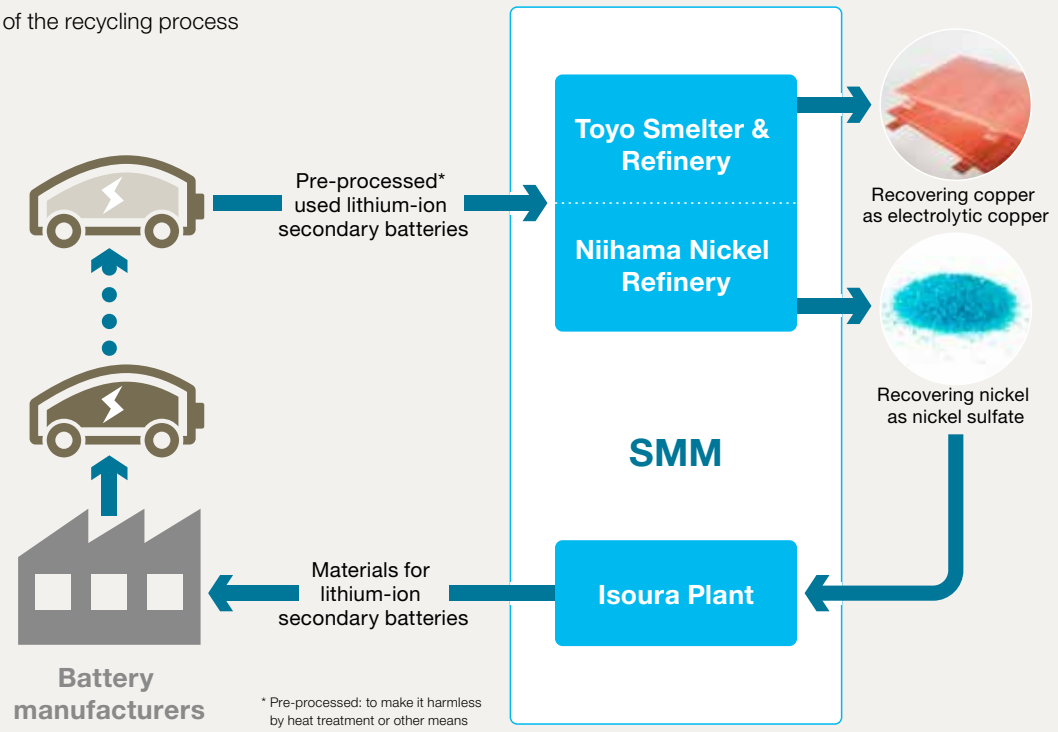
Topic

Achieving Japan's first "battery to battery" recycling of lithium-ion secondary batteries

SMM has achieved the first practical recycling in Japan of lithium-ion secondary batteries. This process recovers the copper and nickel from used batteries. By processing the recovered nickel into battery materials, we have achieved "battery to battery" recycling for waste lithium-ion secondary batteries.

Flow of the recycling process



Through collaboration among our three core businesses of mineral resources, smelting and refining, and materials, we are producing cathode materials for lithium-ion secondary batteries. This lithium-ion battery recycling was achieved as a component of this business. We will recover and recycle the copper and nickel from used lithium-ion secondary batteries and from the intermediates generated by their manufacturing process.

Compared with nickel-metal hydride batteries, the amounts of valuable metals contained in lithium-ion secondary batteries are small, making the development of cost-effective recycling processes difficult. SMM is resolving such issues through a fusion of the advanced technologies it has accumulated. We have established a processing flow that combines the copper pyrometallurgical refining process of the Toyo Smelter & Refinery and the nickel hydrometallurgical refining process of our Niihama Nickel Refinery. By accurately controlling the concentration of impurities in the raw materials, we have successfully recovered copper and nickel.

The recovered nickel is first processed into nickel sulfate at our Niihama Nickel Refinery, and then into cathode materials for secondary batteries at our Isoura Plant. Through this cycle, we have achieved Japan's first "battery to battery" recycling from waste lithium-ion secondary batteries.

The high-purity nickel used in lithium-ion secondary battery cathode materials is rare even among nickel products. It is important for SMM, as a manufacturing company, to establish a stable and efficient system to supply materials using this high-purity nickel to customers. It is also an initiative that will contribute to global resource recycling and to the formation of a sound material-cycle society in Japan. SMM will continue to develop unique technologies in our field.