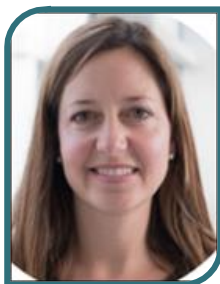




# Battery Materials and Characterisation

19 October 2023 | 13:00 – 14:30 (BST)



## **Chair: Ana Robador (MIMMM)**

*Electronics and Magnetic Materials group, National Physical Laboratory (NPL), UK*

Battery energy storage systems are critical in the race to achieve net-zero emissions, so further research into new battery materials and specialised characterisation tools is crucial to address many of the challenges associated to meet the needs and performance targets. In this webinar, we will discuss some next generation battery materials research and characterisation techniques to better understand the physical and chemical mechanisms that battery materials experience during battery cycling.

## **Electron microscopy based studies of Ni-rich cathodes for Li-ion batteries**

### **Dr. Amoghavarsha Mahadevegowda**

*Department of Materials Science and Metallurgy University of Cambridge, UK*

Li-ion batteries are enabling large-scale deployment of electric vehicles and thus helping to switch from the current fossil fuel-based transport system. A specific class of battery materials - Ni-rich cathodes have recently gained interest due to their high gravimetric specific capacities at a relatively low cost. However, these Ni-rich cathodes suffer from a number of degradation mechanisms that need to be studied and mitigated to enhance their lifespan and applicability. In this talk, I will discuss electron microscopy as a tool to probe battery cathodes.



## **Operando vibrational spectroscopy for batteries: A metrology based approach**

### **Dr. Rudra Samajdar**

*Electrochemistry group, National Physical Laboratory (NPL), UK*

Measurements performed on batteries while the device is in operation (operando) provide crucial information on material performance and degradation. However, the current literature lacks benchmarks in cell design and measurement protocols for operando experiments. In this talk, I will present some of our recent work in operando vibrational spectroscopy (FTIR and Raman) on batteries – starting with exploratory measurements with magnesium electrolytes and moving towards a standard metrology framework for operando spectroscopy of commercial battery materials.



## **Phase engineered 2D transition metal dichalcogenides for next generation batteries**

### **Dr. Ismail Sami**

*Department of Materials Science and Metallurgy, University of Cambridge, UK*

Next generation batteries beyond lithium-ion are needed to support the transition to net-zero by providing higher performance without the environmental burden. Batteries with new chemistries require novel materials to overcome fundamental limitations. These novel materials allow new energy storage solutions which can provide a step change in performance and at low materials cost, enabling new modes of transport such as electric aviation. This talk will discuss phase engineered TMDs as a suitable candidate for lithium-sulfur batteries.

