



Funded by
the European Union

BATTERY HEROES

TRA Dublin 2024



BATTERY
HEROES

The BATTERY HEROES

We aim to combine efforts, maximise our impact, exchange knowledge, share information on similar challenges, and facilitate networking with stakeholders to ultimately ensure visibility.



Environmentally sustainable processing techniques
applied to large scale electrode and cell component
manufacturing for Li-Ion Batteries

HORIZON-CL5-2021-D2-01-04



HORIZON-CL5-2022-D2-01-04





BATTERY
HEROES

Our mission

Provide Europe a leadership position in production of batteries with lower carbon footprint.

We contribute to...

- European leadership position with lower carbon footprint.
- New sustainable electrode and cell manufacturing techniques.
- Complete elimination of organic solvents.
- Implementation of dry manufacturing techniques as 3D patterning.
- Industrialising closed loops - return low-value chemicals to high-value.

...Developed manufacturing techniques are ready to be integrated into digitally-driven production lines.



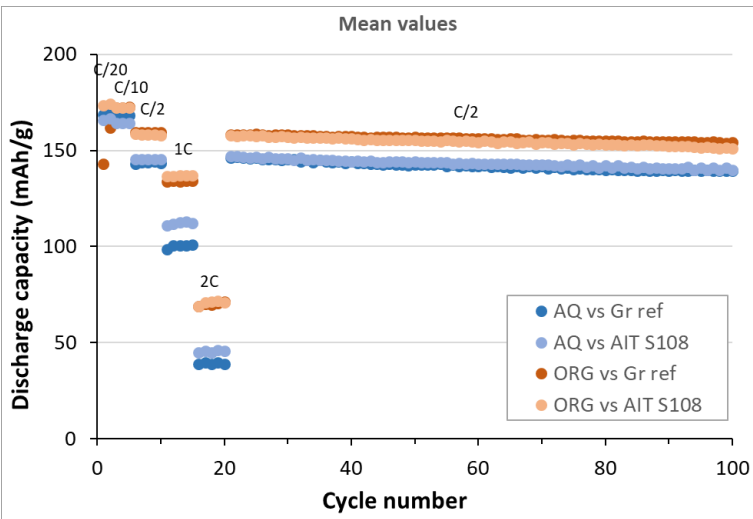
We contribute to...

- European leadership position with lower carbon footprint.
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- **Complete elimination of volatile organic solvents (VOCs).**
- Implementation of dry manufacturing techniques as 3D patterning.
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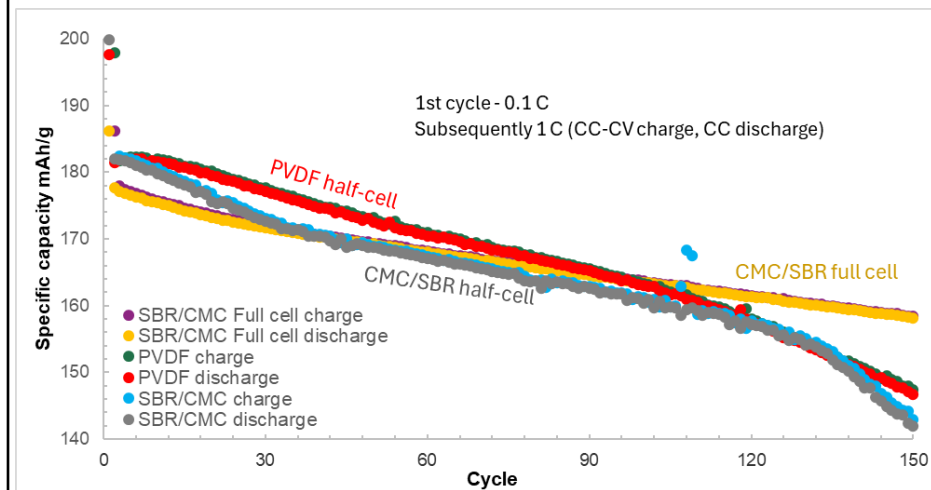
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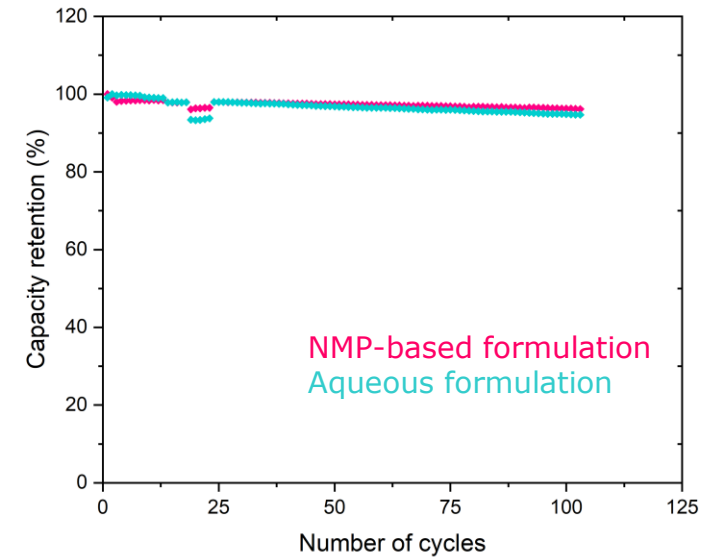
Water-based cathode manufacturing



