

SAFETY

Ultimately, safer LIBs can further enhance safety in large-scale energy storage systems, hence, INERRANT will enhance consumer confidence in the reliability and safety of LIBs for mobility applications (such as electric vehicles, trains, and bicycles), boosting the demand for e-mobility solutions.

SUSTAINABILITY

INERRANT will enhance battery sustainability by improving recycling efficiency, reducing waste, and minimizing reliance on critical raw materials (CRMs), thus supporting Europe's recycling goals, lowering environmental impact, and building a resilient, diversified battery ecosystem that reduces supply chain risks.

INDUSTRY TRANSFORMATION

INERRANT is advancing safer Gen 3 LIBs by establishing sustainable, circular manufacturing practices designed for large-scale Gigafactory production. This approach not only encourages industry innovation and investment but will ultimately benefit citizens through access to responsibly sourced, eco-friendly battery products.

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#InerrantBatteries

INERRANT

Integrating Novel Materials with
Scalable Processes for Safer and
Recyclable Li-ion Batteries



ABOUT



START DATE
01 MAY 2024



36 MONTHS
OF DURATION



BUDGET
4.4 MIL. EURO



11 PARTNERS
FROM 6 COUNTRIES

In the face of climate change, environmental degradation, and far-reaching societal and economic digitisation processes, novel battery technologies are urgently needed to power e-mobility, clean energy storage, and consumer electronics. While lithium-ion batteries (LIBs) offer high efficiency and energy density, they face challenges in performance, sustainability, and recyclability, relying heavily on critical raw materials like lithium, cobalt, and graphite.

To address these issues, INERRANT is committed to pushing the boundaries of current LIB technologies by advancing LIB materials, electrolyte formulations, and eco-friendly recycling methods, focusing on safety and sustainability throughout the battery lifecycle. The project leverages cutting-edge science and technology to build the foundation for safer energy storage solutions, paving the way for a future where mobility is both eco-friendly and secure.

VISION

We strive to accelerate the shift to eco-friendly electric mobility and battery manufacturing practice, bolstering a more sustainable and resilient battery ecosystem in Europe.

MISSION

Our aim is to enhance safety, boost performance and improve fast charging of Gen 3 LIBs tailored for electric mobility applications, while circumventing the reliance on Critical Raw Materials by employing an economical and eco-friendly production approach.

OBJECTIVES

To achieve this, INERRANT will address the following **four challenges** for LIBs components:

- 1 Innovative (nano) material combinations** for anodes and cathodes;
- 2 Smart separators** able to protect against battery flaws;
- 3 Stimuli responsive electrolyte formulations** designed for rapid reactions against external disturbances to mitigate cathode degradation;
- 4 Novel sustainable recycling processes** to improve the purity of recovered materials.

APPROACH

INERRANT's integrated approach aims to overcome existing limitations and truly transform LIBs technology in three major areas:



LIB safety concerns

With the widespread use and energy density of LIBs, ensuring battery safety is crucial to prevent thermal runaway — which may lead to fires or explosions. INERRANT addresses the issue of thermal runaway by identifying its underlying causes and developing safer components for reliable, long-term operation of LIBs.



LIB thermal runaway causes

INERRANT develops internal protection methodologies based on smart, sustainable separators to prevent battery operation during conditions leading to thermal runaway.



Electrode/Electrolyte Interfaces

INERRANT enhances LIB safety and lifespan by improving electrode-electrolyte interfaces, focusing on solid electrolytes and cathode electrolyte interphase development to boost lithium-ion transport and overall battery performance.