

PULSELiON

Newsletter #6 – June 2026

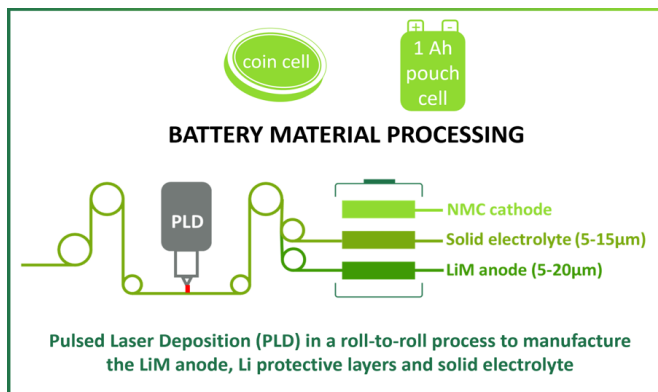
In this newsletter, you will learn more about the latest activities of the PULSELiON project and the activities to come. The next newsletter will be published near the end of the project in August/September 2026. Do you want to stay informed about the latest PULSELiON news in the meanwhile? Please stay tuned via our website www.project-pulseion.eu, or follow us on [LinkedIn](#) and [X](#).

UPDATE FROM OUR COORDINATOR

Status and progress of the PULSELiON project by Anwar Ahniyaz

To enable large-scale manufacturing of solid-state batteries, PULSELiON aims to establish a new production process based on a novel technology: **Pulsed Laser Deposition (PLD)**, developed by the Finnish SME Pulsedeon.

The advantage of this method lies in its ability to fabricate very thin, uniform layers while enhancing interfacial contact. This can significantly reduce interfacial resistance and help suppress lithium dendrite formation—two of the key challenges in solid-state batteries.



As the project approaches its end, the work is being finalized, with several important developments:

- Pulsed Laser Deposition (PLD) has been successfully implemented in a roll-to-roll process to deposit thin layers of lithium, lithium alloys, and lithium phosphorus sulfur chloride (LPSCI)—the sulfide-based solid electrolyte used in the PULSELiON project—directly onto copper current collectors and cathodes.
- Despite these advances, the overall cell resistance remains relatively high, making post-deposition compression of the layers necessary. However, due to the brittle nature of compressed LPSCI, the required level of compaction could not be fully achieved as initially anticipated. As a result, several project partners are now pursuing the fabrication of pouch cells using a free-standing LPSCI layer combined with Li-on-Cu produced via PLD.
- All individual materials have been successfully produced; the remaining challenge lies in optimizing compaction and reducing interfacial resistance to improve overall cell performance.
- In parallel, LPSCI is currently being deposited directly onto the cathode material (NMC955) and will be evaluated in smaller cell formats. Optimization of interfacial compression is required, as well as densification of the LPSCI layer itself. Both isostatic pressure and conventional uniaxial pressure methods are currently under evaluation.

By the end of the project, we hope to present a PULSELiON solid-state battery cell, assembled from components developed within the project, including elements produced by PLD.

Following the conclusion of PULSELiON, efforts to scale up this process will continue, with the goal of contributing to more efficient and sustainable solid-state battery manufacturing in Europe.

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WHAT IS NEW?

UPORTO presents the PULSELiON project at AICME 2026

In the unique setting where the Sahara sands meet the lush forests of the Amazonas in Brazil, the [Amazonas International Conference on Materials and Energy \(AICME\) 2026](#) took place from April 27 to 29. The conference offered inspiring science, insightful technical visits, and meaningful social interactions that open the way to fruitful collaborations.

During this conference, PULSELiON was impactfully represented by our partner UPORTO: Manuela Baptista was awarded first prize for her poster presentation, Beatriz Gomes was awarded an honorable mention, and Prof Maria Helena Braga had the honor of presenting for one hour at the inaugural plenary!



RISE presents PULSELiON at the Battery Safety Conference Goteborg

The Battery Safety Conference is the must-attend event for everyone working in battery safety. The conference, organized by RISE, gathers global experts on battery safety and provides opportunities to learn, discuss, and contribute to safer batteries.

