Sponsor: JX Nippon Mining & Metals Corporation

Recycling of valuable materials is essential for the sustainable growth of a society. High-quality natural resources are getting depleted, and resource nationalism is rising in countries that are rich in natural resources. Therefore, it is very important for the Japanese society to promote recycling of rare metals and base metals. This unit develops environmentally friendly processes for recycling based on smelting and refining technologies for nonferrous metals. Furthermore, it aims to train young researchers and engineers in collaboration with industrial sectors in this field.

Research Group

Project Prof. Toru H. Okabe
Director Professor, Integrated Research Center for Sustainable Energy and Materials, Institute of Industrial Science, The University of Tokyo

Development of Efficient Recycling Technologies for Rare Metals

Resource Circulation of Rare Metals

Raw Materials

Products

Scrap

Aircrafts

Cutting tools

Electronics

Recycling Process

Pyrometallurgy

Hydrometallurgy

Electrochemistry

Our laboratory is developing new, efficient and environmentally sound processes to recycle rare metals for which an increase in demand is expected, such as titanium, tungsten, cobalt, rhenium and platinum group metals.

Project Prof. Takashi Nakamura
Emeritus Professor, Tohoku University

Metal Recycling Based on the New Concept of “Artificial Deposit”

Base Metals and Minor Metals recovered from Primary and Secondary Resources in Non-Ferrous Industry

- Copper concentrate
- Shredder dust
- Zinc concentrate
- Pyx ash
- EAF dust

Copper Smelting

Zn, In, Ga

More than 30 elements can be recovered except REE, W, Mo, Cr, Ni, Ta and U

Cu, Au, Ag, Pb-Sn, Cu-Cl, As, Se, Te

Sulfuric acid

Zn, Cu, Pb

Lead Smelting

Zn

Pb, Sn, Bi, Sb

Refining

In our laboratory, solid / solid separation and concentration technology without heating / dissolving the waste or refractory ore is studied to achieve an energy-saving separation and concentration process. This process is regarded as “pre-treatment” or “middle treatment” before metallurgical / hydrometallurgical process, which produces high-purity metal.

Research Group

Project Prof. Chiharu Tokoro
Professor, Faculty of Science and Engineering, Waseda University

Development of Separation and Concentration Technology to Utilize Waste/Refractory Ore as “Resource”

In order to expand the activities of the unit further after five years in the first term, the second term began in January 2017, with the inclusion of Prof. Chiharu Tokoro as a new member. In the second term, this unit will not only further develop the activities undertaken in the first term but also intensify activities to raise awareness of the importance of this field to the general public, especially women and young children (below high-school age).