NMC622



NMC811



LNMO



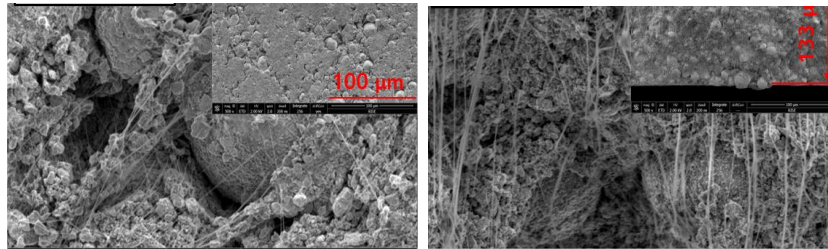
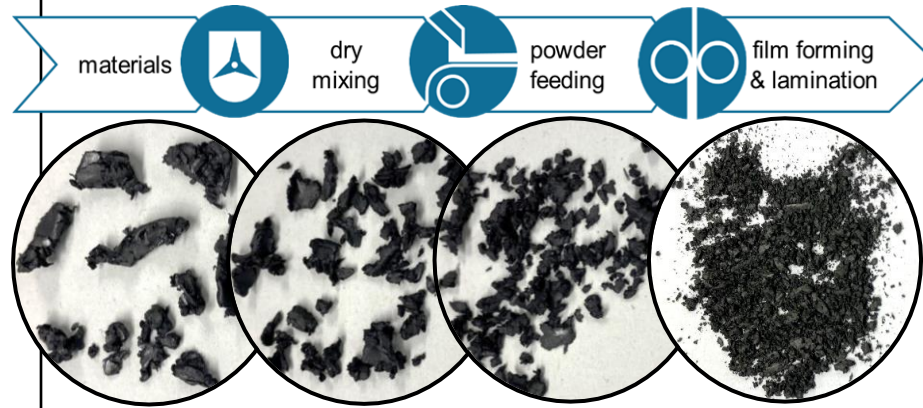
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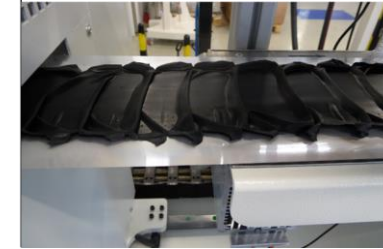
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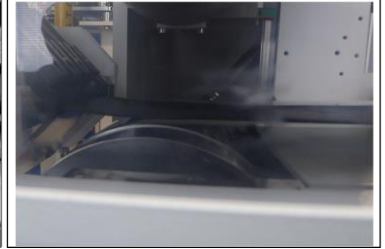
Dry processing of electrodes



Dry extrusion: Slot die coating possible with quality deficiencies



Slot die coating of homogeneous films with smooth edges



We contribute to...

