The EU funded project “Integrated innovative metallurgical system to benefit efficiently polymetallic, complex and low-grade ores and concentrates – INTMET” concentrated on the difficult task to recover valuable metals – base metals as well as CRM – from low-grade and complex ores. INTMET tested three innovative hydrometallurgical processes: atmospheric, pressure and bioleaching, and novel more effective metals extraction techniques (e.g. Cu/Zn-SX-EW, chloride media, MSA, etc.), in relevant environments, aiming to maximise metal recovery yield and minimising energy consumption and the environmental footprint.

Toward the end of the project, after 33 months of experimental work, preliminary results shall be shared with the public, even as the final goal of the project to offer a real business solution seems to be achievable.

For more details please visit the project website: www.intmet.eu

**WP 1: RAW MATERIALS SAMPLING AND CHARACTERIZATION**

Four materials obtained from mineral deposits from CLC, KGHM, BOR and Somincor were sampled and characterised. These included polymetalllic ores and concentrates, complex or low-grade copper ores and concentrates. In this work package the delivery of samples for experimental testing was also coordinated.

Regarding flotation tailings and metallurgical wastes as secondary raw materials, limitations related to polymetalllic low-grade and complex ores were investigated. To achieve high efficiency recovery of valuable metals (Cu, Zn, Pb, Ag) and critical raw materials (Co, In, Sn) have been overcome.

**WP 2: ENHANCED PERFORMANCE FLOTATION PROCESS**

WP2 develops the necessary technology for bulk concentrate production and provides samples for lab-scale and pilot testing. Main areas of activity are comminution and flotation improvements and production of samples from the developed processes.

**WP 3: DEVELOPMENT OF INTEGRATIVE ATMOSPHERIC LEACHING PROCESS**

Atmospheric leaching applied on bulk concentrates or middlings is a one promising key technology for efficient metals recovery from low grade, complex and polymetallic ores proposed by INTMET.

Obtained results at lab and pilot scale have shown the high recoveries as expected (e.g. 94% Cu and 95% Zn recovery). Continuous operation has proved that it is possible to recover lead and silver in high yield from the atmospheric leaching residue. It can be stated that a new technological approach has been developed to treat efficiently reserves of polymetalllic primary sulphides by means of hydrometallurgical processing.

**WP 4: DEVELOPMENT OF INTEGRATIVE PRESSURE LEACHING PROCESS**

High temperature pressure oxidation is a well-proven process for Ni, Au and Zn production. A process for leaching of both Cu and Zn is developed, pressure oxidation in an autoclave of temperatures from 135°C to 210°C destroying sulphides rapidly at leach times lower than 60 minutes - releasing base metals into solution for further leaching.

INTMET proposes this technology as an efficient way to recover base metals from bulk concentrates and middlings. Lab as well as pilot results obtained showed high Cu and Zn yields (Cu 95%, Zn 99%).

**WP 5: DEVELOPMENT OF INTEGRATIVE BIOLEACHING PROCESS**

Bioleaching is a process described as being “the dissolution of metals from their mineral source by certain naturally occurring microorganisms”. This technology is considered very promising to INTMET. The bioleaching performance on four polymetalllic samples was assessed by means of testing and detailed steady-state mass balances.

**WP 6: VALORIZATION OF TAILINGS, WASTES AND EFFLUENTS**

The project intends to limit the amount of wastes and effluents by valorizing these streams using best tailored technologies. Flotation tailings are processed to produce a new collective concentrates that can be used in hydrometallurgical industry. Pyrite is oxidized to produce sulphur in form of potassium sulphate and production that meets requirements of ferrous metallurgy. High-valued coarse-grain gypsum with a limited heavy metals content for commercial applications is produced from sulphuric acid effluents. Post-treatments to recover and separate Co, Mn, Zn and other elements from high-quality coarse-grain gypsum with a limited heavy metals content for commercial applications is produced from sulphuric acid effluents.

**INTMET PROJECT**

**INNOVATIVE PROCESSES TO RECOVER BASE METALS AND CRM FROM LOW-GRADE AND COMPLEX ORES**

www.intmet.eu

**Innovative metals recovery - the European project promoting greener recovery of base metals**

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