phoenix

Building more reliable and performing batteries by embedding sensors and self-healing functionalities to detect degradation and repair damage via advanced Battery Management Systems

Project in a nutshell

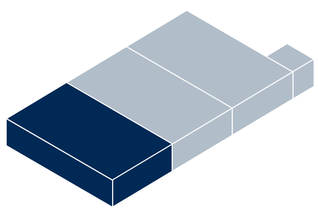
The PHOENIX project aims to explore various possibilities for integrating self-healing, sensing, and triggering functionalities into batteries, to develop cells capable of living longer, detecting and preventing several kind of degradation, being more sustainable and less expensive.

Thanks to the integration of an advanced Battery Management System (BMS) to these functionalities, detecting different kind of degradation in performance and evaluating the battery's overall quality will be possible: batteries lifetime will improve up to +100%.

Methodology

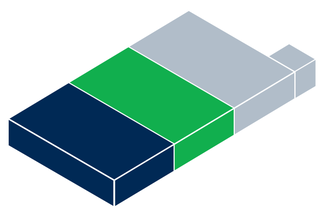
- Develop self-healing battery materials and sensing devices.
- Validate the triggering mechanisms and degradation detection.
- Assess the manufacturing, recycling, and sustainability process and develop the Battery Management System.

Sensors



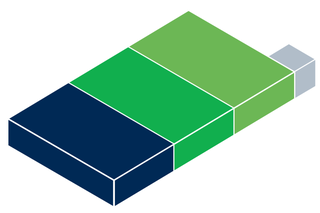
- Ultrasound sensors
- Thermal sensors
- Gas sensors
- Dielectric elastomer and pressure sensors
- Reference electrode for half-cell potential sensing

Trigger devices

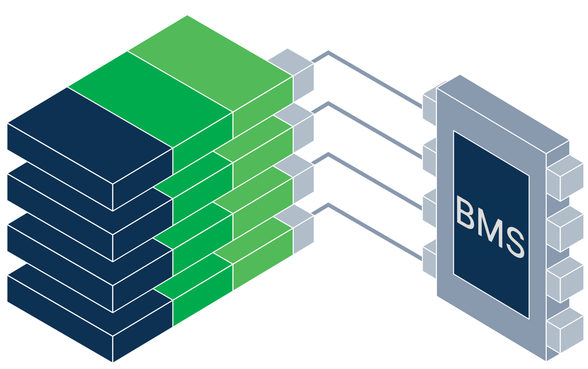


- Triggering by pressure
- Triggering by magnetic field
- Triggering by temperature

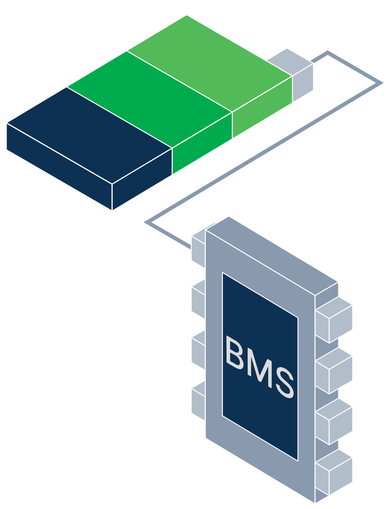
Self-healing functionalities



4 Four different self-healing approaches



- More sustainable batteries
- Lower production costs
- Longer batteries lifetime



Objectives

- Create and develop various types of sensors
- Creating a self-contained solution
- Assess the sustainability of the developed battery technology
- Contribute to the growth of a sustainable battery manufacturing industry in EU
- Develop materials providing self-healing capabilities
- Develop triggering devices that can activate the self-healing process
- Detect and address critical battery degradation
- Implement an adaptable approach to mass production processes of battery cells

Contacts

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BATTERY 2030+

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Consortium

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