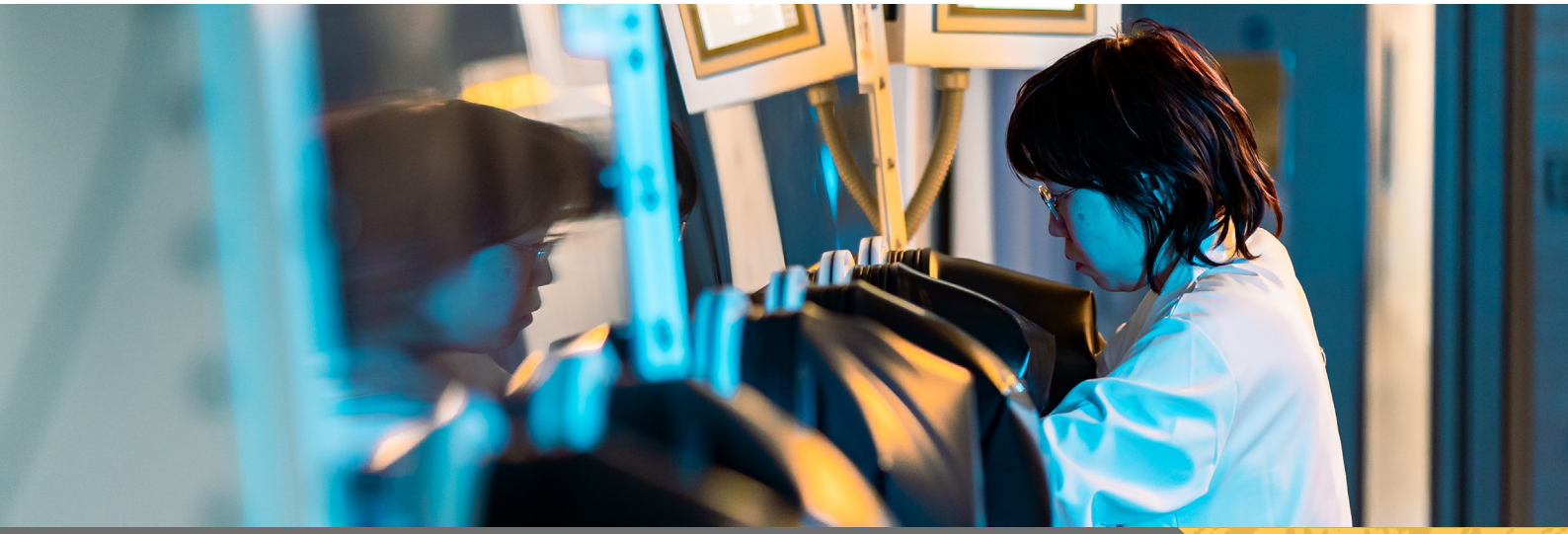
UNIVERSITY OF CAMBRIDGE

ADVANCED MATERIALS RESEARCH & INNOVATION

Royce facilitates development of next-gen battery technology

To reduce carbon emissions, new types of battery technologies that are both sustainable and have a greater energy storage capacity are required as a matter of urgency. One promising technology is lithium-sulphur (Li-S) batteries, which contain fewer expensive and unsustainable transition metals. They are also lightweight, meaning they could potentially be deployed in drones and electric vehicles.



Royce Battery Development Facility

This facility bridges the gap between materials innovation and industrial collaboration. This comprehensive suite can accommodate a variety of materials and overcome difficult processing operations, including digestion, separation, drying, purifying, mixing, and washing.

The Mbraun Labmaster Pro is a glovebox that helps users to handle sensitive materials under inert atmosphere. The Thinky Mixer ARV-501 is a planetary mixer which can also disperse and degas materials in a sealed or lidless container for slurry formulations and homogeneous mixing. The Beckman Avanti JXN26 is a centrifuge with a maximum capacity of 6 litres and 26 thousand RPM, 82 thousand g, for use in liquid-solid seperation and sample processing at temperature control.

University of Cambridge is a Partner of the Henry Royce Institute for advanced materials

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CHALLENGE

Lithium-sulphur batteries have been the subject of research for decades but their commercialiation has been stalled due to issues with the sulphur dissolving into the electrolyte, causing corrosion of the battery and quick failure. Other issues include the need for sulphur to be held in a conductive host. Historically manufacturers have used carbon as a host material, however this is not sufficient in solving the issue of sulphur dissolution.

RESULTS

Now researchers from Molyon, based at Professor Manish Chhowalla's laboratory at the University of Cambridge have created novel cathodes. Rather than using carbon, they can create a host for the sulphur from two-dimensional nanosheets of molybdenum disulphide (Li_xMoS_2). Utilising Royce facilities at the University of Cambridge, the team has now successfully manufactured prototype cells with twice the gravimetric energy density of lithium-ion batteries and the highest reported volumetric energy density for this cell chemistry (735 Wh/L). The results of this research have enabled Molyon to raise $4.6m in seed funding to commercialise their novel breakthrough.

SUPPORT

"The Battery Development Facility provided the ideal setting to test and trial new cathode materials, and the support given by Royce on training, maintenance, and insights on the equipment and how it can uniquely benefit us was ideal." Dr Zhuangnan Li, CTO Molyon.

Contact royce@maxwell.cam.ac.uk to use Royce Cambridge equipment

"The Royce Battery Development Facility has been incredibly helpful in providing us a platform to begin our commercial journey through Molyon."

Visit **royce.ac.uk/impact** to read more impact case studies from the Henry Royce Institute

"Our novel cathode in lithium-sulphur batteries has demonstrated a path to commercialising these next generation batteries and providing a step-change in battery solutions. The Royce Battery Development Facility has been incredibly helpful in providing us a platform to begin our commercial journey through Molyon."

Ismail Sami
CEO and Co-Founder Molyon

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Molyon
Next generation batteries

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