

March 28, 2019

Press Release

Sumitomo Metal Mining Co., Ltd.

Development of a New Recycling Process for Lithium Ion Secondary Batteries and Operation of a Pilot Plant

Sumitomo Metal Mining Co., Ltd. (SMM) has developed a new process to recover and recycle cobalt in addition to copper and nickel from used lithium ion secondary batteries and intermediates generated in their production.

SMM started recovering and recycling copper and nickel from lithium ion secondary batteries by utilizing the smelting and refining process at the Non-Ferrous Metals Division's Toyo Smelter & Refinery (in Saijo City, Ehime Prefecture) and its Niihama Nickel Refinery (in Niihama City, Ehime Prefecture) in July 2017. However, the recovery of cobalt was remained as a technical possibility.

The process that SMM has developed selectively recovers nickel, cobalt and copper as an alloy by using a pyrometallurgical refining process independent of the existing process to separate majority of impurities from lithium ion secondary batteries. Then the alloy is leached and refined by a hydrometallurgical process to recycle the nickel and cobalt for use as a battery material and the copper for electrolytic copper. A pilot plant that uses these pyrometallurgical and hydrometallurgical refining processes has been constructed in the city of Niihama in Japan's Ehime Prefecture to learn feasibility of the new recycling process and scale it up to production level, and this plant commenced operation in March 2019.

Against a backdrop of climate change and other such issues, there is a rising global tide of automobile electrification and electric vehicles (EV) are expected to become increasingly common henceforth. As well as this, competition to acquire nickel, cobalt, and other metal resources for use as EV battery materials is intensifying, and securing a stable supply of these resources is a pressing issue.

If the process that SMM has developed enables the commercial recycling of valuable metals from lithium ion secondary batteries, we hope this will contribute to the further development of a sustainable circular economy in Japan and to the recycling of resources in order to deal with global resource depletion.

Address inquiries concerning this Press Release to:

Sumitomo Metal Mining Co., Ltd.

Amanda Orrisch, Public Relations & Investor Relations Department

TEL: +81-3-3436-7705

FAX: +81-3-3434-2215

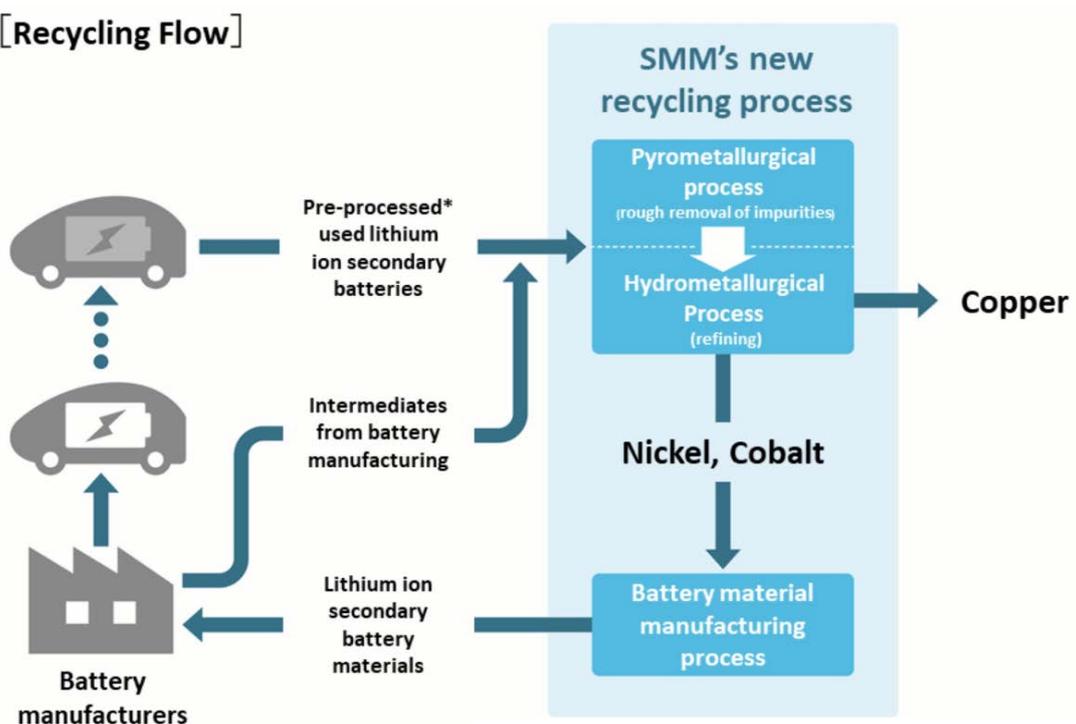
Appendix

■ Pyrometallurgical process pilot plant



■ Recycling flow through new process

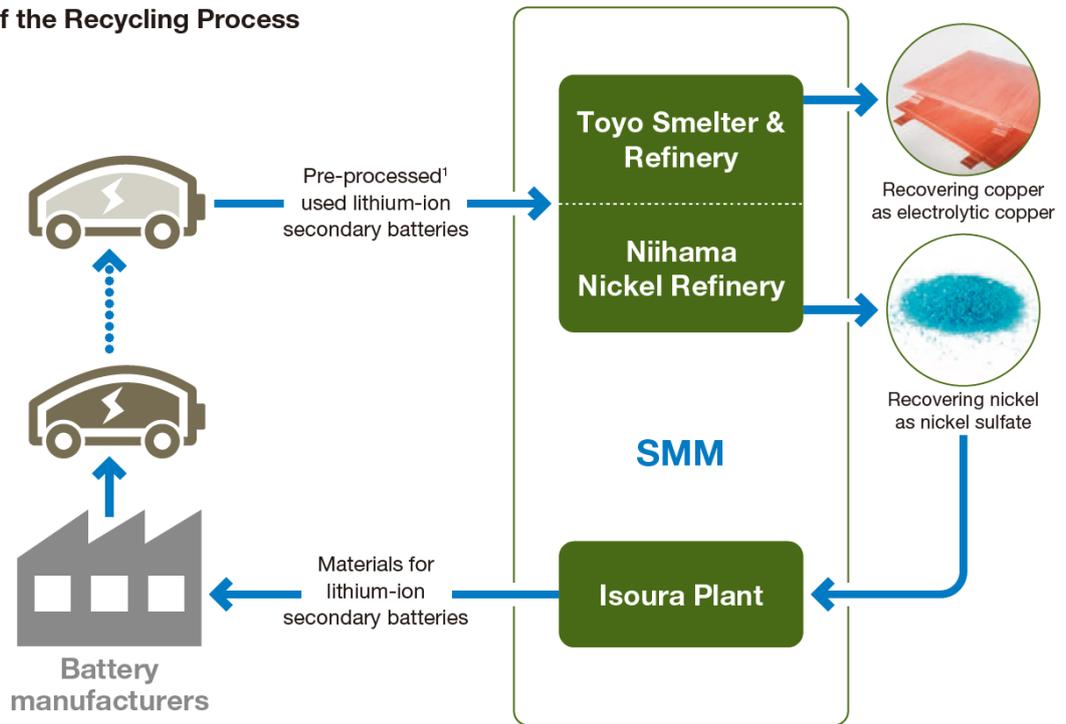
[Recycling Flow]



*Pre-processed: Neutralization through heat treatment, etc.

(Ref: SMM's current recycling flow for lithium ion secondary batteries)

■ Flow of the Recycling Process



*Pre-processed: Neutralization through heat treatment, etc.

End.