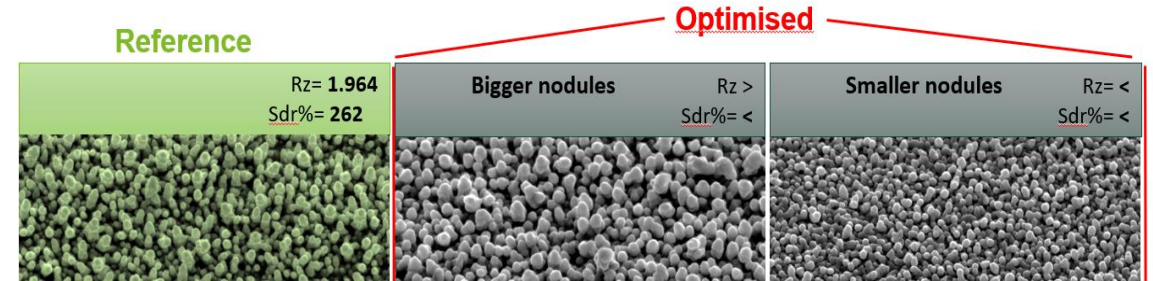
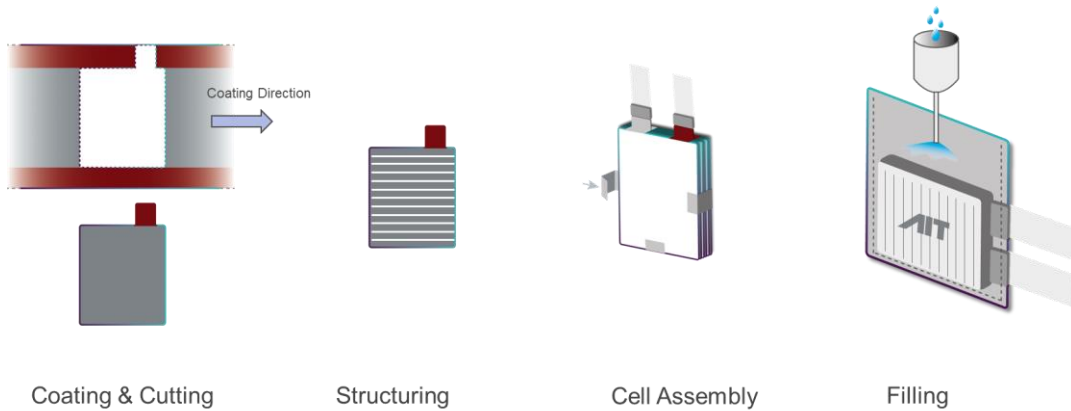
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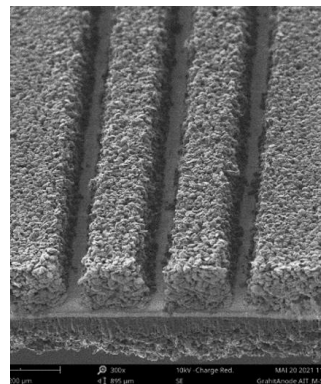
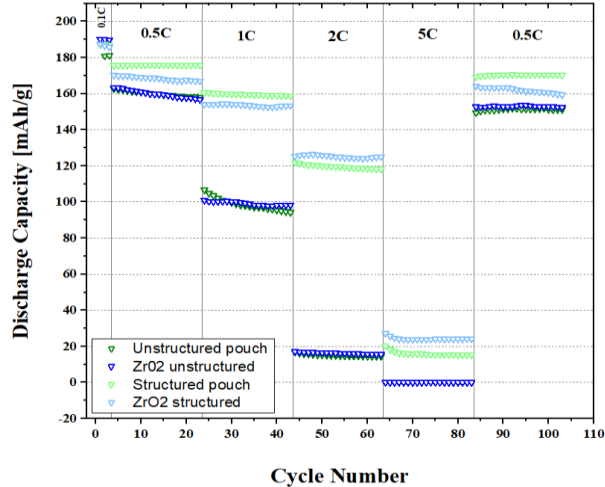
Three-dimensional patterning

