrodeposition into Dealloyed Nanoporous Metals	Restructuring of coordination polymers under electrocatalytic conditions	The role of the ligand in Ni-based OER nanocatalysts
	<b>A18 – R. Majee</b>	<b>B16 – G. Ludlam</b>	<b>C18 – I. Rees</b>	<b>D18 – L. Navarro-Tovar</b>	<b>E18 – R. Yadav</b>
15:10 – 15:30	Designing Low-T Exsolution Fuel Electrode for Reversible Solid Oxide Cells	Humidity-controlled terahertz time-domain spectroscopy for characterizing water uptake and states in Nafion membranes	Evaluating the corrosion and passivation behaviour of Ti6Al4V in a simulated cancerous microenvironment	e3 Group's Optimised Synthesis Method for the in-situ Production of Cu-based Bimetallic Electrocatalyst for a Sustainable Electrochemical Reduction of CO <sub>2</sub>	The Origins of Formic Acid Electrooxidation on Selected Surfaces of Pt, Pd, and Their Alloys with Sn

15:30 – 15:50	<b>A19 – H. Unsal</b>	<b>B17 – J. Goh</b>	<b>C19 – M.J. Anjum</b>	<b>D19 – T Hodges</b>	<b>E19 – A. Mubshrah</b>
	High Temperature Corrosion Protection Effect of MgCr <sub>1.9</sub> Fe <sub>0.1</sub> O <sub>4</sub> and (La <sub>0.65</sub> Sr <sub>0.35</sub> ) <sub>0.95</sub> MnO <sub>3</sub> Coating on 430 FSS as SOFC Interconnect	Sensitive and rapid hydrogen impurity detection using electrochemical proton pumps	Next Generation Li- ion Pouch Cells: Sustainable Solutions for Corrosion Resistant Cell Tabs	EcoFuel: Catalyst Development and Electrode Manufacturing for Electrochemical CO <sub>2</sub> Reduction	Effect of Growth Parameters on the Morphology of Electrodeposited Ni Films
16:00 – 15:50	<p align="center"><b><u>Geoffrey Barker Medal</u></b></p> <p align="center"><i>Prof Ifan Stephen</i></p> <p align="center">G.42</p> <p align="center">Chair: Sarah Horswell</p>				
16:50 – 17:15	<p align="center"><b>Student awards and closing statements.</b></p> <p align="center">G.42</p>				