



OVERVIEW

BATRAW is a 4-year project (2022–2026) coordinated by the Technological Centre LEITAT (Spain), involving **17 partners from 7 countries**. With a total budget of €13 million, co-funded by the Horizon Europe Programme and UKRI, BATRAW aims to develop new technological processes for the recovery of Critical Raw Materials (CRMs) from Electric Vehicle (EV) batteries. The project will deliver **secondary battery-grade Co, Ni, Mn, Li, and C-graphite**, benchmarked in advanced cathodes such as NMC811, NMC9½½, and LMNO. It also seeks **to develop a blockchain platform** for raw material and supply chain tracking, aligned with EU legislation on transparency and the Digital Battery Passport (DBP). The project supports EU policies like the Batteries Regulation and Circular Economy Action Plan, and will contribute to eco-design guidelines, safe handling practices, and a comprehensive exploitation and business plan for circular battery value chains.

KEY OUTPUTS

1st PILOT

Location: Pamplona, ES
Results: Semi-automated EV battery pack dismantling with a **95% component recovery rate**.



2nd PILOT

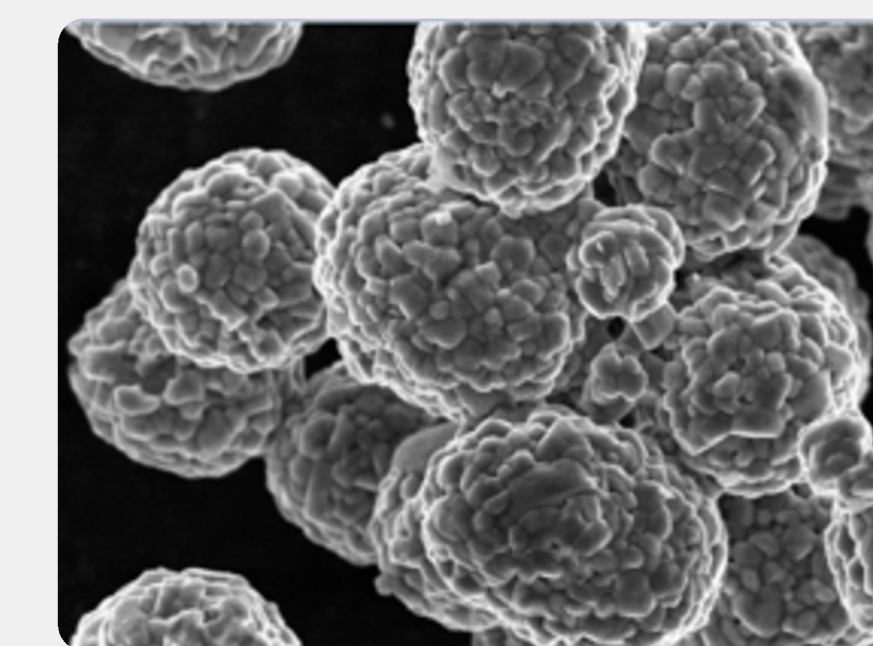
MECHANICAL PRE-TREATMENT

Location: Trept, FR
Results: Achieved a **92–98% black mass recovery** from EoL batteries & production scraps.



HIDROMETALLURGY

Location: Bessines-sur-Gartempe, FR
Results: The recycling method achieves **90–98% selectivity in material recovery**.



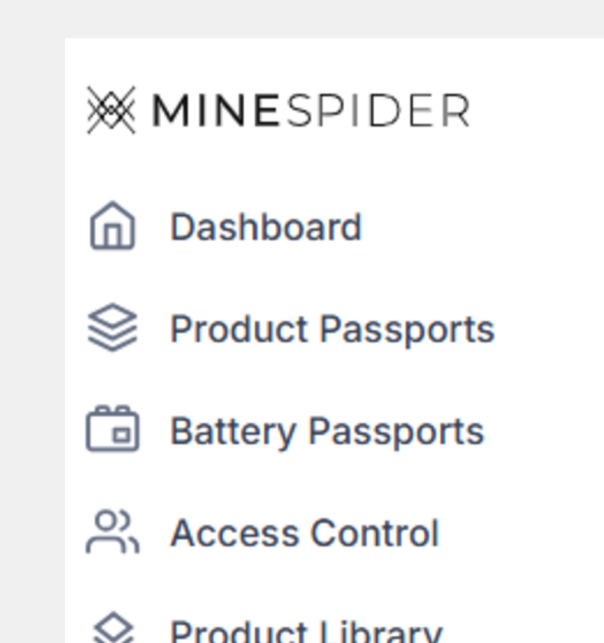
Recovered battery-grade materials were synthesized (NMC, LNMO) or refined (graphite) and **successfully tested**.



Guidelines on battery waste **safe transport and handling**, also on eco-design, for **efficient dismantling & manufacturing**.



A fast tool for **EoL pack diagnosis** & successful battery pack repair. Modules were used to create a **prototype of a second-life battery**.



A **blockchain-based** platform was developed for raw material **tracking** and supply chain **transparency**.

BLOCKCHAIN & DBP

BATRAW integrates blockchain-based digital infrastructure to implement **DBPs with QR codes**. This enables partners to transparently collect, share, and **securely link key data** related to product health, safety, environmental impact, and regulatory compliance. BATRAW ensures responsible tracking and data exchange for EV battery reuse, 2nd life & recycling.

Generated for Torrecid, Fraunhofer IWKS, Leitat, FORD Otosan & CESVIMAP. Also, Minespider provides **ongoing support** to meet EU compliance and traceability requirements and use its platform tools and services.



RMIS CONNECTION

Developing innovative strategies for the **EV batteries recycling with the recovery of raw materials (RMs)** such as: Al, Cu, C-graphite, Li, Ni, Mn, and Co.

Improving **Raw Materials traceability in DBP** by building a roadmap for data point definition and enhancing transparency across the battery value chain.

Providing guidelines on **eco-design for battery packs manufacturing**, the project aims to enhance reparability, reuse & recyclability of EV batteries and RMs recovery.

Assessing the key barriers and enabling factors for an effective **EU Industrial Ecosystem for Circular Battery Applications**.



Meeting CRM demand, battery waste will be fully processed in Europe, enabling a Circular Economy. New guidelines will **boost collaboration, tracking, know-how, competitiveness, & energy independence**.

CONSORTIUM