...laser-structuring of electrodes

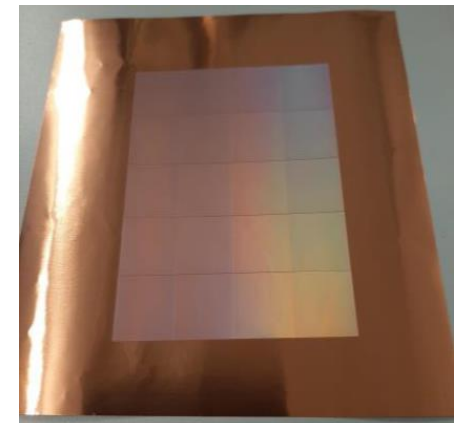


... nodular treatment of anode substrate

RealLife AIT pouch-cells; NMC811-Graphite, Multilayer; RateCap 0.1C, 0.5C, 1C, 2C, 5C 0.5C



...and current collector texturing by laser

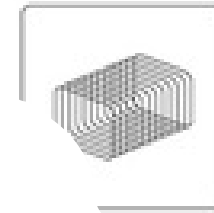


Coming up next...

New projects joining the battery heroes...

Together we are taking our advances in sustainable cell production to another level.

Our aim is to build globally competitive Li-ion battery (LIB) cell production plants in Europe with lowest carbon footprint and energy consumption.



GIGABAT



Get in contact and follow our journey!



**TO VISIT THE
BATTERY HEROES**

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Backup slides

Individual project infos



Advances in dry coating techniques

- Extrusion-based electrode manufacturing enables high dry mass containing slurry recipes
- Modifications of binders are needed to achieve similar homogeneity and performance of the resultant electrodes
- Comparison dry vs. wet electrode manufacturing

