

EUROPEAN COMMISSION

HORIZON 2020 PROGRAMME - TOPIC H2020-LC-BAT-2019
Strongly improved, highly performant and safe all solid-state batteries for
electric vehicles.

GRANT AGREEMENT No. 875189



SAFELiMOVE – Deliverable Report
D4.3 – Electrodes and electrolyte processing
development

Publishable summary

The main objective of the reported activity was the optimization of formulations and processes towards the development and fabrication of composite electrodes and solid electrolyte for “*Li/SE/NMC811*” solid state cells. To do this, three levels of materials (L1, L2 and L3) were developed to be used in three consecutive generations GEN0, GEN1 and GEN2 of solid-state cells. The developed and upscaled solid electrolytes and solid-state cathodes have been validated and tested in coin, single-layer and multi-layer solid state pouch cells with nominal capacity up to 1 Ah.

In this context, concerning composite positive electrode, several formulations based on “*NMC811/Carbon additive/Catholyte*” system have been developed and adapted using different NMC811 grades, carbon based conductive additives, polymers, volatile organic compounds as dispersion media for oxides and polymers, other compounds such as ionic liquids and plastic crystals to improve the ionic conductivity, and binders to improve processing feasibility and mechanical parameters. As result, composite solid-state cathodes with loading up to 3.3 mAh/cm² have been successfully developed and upscaled.

Regarding the solid electrolyte, different composite solid electrolytes, with several combinations of polymers and Li ion conductive ceramic materials – either LATP or LLZO –using different ratio between components have been developed and successfully upscaled.

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Project partners:

#	Partner	Partner Full Name
1	CIC EnergiGUNE	CENTRO DE INVESTIGACION COOPERATIVA DE ENERGIAS ALTERNATIVAS FUNDACION, CIC ENERGIGUNE FUNDAZIOA
2	SCHOTT	SCHOTT AG
3	UMICORE	UMICORE
4	HYDRO-QUEBEC	HYDRO-QUEBEC
5	SAFT	SAFT
6	RENAULT SAS	RENAULT SAS
7	TME	TOYOTA MOTOR EUROPE NV
8	IKERLAN	IKERLAN S. COOP
9	CEA	COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES
10	CIDETEC	FUNDACION CIDETEC
11	TUB	TECHNISCHE UNIVERSITAT BERLIN
12	RWTH AACHEN	RHEINISCH-WESTFAELISCHE TECHNISCHE HOCHSCHULE AACHEN
13	ABEE	AVESTA BATTERY & ENERGY ENGINEERING
14	LCE Srl	LIFE CYCLE ENGINEERING SRL
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