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STELLAR
PROJECT

Lighting the path to Europe's energy independence with next-gen battery manufacturing

STELLAR Project Kicks Off to Advance Sustainable and High-Throughput Production of Reliable Lithium Metal Anodes for Next-Generation Batteries

About

The European Union is taking a significant step towards ensuring a sustainable energy future by advancing the battery manufacturing industry, with a special focus on solid-state batteries (SSBs) Gen 4b/4c and lithium-sulfur batteries (LSBs) Gen 5. The production of lithium metal (LiM) anodes, a critical component in next-generation batteries, must be scaled up using high-throughput, sustainable processes to meet the growing demand for energy storage solutions.

STELLAR aims to revolutionise the production of LiM anodes by deploying a new, sustainable, industrially competitive roll-to-roll (R2R) physical vapour deposition method. This approach will deliver high-purity, dense, and stable LiM anodes with low thickness while achieving high production capacity at a competitive cost. By demonstrating a first-of-its-kind LiM anode production pilot line in the EU, STELLAR will achieve Technology Readiness Level 7 and validate this new generation of anodes in functioning cells for Gen 4b/4c/5 batteries.

The project will build upon the existing R2R vacuum coater at AVESTA's facility and implement several innovations:

- Optimising thermal evaporation and in-situ sputtering of a protective coating within the same vacuum chamber for stable LiM anodes.
- Upgrading the production equipment.
- Applying advanced, non-destructive inline monitoring techniques for thickness and roughness.
- Using high-precision laser cutting for anode fabrication.
- Fully automating quality control through data science and machine learning.

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