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Discovery of Three Microorganisms for Environmentally Friendly Extraction of Metal Resources from Waste Batteries

- National Institute of Biological Resources confirms the possibility of extracting and separating core minerals from waste batteries, such as lithium and nickel, using three microorganisms discovered in an abandoned mine

The National Institute of Biological Resources (NIBR) under the Ministry of Environment, led by Director Seo Min-hwan, announced that three types of microorganisms capable of reducing core minerals* from waste batteries used in electric vehicles were discovered in an abandoned mine in Gyeongsangbuk-do last year, and the feasibility of extracting and separating metal resources using these microorganisms has recently been confirmed.

*Core minerals: Minerals that are nationally managed due to the high reliance on specific countries, which pose a risk of supply chain loss (Korea institute of Geoscience and Mineral Resources, 2020).

The NIBR, in collaboration with researchers Prof. An Jun-mo and Prof. Hwang Guk-hwa from Jeonbuk National University and Prof. Lee Hyo-jeong from Gunsan University, conducted experiments whereby they leached the cathode active materials used in lithium-ion batteries in a solution with activated microorganisms for 24 hours. They confirmed that over 95% of the core minerals, including lithium, nickel, manganese, and cobalt, were separated.

*Cathode active materials: Substances that determine the performance of lithium-ion batteries, which have seen an increase in recycling recently.

The three types of microorganisms used in this study are two species belonging to the Acidithiobacillus genus and one species from the Ferroacidibacillus genus.

The NIBR plans to file a patent related to this research on ‘bioleaching’ within this month and will conduct follow-up research for practical application.

Bioleaching is a biological technique that uses microorganisms to extract effective components of metal resources, instead of using toxic inorganic acids. This method is considered environmentally friendly as it poses low risks during the process and helps reduce environmental pollution.

Director Seo Min-hwan stated, “We will continue to explore the diverse biological resources of Korea to contribute to the cultivation of low-carbon and green industries through research on the materialization of biological resources.”