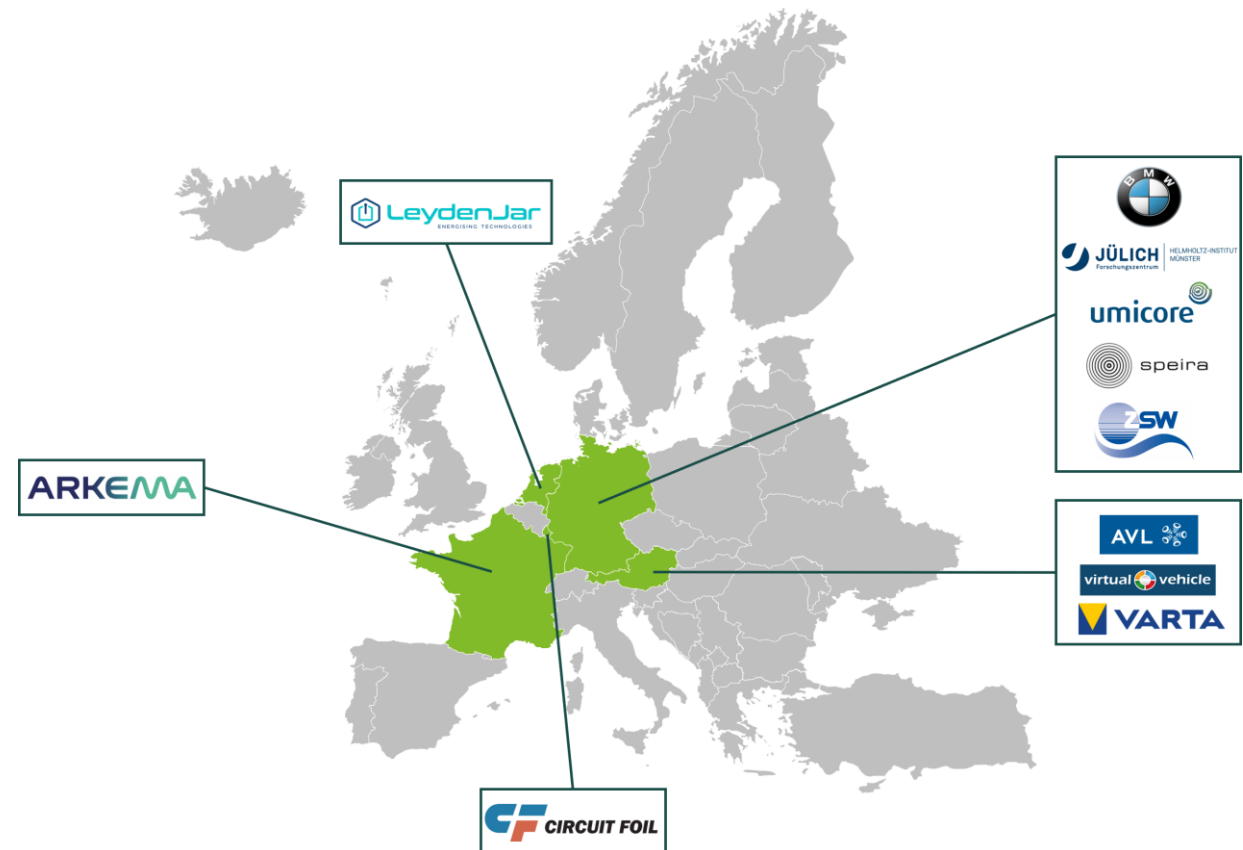




- Coordinated by Virtual Vehicle Research GmbH
- The greenSPEED consortium address two major drawbacks of current battery cell production techniques: The **high energy consumption of the individual production steps** and the use of production processes that require **organic casting solvents**.
- The greenSPEED technology will tackle both of these aspects and, together with the **increase in energy density**, will lead to a **significant reduction in the cost of lithium-ion cells**.



