Development of Advanced Mineral Processing Technology and Recycling Process

Our laboratory is developing a treatment process for unexploited resources that are impure and/or low grade, and valuable metals present in the electronic wastes. The typical research works are as follows.

Development of Advanced Mineral Processing Technology of Unutilized Mineral Resources

◆ Treatment process of impurity bearing copper mineral
◆ Metal recovery form low-grade ore and mine tailing

Development of Precious Metal Extraction Process from Wasted Materials

◆ Precious metal leaching process from printed circuit board by halogen leaching
◆ Development of novel extractant for selective extraction of precious metal

Development of Advanced Mineral Processing Technology for Utilization of Mineral Resources

Development of arsenic and antimony removal process to produce clean copper concentrate

Removal of impurity (arsenic etc.) or recovery of copper by physico-chemical separation process

Comparison of each method to find optimum process

Copper concentrate
(Feed of copper smelter)

Arsenic concentrate
(Solidification and stabilization)

Copper mineral
Chalcopyrite CuFeS₂

Arsenic bearing copper mineral
Enargite Cu₅AsS₄

Tennantite (Cu, Fe)₁₂As₄S₁₃

Roasting
Alkali leaching
Pressure leaching

Development of Precious Metal Extraction Process from Wasted Materials

Development of precious metal extraction process to recycle precious metal from wasted materials

Valuable waste (Urban mine)
(Printed circuit board, Automobile catalyst) etc.

Crushing / Classification

Separation and recovery of precious metal and rare metal

Physical separation

◆ Color sorting
◆ Table concentrator etc.

Chemical separation

◆ Halide leaching
◆ Alkaline leaching
◆ High pressure leaching etc.

Image of high pressure and temperature leaching reactor (Autoclave)

Precious metal extraction

Creation of novel extractant for selective extraction of precious metal

For effective extraction of precious metal and rare metal