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Strongly improved, highly performant and safe all solid-state batteries for electric vehicles.

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SAFELiMOVE – Deliverable Report

<< D9.4 – Validated & improvement of SAFELiMOVE battery models >>

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Publishable summary

The document outlines two integral models developed in the SAFELiMOVE project: the pseudo-two-dimensional (p2d) model and the electrothermal model. The p2d model is a computational tool designed for pouch cell batteries, enabling the prediction of battery behavior across various conditions. This model is essential for addressing the challenges of upscaling from coin cells to pouch cells. It incorporates mechano-electrochemical aspects to simulate the internal stress within the cell during charge and discharge cycles, ensuring the model's relevance for real-world applications. Its validation against experimental data showcases its precision and reliability in battery performance simulation. Building upon the foundation of the p2d model, the electrothermal model presents a physical approach for analyzing thermal management in batteries. Utilizing Thévenin equivalent circuits and lumped heat transfer equations, it is calibrated against experimental data through non-linear parameter identification techniques, focusing on the physical phenomena rather than just data fitting. This model can simulate the thermal behavior of both single cells and battery modules, aiding in the pre-design phase to evaluate the necessity and efficiency of cooling systems. Such predictive capability is instrumental in optimizing thermal management strategies before empirical data collection, enhancing the early stages of battery module design.

Appendix A- Acknowledgement

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Project partners:

#	Partner	Partner Full Name
1	CICe	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
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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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