ADVAGEN

Deliverable report

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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 nº & name:	D2.1 End-user driven specifications
Version	4
Work Package n°	2
Due date of D:	M6, 31/01/2023
Actual date of D:	25/10/2022
Participant responsible:	TME
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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
30/11/2022	V1	FEV, CEA	Errors in tables 1, 3, 4 and 5, comments regarding lithium thickness and electrolyte dimensions for 1 Ah pouch cell
13/12/2022	V2	ABEE	Changes in wording, recommandations regarding composition range for hybrid electrolyte and positive electrode coating, addition of a glossary
10/01/2023	V3	FEV, CEA, ABEE, CICE, INEGI, POLITO	Further information regarding hybrid electrolyte fabrication, few typos in text
30/06/2023	V4	EQY	Corrections as per 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 extra components are needed to ensure their safety. Therefore the development and production of new battery generations, such as Solid-State Batteries (SSBs), is required 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 such as CPT, battery manufacturers such as ABEE as well as 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

The objectives of the deliverable D2.1 is to define and set KPI (i.e., energy density, cell impedance/power, cyclability) and technical targets to be fulfilled by small (1 Ah) and large (10 Ah) cells using technical requirements from end users as inputs. For this a cell unit is defined as a building block and depending on the capacity aimed in the pouch cell the dimensions and the number of the cell units to be stacked will vary. A list of fixed and variable parameters necessary to fully described the cell unit was established based on all partners knowledge and manufacturing capabilities. This allowed to determine optimal variable parameters such as component thicknesses and positive electrode formulation that will ensure that the manufacturedlarge pouch cells meet the energy densities targeted in ADVAGEN. All deliverable objectives set in task 2.1 were achieved on time thanks to good communication between all involved partners.