

Energy Materials Special Interest Group

Taking Batteries from Lab to Fab

14 Feb 2024

Panel

Michael De Volder, Professor of
Advanced Materials Engineering,
University of Cambridge

Andrew Diamond, Head of Process
and Product Development, EV
Metals Group (EVM)

Alex Groombridge, Chief
Technology Officer & Cofounder,
Echion Technologies Ltd.

Emma Kendrick, Professor of Energy
Materials, Metallurgy and Materials,
University of Birmingham

Rapporteur: Camilla Tacconis

For more information, contact
decarbnetwork@admin.cam.ac.uk

Challenges

- Designing new materials and systems with an early focus on recycling to reduce environmental impacts.
- Identifying key requirements of academic projects which will facilitate their integration into the existing battery market.
- Identifying routes, facilities and funding available to assist lab-scale projects to scale up *en route* to commercialisation.
- Creating relationships and alliances with industry players and international commercial and academic sectors.

Discussion Points

- A [study](#) has revealed that numerous startups operating in the battery industry predominantly occupy downstream in the value chain. Their contributions tend to be incremental improvements to established technologies, which contrasts with the more upstream fundamental material innovations and research priorities observed in academic settings.
- Due to the huge investment required in building Giga factories, novel materials that wish to replace current Li-ion technologies must be integrated into the existing production chain, or risk ending up as a niche market product.
- To produce a tangible industrial impact, academic initiatives in the battery sector should emphasize the selection of raw materials which are sustainable and abundant, as well as using synthesis routes that are commonly adopted in material production chains to enhance scalability prospects.
- A primary obstacle in transitioning fundamental materials science breakthroughs from academic research to industrial application is the upscaling of material production. In the United Kingdom, an expanding network of centres is designed to support this transition.
- A significant portion of the battery industry is located in Asia, encompassing both materials manufacturing and the assembly of battery packs. Collaborations and alliances between European Academics or early-stage companies and large international industry partners are key going forward.
- To foster such international connections, it is important to build relationships and trust through face-to-face interactions where possible. Initial outreach efforts to potential company collaborators may benefit from engaging with technical personnel who are typically more receptive and open to discussing scientific findings.
- The United States has recently updated its federal tax code to encourage the onshoring of heavy metal manufacturing, as well as incentivizing the manufacturing and selling of products within the US. This has resulted in the move of a portion of battery-centered projects from Europe to the US. A similar initiative is in place in Europe with the 'Rules of Origin for Electric vehicles', however, there are doubts that the European Battery ecosystem will be able to address these needs in time.
- The construction of new mines to address the material needs of the battery industry is one of the main concerns in terms of sustainability. To address this, it's essential to instil a focus on recycling used battery packs and reutilizing raw materials from the onset of new project developments.

Opportunities

- The UK is a good ecosystem for small businesses, with a growing interest and funding in commercialising new battery technologies.
- Academic funding is available through initiatives such as the Faraday Entrepreneurial Fellowship or Impact Accelerator awards.



UNIVERSITY OF
CAMBRIDGE

These reports capture key points from the University of Cambridge Decarbonisation Network discussion series, held under Chatham House rules. These reports are made available for information only, do not constitute professional advice and should not be relied upon for that purpose. The accuracy and completeness of any factual content has not been verified; any views/opinions expressed are the participants' own and do not necessarily represent the views of the University of Cambridge or the organisations to which the participants are or were affiliated.