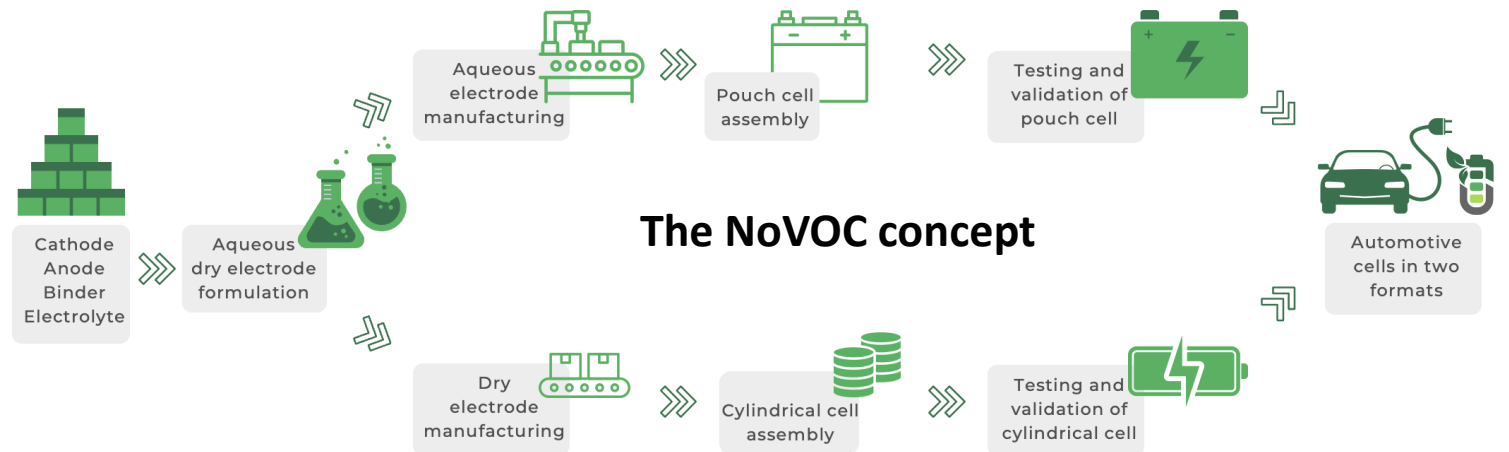
TO VISIT THE WEBSITE





www.novoc.eu

- Coordinated by RISE Research Institutes of Sweden
- In NoVOC, our goal is to create, showcase, and compare two **cutting-edge methods** for developing battery electrodes: one using water-based manufacturing and the other using a dry process.
- These electrodes will later be used for the production of automotive batteries. Our focus is on producing them in an **environmentally friendly** and **energy-efficient way** for a greener future in Europe and beyond.





- The main objective of GIGAGREEN is to boost the next wave of electrode and cell component processing techniques, enabling breakthrough innovations to improve the environmental, economic and social performance of generation 3b Li-ion cells manufacturing industry, thus positioning Europe at the forefront of the global market



GIGAGREEN Design to Manufacture Giga-Factory concept

SAFER

- NMP-free
- SOPs for safety handling and automation

CHEAPER

- Reduced energy and material consumption, economy of scale
- Cell manufacturing cost reduced by 20%

GREENER

- Reduced energy and material consumption
- Energy consumption of cell manufacturing reduced by 25%

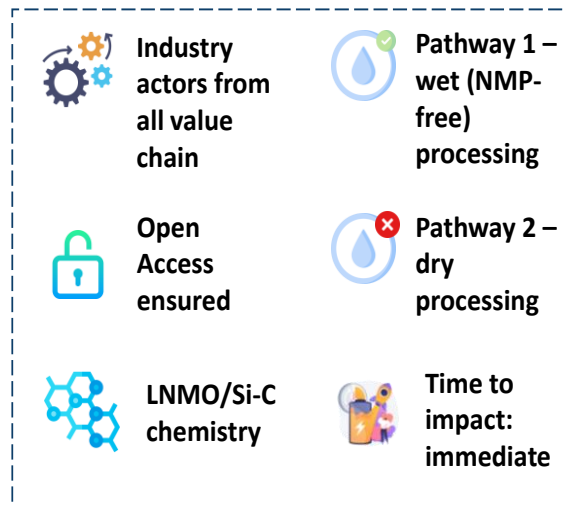
FLEXIBLE

- Digitalisation processes allowing to quicker specification change
- Affordable scalable process

BETTER

- High performance LNMO/SiC
- Data-driven process and product quality control

Overarching approach





BatWoMan aims at paving the way for sustainable and cost-efficient lithium-ion battery cell production in the European Union. This is achieved through the removal of volatile organic compounds in electrode processing and the use of high dry mass content slurries. An innovative dry room requirement reduction concept with improved electrolyte filling will be established, as well as low-cost and energy-efficient cell conditioning, namely wetting, formation and ageing. An AI-based platform and a digital battery dataspace and passport will support these technological improvements. The overall goal of the project is to reduce the production cost and energy consumption by more than half, pushing towards low-emission battery cell manufacturing

MORE COMPETITIVE AND SUSTAINABLE EU BATTERY PRODUCTION



More sustainable batteries

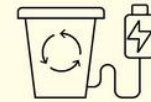


Less costly production

GOALS



Increased Efficiency

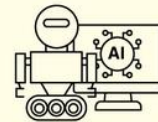


Less waste of resources
and energy

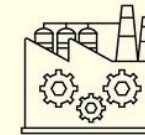
OBJECTIVES



Optimisation
of supply chain



Supply chain Optimisation
through AI and Industry 4.0



New machinery



GIGABAT

- Coordinated by CIDETEC Energy Storage
- The GIGABAT consortium is on a mission to lead the change towards the development of sustainable and digitalized Gigafactories that utilizes cutting-edge made-in-Europe machinery
- GIGABAT will boost the promotion of globally competitive Li ion battery cell production plants in Europe by
 - Promoting **European-made machinery**
 - Ensuring the **integration of local energy and materials supply chains**
 - Working closely with **key players in GEN3b technologies**

