

Yamaguchi LAB.

[Extractive Metallurgy and Resource Recovery]

International Research Center for Sustainable Materials

<http://susmat.iis.u-tokyo.ac.jp>

Precision
engineering
department

Extractive Metallurgy and Resource Recovery

Extractive Metallurgy of Non-Ferrous Metals

Recovery Process of Rare Metals in Non-Ferrous Extractive Metallurgy

In non-ferrous smelting process the base metals of copper, lead and zinc as well as rare metals are produced from secondary materials such as scrap metals, alloys and residues.

The valuable metals that result from the refining process provide the raw materials for a wide range of application possibilities in various fields.

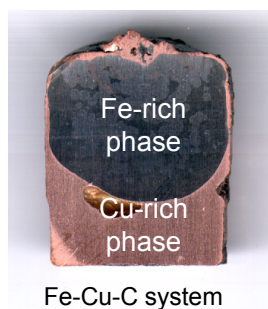
We suggest a new and effective recovery process of rare metals in the non-ferrous extractive metallurgy.

Copper enrichment based on liquid phase separations.

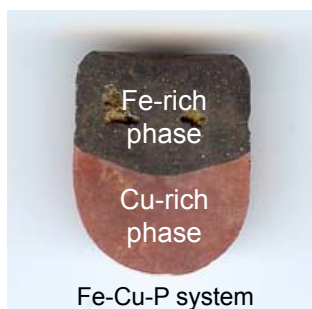
Recycling of platinum group metals for used auto catalyst.

Recovery of rare earth elements from magnet scrap by using B_2O_3 flux.

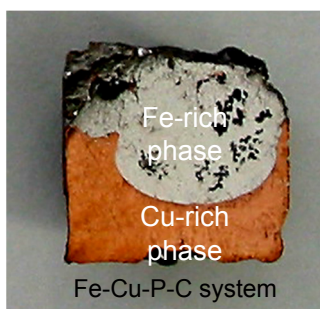
High temperature calorimetry.



Fe-Cu-C system



Fe-Cu-P system

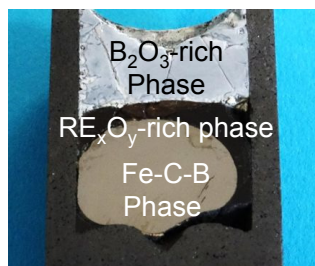


Fe-Cu-P-C system

Copper enrichment of low grade copper scraps



New and efficient process for recovery of platinum group metals.

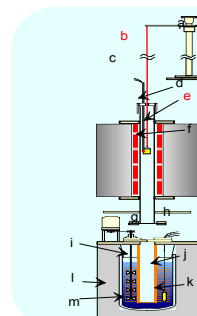


3 phase separations of the RE(:Nd,Dy,,Pr)-Fe-B-C-O system



Recovered rare earth oxides

Recovery process of rare earth elements from magnet scrap with B_2O_3 flux



- a) Dropping mechanism
- b) Pt-10%Rh wire
- c) Pt/Pt-Ph thermocouple
- d) Alumina tube
- e) Molybdenum silicide $MoSi_2$ heater
- f) Pt crucible
- g) Shutter
- h) Pt resistance thermometer
- i) Copper tube
- j) Copper fins
- k) Dewar vessel
- l) Insulating material
- m) Distilled water

High temperature drop calorimeter