PULSELiON

PRESS RELEASE

Next generation battery manufacturing: PULSELiON - PUlsed Laser depoSition tEchnology for soLid State battery manufacturIng supported by digitalizatiON

A consortium of 15 interdisciplinary European partners will develop manufacturing technology for Generations 4a – 4b solid-state batteries, that can improve the energy density and safety of lithium metal solid state batteries

28 September 2022 – Lithium-ion battery cells with conventional active materials are reaching their limits in terms of energy densities and suffer from safety issues that become even more critical in the future. Solid-state batteries can solve these issues, but they are not yet manufactured on a large scale. Hence, there is an urgent need for the development of manufacturing technologies for solid-state batteries, as a next step to significantly enhance battery energy density and safety. The new research project PULSELiON, sets out new pulsed laser deposition based technologies for solid-state battery manufacturing. Funded through the European Union's Horizon Europe Framework Programme for Research and Innovation, the project will receive EUR 7 million over the next four years. PULSELiON is coordinated by RISE and the consortium kicks off its activities today with a meeting at the Stockholm premises of RISE in Sweden.

Lithium-ion battery cells with conventional active materials are reaching their limits in terms of energy densities. Also, safety issues arise with the utilization of liquid organic electrolyte, which is becoming even more critical with the recent introduction of advanced materials made to increase cell voltage and fast-charging rates. Hence, there is an urgent need for the development of innovative scalable manufacturing technologies based on new solid electrolytes that can also be combined with metallic lithium at the anode, leading to significantly enhanced energy density. In this context, solid-state electrolytes enable overcoming current battery cells limitations in terms of voltage and safety (reducing the Lithium dendrite formation risk) leading to an increased intrinsic thermal and electrochemical stability.

PULSELiON project aims to develop a manufacturing process for Generation 4b solid-state batteries that are based on a lithium-metal anode, a sulfide solid electrolyte, and a nickel-rich NMC cathode. A novel pulsed laser deposition technique, already developed by project partner PULSEDEON, will be adapted and modified into a single-step vacuum process for safe and efficient manufacturing of anode components composed of lithium metal, protective layers, and sulfide-based solid electrolytes. The cathode layer will be based on conventional wet processing techniques.

Initially, the anode and cathode layers will be developed in small-scale to make coin cells and monolayer cells for optimising the materials and process. Solid-state cells will be developed with optimised process routes and will be upscaled to a pilot line proof-of-concept (TRL 6) by large scale manufacturing of 10 Ah solid-state batteries. Digitalisation will be incorporated in the process modeling (digital twinning) task with the inputs obtained from process upscaling and cell testing tasks, which will enable efficient process optimisation.

The PULSELiON consortium, responsible for this novel battery manufacturing process, brings together top EU experts from research institutes, technological / industrial partners, a battery end user from the automotive industry, and dissemination and exploitation partners, from Sweden, Finland, The Netherlands, Belgium, France, Spain, Portugal, Italy, Slovenia and Austria. The project officially kicks off its activities with a first meeting taking place at the premises of RISE on 28 September 2022.

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Project Key Facts

Full Name:	PULSELiON- PUlsed Laser depoSition tEchnology for soLid State battery manufacturIng supported by digitalizatiON
Start Date:	1 September 2022
Duration:	48 months
Budget:	7 million €
Coordinator:	RISE, Sweden
Website:	www.project-pulselion.eu

Project Partners

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