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News

Innovation and Industry

Sustainable mobility | Electrified Mobility | Batteries

The Modalis² “MODelling of Advanced LI Storage Systems” project has just been launched for a period of three years. Led by IFP Energies nouvelles (IFPEN), it is being conducted within the framework of the European Horizon 2020 research and innovation program. Objective of Modalis²: to develop a chain of numerical tools aimed at modeling and designing battery systems using new materials (alloys with silicon for negative electrodes, solid electrolytes, etc.).

With the increasing electrification of the vehicle fleet, industrial players have to develop efficient battery systems, incorporating new, competitively-priced materials, in a short space of time. The use of modeling is one way of significantly reducing the development costs and times associated with advanced batteries.

A European project

With nearly fifteen years’ experience in the study, characterization and modeling of electrochemical storage systems (ESS) for transport, IFPEN is recognized as a leading player in battery modeling and simulation in France. As such, IFPEN is leading the Modalis² project, alongside nine other academic and industrial partners: the Fiat research center, Digital Industry Software, Gemmate Technologies, K&S, Saft, Siemens Corporate Technology, Solvay, the University of Turin and Umicore. Drawing on

the partnership's synergy, and, in particular, the presence of four members of the European Battery Alliance, this project will develop solutions addressing the needs of industry, ultimately supporting Europe's battery system production ambitions.

Subsidized by the European Union to the tune of €4.8 million, the project will thus support the development of new-generation battery cells by using a modeling and simulation approach. The challenge is to develop and validate a chain of numerical tools in order to understand, predict and manage the interactions between the materials within the cells, as well as the interfaces where the electrochemical reactions take place.

Significant results expected

By demonstrating a potentially 3-fold reduction in the number of experiments, this numerical approach should result in a significant decrease in the costs and development times associated with advanced battery systems. With three advantages as a result: faster launch to market of new materials, faster integration of these materials in batteries and easier integration in vehicles thanks to system simulation.

"Using this new modeling approach, the costs of developing batteries and the materials of which they are composed may be reduced by between 20 and 35%. By decreasing the time-to-market of new-generation batteries, it is possible to significantly reduce their cost price. This is the challenge we are seeking to overcome via Modalis², with the expectation that this project will reinforce the European battery production industry", explains Martin Petit, research engineer at IFPEN and Modalis² project coordinator.

A first progress report on the Modalis² project is expected to be presented in June 2021, prior to the final report due for publication in December 2022.

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IFPEN leads the European Modalis² project for the modeling of advanced batteries
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