During [the Battery Safety Conference 18–19 March 2026](#), the PULSELiON project was represented by Anwar Ahniyaz of RISE through a poster presentation, highlighting the impact of the PULSELiON technology on battery safety.



PULSELiON represented at the Battery Materials and Processing Conference (BMPC) in Stockholm by RISE and AIT

On 27-28 May 2026, the [Battery Materials and Processing Conference \(BMPC\)](#) took place in Stockholm. This event serves as an important meeting point for experts, researchers, and industry leaders working in battery materials, processing technologies, and energy storage. The conference provides valuable insights into the latest developments in **materials innovation, sustainability, and next-generation battery technologies**.



BMPC covers the entire battery materials value chain—from raw materials and active components to processing, cell development, and manufacturing. Key topics include cell components, binders, separators, as well as testing methods and advanced characterisation techniques. In addition, **safety, recycling, and reuse** are central themes, supporting the transition toward more sustainable and innovative energy solutions.

The 2026 edition welcomed over 100 participants from across Europe, fostering lively discussions on key challenges and opportunities in battery materials and processing technologies.

During the event, the **PULSELiON project** was proudly presented by **Anwar Ahniyaz and Agnes Digranes (RISE)** and **Susan Montes (AIT)** through a poster presentation, highlighting the project's progress and contributions to advancing solid-state battery manufacturing.



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PULSELiON General Assembly Marks Key Milestone Toward Project Completion

On 11–12 March, the PULSELiON consortium gathered in Porto for its General Assembly meeting, marking an important milestone as the project enters its final phase.

Over the course of two days, project partners engaged in in-depth discussions, technical reviews, and strategic planning. The meeting provided an opportunity to assess progress across all work packages, align priorities, and define the pathway toward delivering a fully functional solid-state cell by the end of the project.

Significant advancements were presented across multiple areas, including materials development, manufacturing optimisation, interface engineering, modelling, and system integration. Building on these results, the consortium agreed on the key remaining steps to successfully conclude the project. These include finalising the next iterations of the PULSELiON solid-state cell, conducting comprehensive performance testing, and consolidating the project's scientific and technological outcomes.



In addition, discussions focused on strengthening Europe's innovation capacity in advanced battery technologies, ensuring that the knowledge and results generated within PULSELiON will have a lasting impact beyond the project's lifetime.

The consortium would like to express its sincere thanks to all partners for their continued commitment, expertise, and collaborative spirit. Special appreciation goes to the Porto hosts, INEGI and the Faculty of Engineering of the University of Porto, for their excellent organisation of the meeting and for providing insightful guided tours of their laboratories.

As PULSELiON moves into its final months, the project maintains strong momentum and a clear vision: to contribute to the development of solid-state batteries manufactured through sustainable and scalable Pulsed Laser Deposition processes, supporting the transition toward next-generation energy storage solutions in Europe.



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PULSELiON Featured in BATT4EU Success Stories Webinar

On 21 April, the PULSELiON project was highlighted during the latest edition of the **BATT4EU Success Stories** webinar series, organised by the Batteries European Partnership Association (BEPA).

The event brought together leading European battery initiatives to showcase recent achievements and share insights into ongoing research and innovation efforts across the battery value chain.

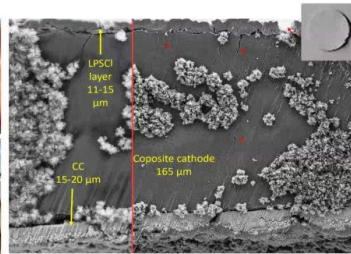
During the session, **Anwar Ahniyaz (RISE Research Institutes of Sweden)**, coordinator of the PULSELiON project, presented the project's key breakthroughs. His presentation provided an overview of recent progress, including advancements in materials development, manufacturing approaches, and the application of Pulsed Laser Deposition (PLD) for solid-state battery production.

PLD Process: Li on Cu Roll-to-Roll

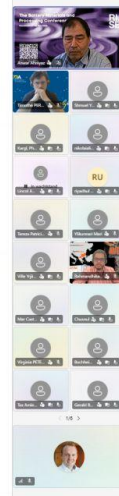
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PLD process - Li on Cu: 5-10µm thin → a possible benefit to commercial foil (picture taken by Pulsedon)



Cross-section of cathode with LPSCI layer deposited by PLD (picture taken by AIT)



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The webinar offered an excellent opportunity to highlight PULSELiON's contribution to the development of next-generation battery technologies and its role within the broader European battery ecosystem. By sharing these results with a wider audience, the project continues to support knowledge exchange and collaboration across the sector.

