2022 - 2026

ADVAGEN

Development of advanced next generation solid-state batteries for electromobility applications

NEWSLETTER #5 - SPRING 2025

ADVAGEN is a Horizon Europe project gathering 14 partners from 9 European countries. It aims at developing, manufacturing and validating the most performant, stable and safe 10Ah solid-state pouch cells by developing novel materials for each of the parts that constitute a battery (i.e., the electrolyte, anode and cathode). In particular, an innovative hybrid oxide-sulfide ceramic electrolyte to be integrated with a lithium metal anode and a high Ni-rich content-based cathode.

In this newsletter, you will learn more about the ADVAGEN latest activities, as well as the ones to come.

Willing to know more about ADVAGEN and its latest developments? Visit our website and follow us on LinkedIn and Twitter!

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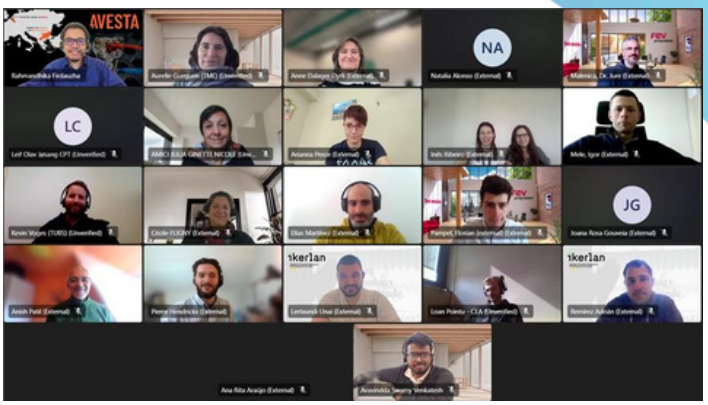
WHAT IS NEW?

• LATEST EVENTS

- **6th Consortium Meeting:**

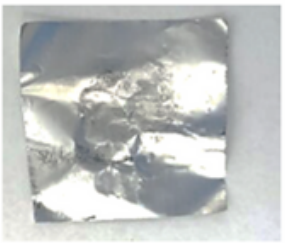
The ADVAGEN consortium held its latest project meeting online at the beginning of April. The session provided an opportunity to review progress across all work packages, share early technical results, and coordinate next steps. Key discussions focused on material development, electrolyte behavior, cell characterization, and scale-up challenges. The collaborative atmosphere reinforced the consortium's shared vision for delivering innovative, sustainable solid-state battery technologies.



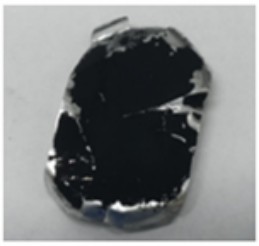
• TECHNICAL INSIGHTS

- **Delamination of Synthetic cathodes**

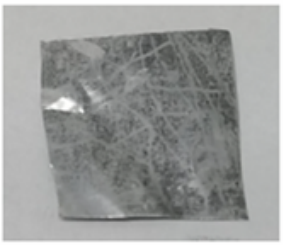
Recent lab work focused on the separation of synthetic cathodes composed of NMC and LPSCl. These multilayered cathodes include valuable active materials alongside sulfide-based solid electrolytes. To remove the sulphide (LPSCl) component, researchers tested both polar and non-polar solvents. The non-polar solvent proved significantly more effective, enabling clean separation from the aluminium foil even without stirring. This suggests a chemical mechanism rather than mechanical detachment. These promising results pave the way for more efficient recovery of valuable battery materials and will inform further optimization and scale-up efforts.



Electrode samples Stirred in Nonpolar solvent



Electrode samples Stirred in polar solvent



Electrode samples placed in Nonpolar solvent

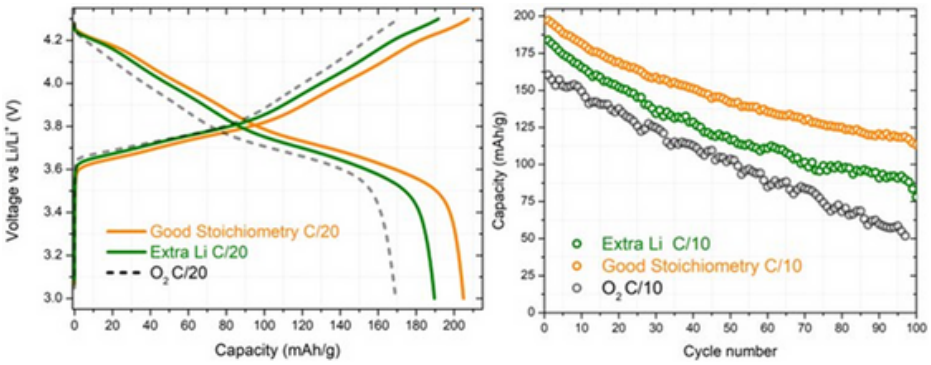
- **Unveiling the Secrets of Interfaces in Solid-State Batteries at MATSUS2025**

ADVAGEN partners were invited to present at the MATSUS2025 conference, where they shared new findings on solid electrolyte interfaces with lithium metal in All Solid-State Batteries (ASSBs).
The presentation explored the contrasting behaviors of oxide and sulfide electrolytes, highlighting the impact of interface chemistry on battery performance.
Using NMR and impedance spectroscopy, the team demonstrated how engineering these interfaces can reduce resistance and improve cycling. Future work will focus on hybrid materials and manufacturing strategies.

