

April 9, 2012

## **Completion of Facilities for Recovering Rare Metals from Used Lithium-ion Batteries and others**

JX Nippon Mining & Metals Corporation (head office: Otemachi 2-chome, Chiyoda-ku, Tokyo; president: Masanori Okada) has completed the construction of facilities for rare metal recycling on the site of wholly owned subsidiary JX Nippon Tsuruga Recycle Co., Ltd. (head office: 1 Wakaizumi-cho, Tsuruga-shi, Fukui; president: Toshihiko Yoshimi). The facilities include equipment for recovering rare metals from used lithium-ion batteries (LiB recycling facility), additional stationary furnaces for processing used consumer electronics devices, and an In/Co recycling facility for recovery of the rare metals indium and cobalt from sludge. On April 11, we will hold a completion ceremony at the Tsuruga Recycle site to commemorate the occasion.

The facilities are described below.

### 1. LiB recycling facility

Project description	Starting in April 2010, we carried out a commercial feasibility trial, commissioned by the Ministry of Economy, Trade and Industry (METI), on recovery of the rare metals cobalt, nickel, manganese, and lithium from used lithium-ion batteries and other materials. After that trial demonstrated the prospects for early commercialization, the new facilities have been introduced for better removal of impurities, drying, and packing, which will enable us to draw up final recycling business plans by further improving the processes, reducing costs, and scaling production to optimize cost performance.
Production (processing) capacity	Processed cathode material: 50t/month Recovered metal: nickel 6t/month, cobalt 10t/month manganese 6t/month, lithium carbonate 10t/month
Capital investment	705 million yen

### 2. Stationary furnaces

Project description	The printed circuit boards and electronic components of smart phones and other consumer devices contain rare metals. Since these rare metals are typically enclosed in plastic, ceramics, aluminum, or other covering, they need to undergo processes of extraction, separation, and removal of impurities before the metals can be refined. In our Group, we adopted the approach of burning in stationary
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furnaces at Tsuruga Recycle. To increase our rare metal recycling capacity, we invested in two stationary furnaces, as well as introducing equipment for treating the exhaust gas and water emitted by these furnaces.

Production (processing) capacity	Processed circuit boards, components, etc.: 250t/month
Capital investment	489 million yen

### 3. In/Co recycling facility

Project description	The wastewater sludge produced when making electronic materials contains rare metals used in the manufacturing processes. Currently this sludge is treated as industrial waste, but now we have completed a facility for recovering cobalt and indium from the sludge generated in our Group and at similar plants.
Production (processing) capacity	Processed wastewater sludge: 30t/month
Capital investment	50 million yen

These facilities were eligible for a grant under a METI program to encourage advancement of the rare metal recycling industry (introduction of equipment by industries making use of rare earths, etc.). Our Group has long been committed to maintaining and improving the sustainable development of society and coexistence with local communities through the proper disposal of waste materials and recycling of rare metals and other valuable metals. These projects will further enhance our ability to achieve a stable supply of rare metals while helping to create a sound material-cycle society.

Santoku Corporation has also completed a plant on the Tsuruga Recycle site, for recovery of rare earths such as dysprosium and neodymium used in motor magnets. A completion ceremony for this plant is to be held at the same time. It is hoped that these new facilities of ours and of Santoku will further advance the recycling industry, especially as relates to automobiles, in Fukui Prefecture and the city of Tsuruga.