



ADVAGEN

DELIVERABLE REPORT



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Development of ADVanced next GENERation Solid-State batteries for Electromobility Applications
GA n° 101069743

Title of the project	Development of ADVanced next GENERation Solid-State batteries for Electromobility Applications
GA n°	101069743
Start date of project:	01/08/2022
Duration of project:	48 months
Deliverable n° & name:	D2.3. Protocols for the testing of labscale, small cells and large cells
Version	4
Work Package n°	2
Due date of D:	M9, 30/04/2023
Actual date of D:	24/04/2023
Participant responsible:	POLITO
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Nature of the Deliverable		
R	Document, report (excluding the periodic and final reports)	X
DEM	Demonstrator, pilot, prototype, plan designs	
DEC	Websites, patents filing, press & media actions, videos, etc.	

Dissemination Level		
PU	Public, fully open	
SEN	Sensitive	X

Quality procedure			
Date	Version	Reviewers	Comments
11/04/2023	Rev0	Atan Fikret	Minor comments/Revisions
13/04/2023	Rev1	Cécile Fligny	Minor comments/Revisions
17/04/2023	Rev2	Andrea Pitillas	Minor comments/Revisions
19/04/2023	Rev3	Adrian Ramirez	Minor comments/Revisions
08/06/2023	Rev4	Cécile Fligny	Corrections as Martha GIALAMPOUKI's request

Project summary

This report is part of the deliverables from the project "ADVAGEN" (Development of ADVANCED next GENERATION Solid-State batteries for Electromobility Applications), which has received funding from the European Union's Horizon Europe research and innovation program under grant agreement No. 101069743.

To date, the battery market is dominated by lithium-ion (Li-ion) chemistries, as the energy density has more than doubled, and their costs have dropped by a factor of at least 10. However, conventional Li-ion batteries (LIB) are reaching their performance limits in terms of energy density and facing safety issues; therefore, the development and production of new battery generations are required, such as Solid-State Batteries (SSBs), to create a new industry value chain in Europe towards their commercialization. Consequently, high-energy-density EU-made SSBs will ensure the supply of, among others, the automotive sector. To do so, the development and deployment of new manufacturing technologies, enabling the large-scale production of SSBs, is crucial. Indeed, among the overarching themes to develop and produce sustainable batteries in the future, the BATTERY 2030+ roadmap⁴ considers manufacturability as a cross-cutting key area. Innovative and scalable manufacturing techniques to produce SSBs will accelerate cost reduction, energy savings, and enhanced safety. ADVAGEN will develop a new lithium metal (LiM) battery cell technology based on a safe, reliable, and high-performing hybrid solid-state electrolyte (LLZO-LPS based), gaining a competitive advantage over the worldwide (mainly Asian) competition. This will sustainably strengthen the EU as a technological and manufacturing leader in batteries, as specified in the ERTRAC electrification roadmap and SET-Plan Action Point-7. ADVAGEN consortium contains key EU actors in the battery sector, from industrial materials producers (CPT, ABEE), battery manufacturer (ABEE) to R&D centers (IKE, CEA, IREC, TUB, CICE, POLITO, INEGI, UL, FEV) and the automotive industry (TME), covering the complete knowledge and value chain. By developing high-performance, affordable and safe batteries, ADVAGEN aims to re-establish European competitiveness in battery cell production.

Objective and Executive Summary

This deliverable aims to establish common test protocols for ADVAGEN's cells, to check cell electrochemical performance at each development stage. The early definition of these protocols should allow ADVAGEN's partners to (i) proceed consistently, (ii) obtain comparable results, and (iii) work more efficiently to reach the project's Key Performance Indicators (KPIs). The tests are grouped into three main categories, namely performance evaluation, aging tests, and safety tests, followed by the envisioned protocol for final module testing. In the final part of the deliverable, a table gathers the name of the partner responsible for each test and the minimum number of cells required for each protocol.

The procedures reported hereafter have been defined by all partners responsible for testing, together with the partners who will use the produced data as input for their specific activities (e.g., for modeling in WP6), following the ADVAGEN proposal and different automotive testing standards (e.g., IEC 62660 "Secondary lithium-ion cells for the propulsion of electric road vehicles", part1: Performance testing, part 2: Reliability and abuse testing and part 3: Safety requirements).

This deliverable is meant to be used by the consortium members as a point of reference for finding the appropriate parameters and procedures for testing and integrating the ADVAGEN cells.