



# METALS EXTRACTION, PRODUCTION and PURIFICATION

Our main concern is related to developing, optimising and evaluating hydro-electrometallurgical processes. The focus of attention is directed to pyro- and hydrometallurgical methods suitable for processing or treating solid or liquid metalliferous waste materials. Techniques of metals extraction and metals refining based on electrolytic and other reducing or oxidising processes are linked to these fields.

## COMPETENCIES

- Treatment and utilisation of metalliferous waste materials from industrial and other sources
- Hydro- or electrometallurgical processes suitable for recovering the metal content from such materials
- Treatment, purification or enrichment of solutions containing metals; collective or selective removal of the metals
- Preparation of high-purity metals
- Melting of metals and metalliferous materials, metals extraction in liquid state
- Refining and purification of metal melts



## SERVICES

- The elemental analysis of the above materials
- Investigation and development of the methods for recovering metals from the above materials
- Development of chemical metallurgical methods for the complex utilisation or treatment of metalliferous waste materials
- Investigation and development of metal refining processes
- Thermodynamic and kinetic investigation and characterisation of metallurgical processes



## TOOLS

### HYDRO-ELECTROMETALLURGICAL RESEARCH FACILITIES

- Laboratory glassware, bi-distillation and ion-exchange equipment for water purification, acid, alkali salt and other reagents, suction boxes, drying and cleaning equipment
- Rotary vacuum evaporator, heating magnetic stirrers, mechanical stirrers, shaking machines, vacuum filtration and chromatographic ion-exchange equipment
- Electrolysis equipment, electrolysis cells with membrane separation and electrolyte circulation, laboratory current supplies, analogue/digital converters, virtual systems, oscilloscope, multi-meters, potentiodynamic measuring systems
- Atomic absorption (AAS) spectrometer, UV-Vis spectrophotometer, classical analytical equipment, micro-pipettes and automatic burettes, electronic pH meters, ion selective electrodes, conductivity meter, dissolved oxygen meter, indicators

### PYROMETALLURGICAL RESEARCH FACILITIES

- Vacuum induction, induction and resistance heating laboratory furnaces of high temperature, crucible and tube furnaces, digital thermometers
- Gas-fired rotary furnace
- Rotating nozzle gas flushing equipment for melt treatment
- Semi-continuous laboratory casting machine
- Laboratory jaw crusher, ball and attrition mills, granulometric classification sieve series, shaking machine
- GD-OES plasma spectrometer



## REFERENCES

- Arconic Mill Products Hungary Ltd. (earlier Arconic-Köfém Ltd, Alcoa-Köfém Ltd.)
- INOTAL Alumínium- és Salakfeldolgozó Inc.
- Prometec Színesfém-metallurgia Ltd.
- VISHAY Hungary Ltd.
- MAL Inc.
- ISD Dunaferr Inc.
- Steel Works Ozd Ltd.
- Jabil Circuit Hungary Ltd.
- Bosch Group
- Kienle - Spiess Hungary Ltd.
- NEMAK Győr Aluminium Foundry Ltd.
- NAGÉV Ltd.