

# HIDDEN Timeline



HIDDEN project has already reached Month 31!

## PRESS RELEASE

### The project

The HIDDEN project aims to **enhance the lifetime of Li-metal batteries** by 50% and increase their energy density by 50% beyond the current level achievable with Li-ion batteries. To achieve these goals, the project is developing **self-healing thermotropic liquid crystalline electrolytes** and **piezoelectric separator** technologies to **prevent dendrite growth**. To speed up the development of new materials, the consortium is using **multiscale modelling for advanced electrolyte design**, and dendrite growth is being monitored with algorithms to track the effects of the selected self-healing methods. **Algorithms are used to monitor dendrite growth**, allowing for the effects of the self-healing methods to be followed and triggered at the correct time by increasing the cell temperature.

In the first period, the focus was on developing self-healing methods and materials, while in the second period, these methods will be tested, modified, and validated as well as scaled up to production level.

### The HIDDEN project goes beyond the state-of-the-art

The HIDDEN consortium has focused recently both on **upscaling the processes** and **developing and testing the self-healing materials** at the same time. We have two different self-healing methods in the project: the **piezoelectric separator** and the **liquid crystalline electrolyte** – both targeting to hinder the growth of dendrites in the studied Li-metal battery.

The **materials and processing of the piezoelectric separator** were developed at CSEM in lab scale in the first half of the project. During the past few weeks, VTT transferred first one part and then the whole

process into pilot scale. These separators are currently under cycling tests at CSEM. The results look promising so far, as the Li-metal cells are still working well after the first cycles.

Regarding the **liquid crystalline electrolyte**, Specific Polymers has synthesized a new set of 2nd generation electrolytes, which are currently under evaluation. For the first generation, they have already upscaled the production, and the materials have been used for process development and testing different additives to further improve the performance. The liquid crystal electrolyte is a special material, and it has not been easy to fine-tune the Li-salts, additives, and processing methods to prepare well-working functional cells. The consortium has now an updated action plan and a target to have the cells working well and the self-healing reaction demonstrated before April 2023. We will select then which cell types we will use in the coming work to combine the self-healing methods into the battery management system. The self-healing reaction with the liquid crystals requires also heating of the cell and we have thus developed a cell level heating element to increase the cell temperature on demand.

The HIDDEN consortium is also teaming up with the Battery 2030+ Spartacus project to integrate the heating element with the temperature sensor from Spartacus.

More information: [www.hidden-project.eu](http://www.hidden-project.eu)



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