- **NMC811 via Spray Pyrolysis – Toward Scalable Production**

In collaboration with Cerpotec, IREC has optimized the synthesis of NMC811 using spray pyrolysis. This technique allows for cost-effective mass production by pyrolyzing metal precursor solutions. IREC tested multiple stoichiometries, calcination temperatures, and atmospheric conditions to minimize surface carbonates and cation mixing. The outcome is a reproducible synthesis protocol suitable for upscaling in ADVAGEN. Results are being prepared for publication.

After this study, the correct solution formulation, calcination treatment and atmosphere have been stablished as a formulation to NMC811 mass production for ADVAGEN project. The results of this study are being exposed in a publication which is under revision.



- **Deciphering of the EIS spectra with the electrochemical battery model**

EIS provides non-invasive insights into battery performance and degradation. In ADVAGEN, high-fidelity numerical models have been aligned with EIS measurements to replicate internal cell behavior with high accuracy. By integrating advanced sub-models, the team extracted meaningful physical parameters from EIS spectra, offering a window into the internal states of solid-state cells. This technique will support prototype evaluation and guide further optimization.
For further information, DOI: 10.1149/1945-7111/ad6eb9

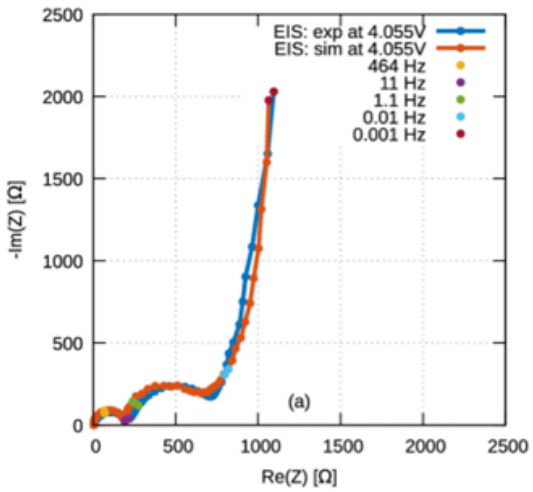


Figure 1 : A comparison between experimentally measured and simulated EIS spectra for the 3b generation half-cell with NMC811 electrode material.

WHAT IS NEW?

SOLID4B CLUSTER'S NEWS

The Solid4B cluster is actively bringing together Horizon Europe projects focused on solid-state battery technologies. Through this initiative, partners share knowledge, coordinate dissemination activities, and strengthen the collective impact of EU-funded research in the field.
Regular webinars and joint events are organised by the participating projects, offering valuable technical insights and opportunities for cross-collaboration. To stay informed, follow the Solid4B cluster on LinkedIn — you'll get updates on upcoming sessions, new publications, and collaborative achievements.
Is your project part of Horizon Europe and working on solid-state batteries? Don't hesitate to reach out to any of the Solid4B member projects if you're interested in joining the cluster — we're open to expanding the network!

COMMUNICATION & COMMUNITY

OVER 400 FOLLOWERS ON LINKEDIN – ON THE WAY TO 500!

Our LinkedIn community is growing fast — we've just surpassed 400 followers and are already approaching the **500 mark**! We're thrilled to see such strong engagement from the battery community.
If you haven't already, follow us **on LinkedIn** to stay updated on project milestones, publications, and events.

SCIENTIFIC PUBLICATIONS

The collaborative efforts of all partners are beginning to engage a broader audience, thanks to scientific publications stemming from the project's advancements!
Don't miss the chance to explore our work!
Upcoming publications topics:

- "Synthesis optimization via spray pyrolysis of NMC811 powders, a study of calcination temperature, atmosphere and Li stoichiometry"
- "Ecodesign Recommendations for Sustainable Solid-State Batteries"
- and much more !

WHAT IS NEXT?

NEXT EVENT

The ADVAGEN project will be present at the E-MRS 2025 conference, as our partner Alex Morata (IREC) is part of the organising committe. If you have not register yet, here is the link: Registration
The deadline to register is **May 19th.**
We hope to see you there!

NEXT CONSORTIUM MEETING

The next ADVAGEN Consortium Meeting is scheduled for October 2025 and will be held in Grenoble at the CEA's facilities. This session will allow us to review progress just before the project's third anniversary, ensuring that all partners are aligned in terms of ideas, work, and solutions as we move toward the end of the second reporting period in August 2026.

END OF THE 2ND REPORTING PERIOD

ADVAGEN is approaching the end of its second reporting period. This marks a key moment to consolidate technical results and prepare for the next phase of the project. Significant progress has been made in material development, modelling, and prototype preparation.

Stay tuned for more updates and insights in our next newsletter, scheduled in Fall 2025.
In the meantime, feel free to reach out with any questions or to learn more about ADVAGEN!

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