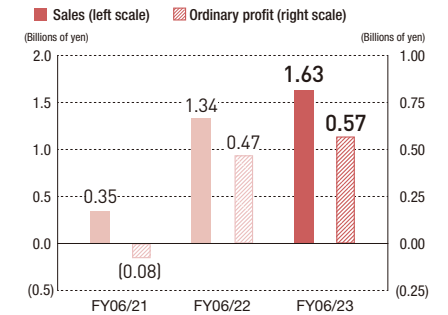




Lithium-ion Battery Recycling Business

As various economic activities are being electrified with a view toward achieving carbon neutrality, demand for lithium-ion batteries (LIBs) is expanding rapidly. However, concerns exist about the shortage of rare metals, which are used in LIB production. The ENVIPRO Group is contributing to progress of electrification by recycling rechargeable batteries, including LIBs.

We aim to achieve a closed-loop system of LIB-to-LIB and envision a circular economy for batteries.



Recycling LIBs to Produce Black Mass and Collect Valuables

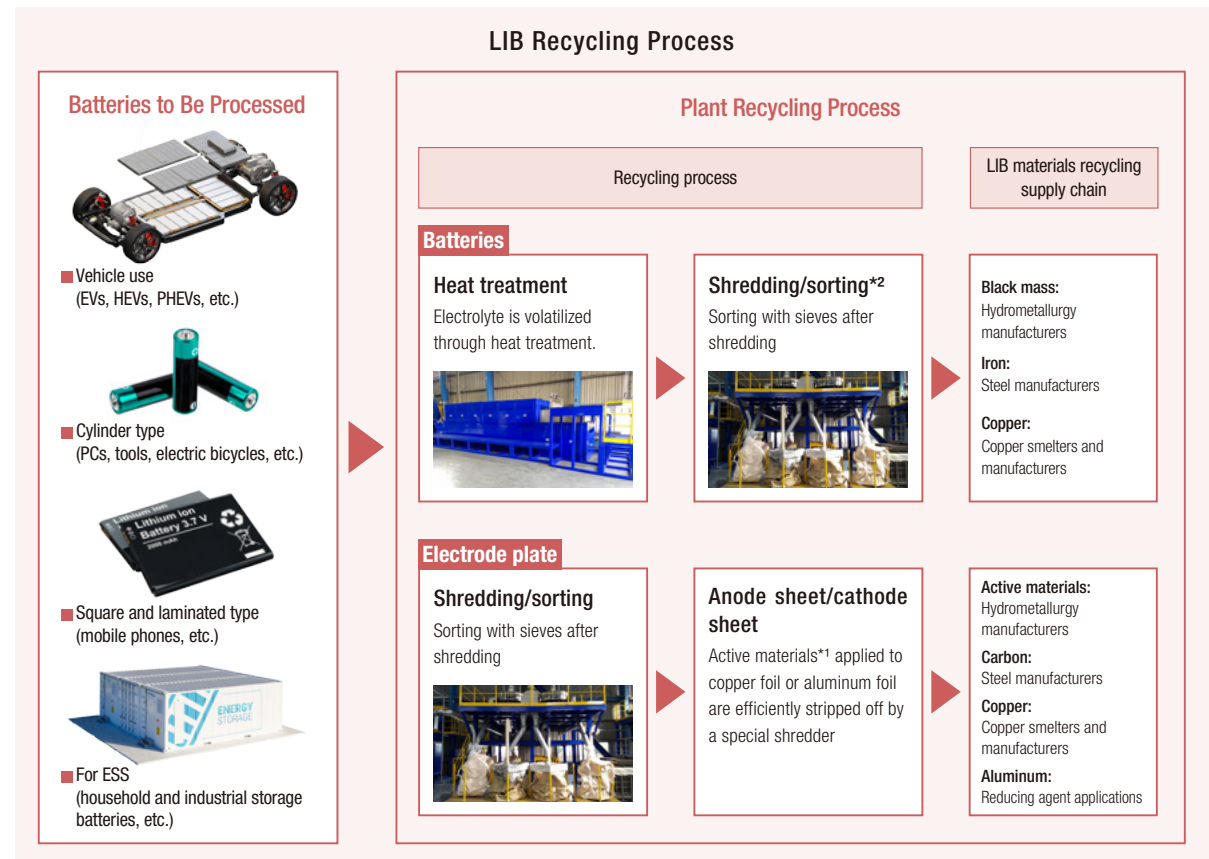
LIB cathode materials contain minor metals, such as cobalt, nickel, and lithium. After LIBs are heated, they are crushed and sorted to collect black mass*1, a mixture of minor metals. The company also collects copper contained in the anode material. VOLTA Inc. leverages its accumulated expertise to sell high-quality collected metals to various refining manufacturers. In 2023, we have expanded our LIB recycling line and significantly increased our production capacity. We also conduct production equipment adjustments for each type LIB to ensure optimal recycling.



