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(MEET at the University of Münster)

Thursday 24. April 2025 | 3:45 pm | H 36, NW III

Material, Cell, and Safety Considerations for High-Energy Density Li Metal Batteries – High Risk, High Gain?

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Lithium metal batteries (LMBs) are considered as THE future high energy density next generation/beyond lithium ion battery systems, either with liquid or with solid electrolytes.

In the process of developing rechargeable LMBs emphasis is typically placed on the design of novel battery materials enabling enhanced performance and energy density. Safety properties of novel battery materials and their combinations are often insufficiently analyzed and, thus, require detailed investigations. In this context, thermal safety properties determine overall battery safety as abusive conditions are typically associated with heat generation potentially ending in thermal runaway.

After an introduction into lithium metal batteries and their surprising reactivity during cell assembly, this presentation will report on a methodology to combine thermal and electrochemical analysis with cross-section imaging, enabling detailed investigations and liquid organic carbonate-based electrolyte LMBs. Overall, this study demonstrates the relevance of battery safety assessment both on material and cell level while also considering gas evolution, pressure generation, besides thermal indicators like onset temperature and generated heat.

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