



FRAUNHOFER INSTITUTE FOR SILICATE RESEARCH ISC
WÜRZBURG, GERMANY

PRESS RELEASE

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EU project BIG-MAP accelerates the development of the next generation of super batteries

Batteries will play a crucial role in the phase-out of fossil fuels, in particular in the transport sector. If the goal of reducing CO₂ emissions in Germany by 55 percent by 2030 is to be achieved, future batteries must above all become more sustainable and also cheaper. That is a big challenge, because the development of new batteries takes a long time – longer than we can wait for the green transition. The EU project BIG-MAP (Battery Interface Genome – Materials Acceleration Platform), aims at accelerating the speed of battery development by changing the way of inventing, so that future sustainable and ultra-high-performance batteries can be developed 10 times faster than today.

BIG-MAP is a central part of the large-scale and long-term European research initiative on batteries, BATTERY2030+, and it involves 34 partners from 15 countries. BIG-MAP is the EU's most expensive single research project on developing sustainable batteries for the future.

The vision is not only to be able to develop new batteries much faster, but also to ensure that they can store energy extremely efficiently, can be produced sustainably and at such a low cost that in the future it will be profitable to store electricity from, for example solar and wind in batteries. This however requires fundamentally new materials and rapid progress within battery technologies, which we may not even have heard of yet. "In BATTERY 2030+ and BIG-MAP, We have to 'reinvent' the way we invent batteries. Last year the Nobel Prize in chemistry went to the inventors of the Li-ion battery. A fantastic invention, but it took 20 years from idea to product - we need to be able to do it in a tenth of that time if we are to have sustainable batteries ready for the green transition," says Tejs Vegge, professor at DTU Energy and head of BIG-MAP.

Reinvent how to invent – combining artificial intelligence and future technologies

"You can say that the project is not about inventing a new battery, but a new way of inventing - which we will also use to invent new batteries," Tejs Vegge explains. So BIG-MAP is not just about the next generation of batteries, but about a new efficient way of quickly finding new solutions from existing knowledge and digital modelling with artificial intelligence and very real researchers. "We need to develop a whole new scientific platform and a new common 'battery language', which allows artificial intelligence to be used to obtain, analyse and exploit data from all parts of the research

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and development value chain at the same time - with minimum human interference and without being bound by traditional development processes."

Using machine-learning algorithms coupled with physical models and data it will - for example- be possible to predict the durability of a new battery in a fraction of the time it has taken so far. This can be done through large-scale computer simulations, experiments and tests that are continuously evaluated without human intervention.

The Fraunhofer R&D Center Electromobility at the Fraunhofer Institute for Silicate Research ISC contributes its knowledge concerning laboratory automation for material synthesis and development. „In the BIG MAP project we will develop a modular robot system starting with the synthesis of protective coating materials. Our ambition is to have this framework acting as a physical interface in the more and more digitized materials development of the future“, says Dr. Henning Lormann, Head of the Fraunhofer R&D Center Electromobility.

For Fraunhofer ISC this projects in line with its strategic target towards a data-driven and robot-aided digital materials development. The project will initially run over the next three years and is expected to significantly accelerate the speed at which new battery types can be developed. And because the project uses the specific development of batteries to develop the platform and vice versa, it is also quite possible that BIG-MAP researchers will introduce new battery materials in the course of the project's 3 year period.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957189.

More about BIG-MAP: <http://www.big-map.eu>

The EU research initiative Battery 2030+

BIG-MAP is part of BATTERY 2030+, a large-scale research initiative in Europe with the aim of developing more environmentally friendly and safer batteries with better performance, greater storage capacity options and longer life. Under the umbrella of Battery 2030+, research projects from three different areas are currently being launched:

- ➔ Development of a European infrastructure platform to combine large-scale calculations and experimental studies to map the complex reactions that take place in a battery.
- ➔ Development and integration of sensors that monitor and report the condition of the battery in real-time.
- ➔ Development of regenerative components that extend battery life and improve safety.

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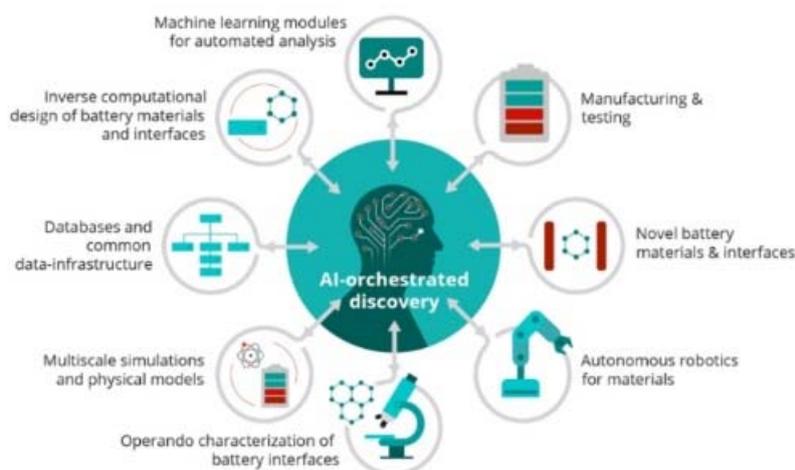
Battery 2030+ is coordinated by Prof. Kristina Edström, University of Uppsala, Sweden. The consortium comprises 23 partner organizations and companies from 14 European countries.

More about Battery 2030+: <https://battery2030.eu>

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Footage



The BIG-MAP infrastructure © DTU

The **Fraunhofer-Gesellschaft**, headquartered in Germany, is the world's leading applied research organization. With its focus on developing key technologies that are vital for the future and enabling the commercial exploitation of this work by business and industry, Fraunhofer plays a central role in the innovation process. As a pioneer and catalyst for groundbreaking developments and scientific excellence, Fraunhofer helps shape society now and in the future. Founded in 1949, the Fraunhofer-Gesellschaft currently operates 74 institutes and research institutions throughout Germany. The majority of the organization's 28,000 employees are qualified scientists and engineers, who work with an annual research budget of 2.8 billion euros. Of this sum, 2.3 billion euros is generated through contract research.

The **Fraunhofer Institute for Silicate Research ISC** (director Prof. Dr. Gerhard Sextl) is one of the leading Bavarian R&D centers for material-based research and development in the fields of energy, environment and health. With a permanent staff of about 380 scientists and technicians the Institute works to develop innovative materials and technologies for sustainable products and make essential contributions to solving the major global issues and challenges of the future. With its parent Institute and the Translational Center in Würzburg, and its Center for High-Temperature Materials and Design HTL at Bayreuth Fraunhofer ISC combines first-rate expertise in materials science with long-standing experience in materials processing, industrial application and the upscaling of production and process technologies to pilot scale as well as in materials analysis and characterization. With a clear focus on sustainability, the Institute with its project groups is a strong R&D partner for industrial partners.

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