Black mass

Production Using a Decarbonization Process at RE100 Plants

To achieve carbon neutrality by 2050, decarbonization processes will be required in battery recycling, as well. With the exception of the trucks we use for haulage, VOLTA is transitioning to 100% renewable energy in all its processes. We will help to build a low-carbon society by working toward RE100 at new sites we will establish in the future.



*1 Black mass/active materials: A concentrated sludge of cobalt, nickel, and lithium

*2 By evaporating electrolytic solution through heating treatment, shredding and sorting are handled in a continuous line

Lithium-ion Battery Recycling Business

Low-Environmental-Impact LIB Recycling

In the heating process during LIB recycling, toxic gases are generated, mainly consisting of fluorine compounds. VOLTA Inc. has installed environmental facilities to remove these harmful substances and reduce environmental impact.



Environmental facilities at the Fujinomiya plant

Recycling of Used Rechargeable Batteries Through Contracted Industrial Waste Disposal

The rate of use is increasing for lithium iron phosphate batteries, which are used in industrial and portable power applications. As these batteries do not contain nickel or cobalt, they are typically circulated as waste materials. VOLTA will respond to this trend by utilizing permits for intermediate disposal of industrial waste and establishing a system for accepting materials from valuable items to industrial waste. This will allow us to provide customers with a one-stop service for LIB recycling, ensuring competitiveness and diversifying revenue sources.

Obtaining Certification under the R2 Standard for Sustainable Recycling

VOLTA has obtained certification under the R2 Standard for responsible reuse and recycling of battery equipment, a widely adopted standard in the United States. The standard attests to VOLTA's use of a recycling management system for appropriate recycling.

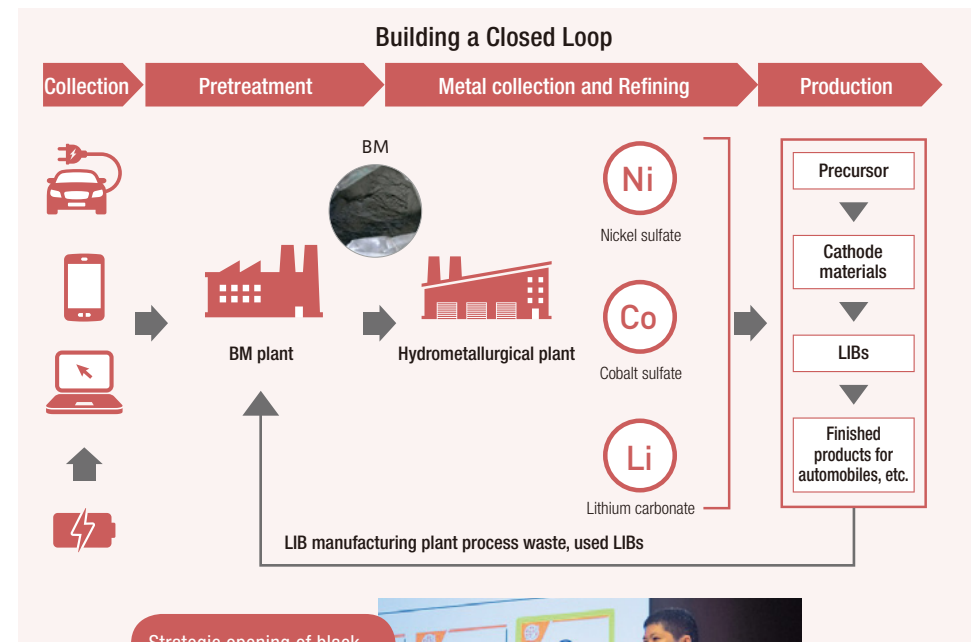
Promotion of DX in Closed-Loop LIB Recycling

The ENVIPRO Group is working to establish an information management system that complies with the battery passport mechanism mandated by European battery regulations, which will be enforced in the EU in 2026. Our goal is to eventually incorporate the operational results of the information management system for LIB closed-loop recycling in the downstream area of resource circulation, which has been demonstrated by VOLTA, into a nationally led information management system.

Expanding Our Base of Operations and Taking up Challenges in the Hydrometallurgy Business

In 2023, we acquired an LIB recycling plant in the city of Hitachinaka, Ibaraki Prefecture, with a processing capacity of 5,000 tons. We are preparing for the plant to commence operation in 2024. In addition to collecting process waste from LIB production factories, at the Ibaraki plant we also expect to collect used LIBs from the densely populated Kanto area.

As no commercial-scale black mass refining facility is currently operational in Japan, significant resources are flowing overseas. The ENVIPRO Group is taking the lead to establish a hydrometallurgy business to promote a circular economy for LIBs in Japan, and we continue with research aimed at achieving closed-loop recycling.



Strategic opening of black mass production sites to achieve closed-loop hydrometallurgy



Conducting numerous lectures to raise awareness of LIB recycling