For those who were unable to attend, the full recording of the **5th edition of the BATT4EU Success Stories webinar** is available online: [link to video](#)



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3 NEW OPEN ACCESS PUBLICATIONS

Since the publication of the last newsletter, the researchers within the PULSELiON project have published another three new open access publications, that acknowledge funding by the project PULSELiON. **This brings the total number of open access publications to 29!**

This astonishing number of publications in the PULSELiON project underpins the high level of the groundbreaking research that is performed within the project, both on fundamental battery research and battery production technology, as well as on battery models.

All published articles can be found on our website: <https://project-pulselion.eu/results/>.

27th publication: *“Ferroelectric and ferroionic multifunctional quantum sensors: Incursion into applications”*

Project PULSELiON is proud to announce its **27th Open Access publication**, titled *“Ferroelectric and ferroionic multifunctional quantum sensors: Incursion into applications”*, published in **Applied Physics Reviews (2026, 13, 011306)**.

The review explores the rapidly growing field of ferroelectric and ferroionic materials and their potential for next-generation multifunctional quantum sensors. The paper discusses advanced materials such as MoS₂, WTe₂, CuInP₂S₆, BaTiO₃, hybrid perovskites, and ferroionic glass electrolytes, highlighting their coupled ionic–electronic behavior and adaptive sensing capabilities.

Applications covered include photodetectors, memristors, strain and pressure sensors, thermal sensing, and neuromorphic devices. The work also outlines how multiscale simulations and nanoscale characterization techniques can accelerate the development of future quantum technologies.

This publication brings together the work of **Beatriz M. Gomes, Beatriz A. Maia, Manuela C. Baptista, and Maria Helena Braga (University of Porto)** within the **PULSELiON Horizon Europe project**, in collaboration with additional partners.

[Read the full publication here](#)

28th publication: *“When Electrolytes Are Semiconductors: A Feature, Not a Bug for Solid-State Batteries”*

Project PULSELiON also announced its **28th Open Access publication**, titled *“When Electrolytes Are Semiconductors: A Feature, Not a Bug for Solid-State Batteries”*, published in **Batteries (2026, 12, 60)**.

The study explores the electronic behavior of three promising sulfide-based solid electrolytes — Li₆PS₅Cl (LPSCI), Li₆PS₅Br (LPSBr), and Li₁₀GeP₂S₁₂ (LGPS) — using a combination of advanced electrochemical techniques and Density Functional Theory (DFT) simulations.

Contrary to the common assumption that solid electrolytes behave as perfect insulators, the research demonstrates that these materials exhibit semiconductor-like properties. Interestingly, this behavior may actually benefit all-solid-state batteries by supporting stable interphase formation and controlled charge transfer processes.

Among the investigated materials, **LPSCI** showed the most promising balance between electrochemical stability and compatibility with lithium metal, making it a strong candidate for future solid-state battery applications.

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The publication was authored by **Beatriz M. Gomes, Manuela C. Baptista and M. Helena Braga** of **UPORTO** within the framework of the **PULSELiON Horizon Europe** project.

[Read the full publication here](#)

29th publication: *“Anode-Less (Anode-Free) Batteries: From Fundamental Principles to Practical Pathways Toward Solid-State Implementation”*

Over the last period, project PULSELiON also announced its **29th Open Access publication**, titled *“Anode-Less (Anode-Free) Batteries: From Fundamental Principles to Practical Pathways Toward Solid-State Implementation”*, published in **Materials (2026, 19, 1232)**.

The review provides a comprehensive overview of anode-less battery technologies, which eliminate the traditional host anode material to achieve higher energy density, simplified manufacturing, and safer battery operation.

The paper explores key topics including electrolyte and interface engineering, dendrite suppression, operando characterization methods, and the transition toward fully solid-state battery systems. It also introduces a “development pyramid” framework connecting fundamental research with practical industrial implementation.

The publication highlights both the opportunities and the remaining scientific challenges for bringing anode-less batteries from laboratory concepts to commercial applications.

The work was authored by **Manuela Carvalho Baptista and Maria Helena Braga** of **UPORTO** within the framework of the **PULSELiON Horizon Europe** project.

[Read the full publication here](#)

UPCOMING FINAL EVENT

As the PULSELiON project approaches its conclusion, preparations are underway for its **final event**, which is planned to take place in the **last weeks of August 2026 in Stockholm**.

This event will mark an important milestone for the consortium, providing an opportunity to present the project’s key achievements, technological developments, and final results to a broader audience of stakeholders, researchers, and industry representatives.

Over the course of the project, PULSELiON has advanced innovative manufacturing approaches for solid-state batteries, particularly through the development and application of Pulsed Laser Deposition (PLD). The final event will offer insights into these innovations, as well as the progress made toward delivering a functional solid-state battery cell.

Further details, including the exact date, location, and programme, will be announced soon via our social channels and website. Stay tuned for more information and join us in celebrating the outcomes of the PULSELiON project.



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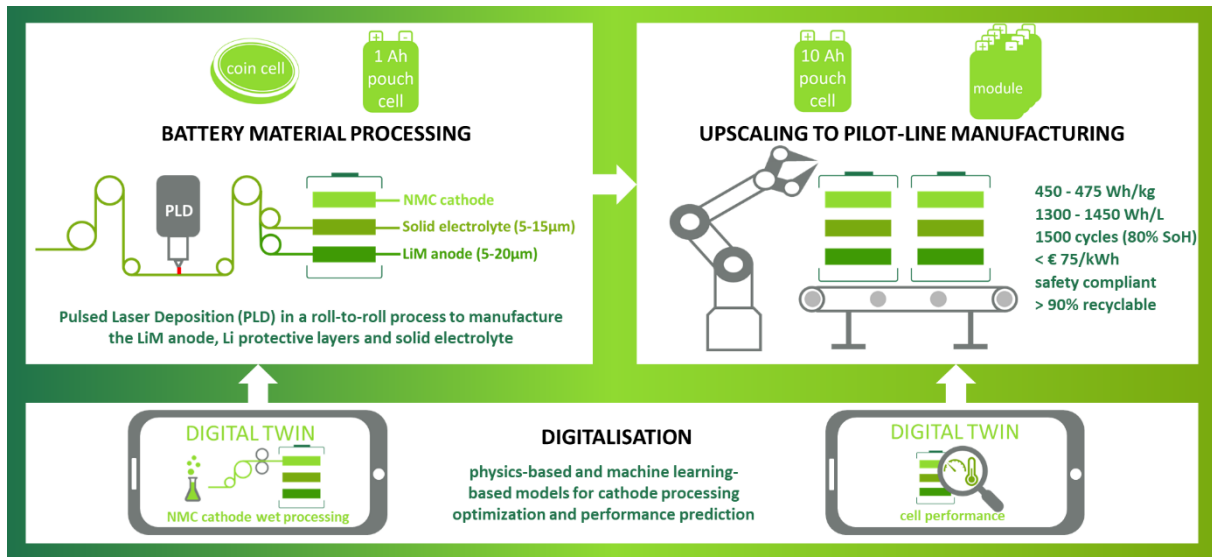
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ABOUT PROJECT PULSELiON:

Project PULSELiON has the ambition to develop a manufacturing process for Generations 4a – 4b solid-state batteries, while improving the battery energy density (450-475 Wh/Kg and 1300-1450 Wh/L), costs and safety. The main innovation in project PULSELiON is bringing Pulsed Laser Deposition (PLD) based solid-state battery manufacturing technology from TRL3 to TRL6. The results of PULSELiON will help increase global competitiveness of the European battery ecosystem, increase safety of batteries, decrease battery production costs, and improve battery recyclability. PULSELiON is a Horizon Europe project bringing together a multidisciplinary consortium of 15 partners from 10 countries.

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PULsed Laser depoSition tEchnology for soLid State battery manufacturing supported by digitalizatiON



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Project PULSELiON has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No. 101069686 (PULSELiON). Views and opinions expressed are those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.



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