



MINERALOGY

INDEPENDENT INSPECTION AND ANALYSIS SERVICES

MINERALOGY

WE OFFER A WIDE RANGE OF INDEPENDENT MINERALOGICAL SERVICES TO HELP ORGANISATIONS BETTER UNDERSTAND THE PHYSICAL AND CHEMICAL STRUCTURE AND PROPERTIES OF THEIR COMMODITIES.

We enable trade by providing fast, accurate and professional reporting to support our clients irrespective of location

EXPERTS YOU CAN TRUST



ASMIN Industrial Limitada, part of the Alfred H Knight Group, is a consulting company in metallurgical processes, with over 15 years of experience serving the mining industry with offices in Santiago, Calama and Lima-Peru. Established in 1881, Alfred H Knight has been at the forefront of the metals and minerals industry providing inspection, analysis and technical consultancy and has built a reputation for delivering swift, accurate and reliable services.

Our network of highly-qualified experts is trusted by clients to provide key understandings of the physical and chemical behaviour of their minerals and compounds. We produce technical feasibility studies to help clients design operational parameters, improve production and remove bottlenecks.

SERVICES

Alfred H Knight supports businesses in the optimisation of their plant processes by helping to: determine mineralogical species, classify rocks according to their origin, recognize associations and textures between minerals, know the alteration of the rocks and characterize metallurgical products (concentrates – tailings – feed – slag, etc.).

Our expert team of chemists and laboratory technicians can provide the following services from our ISO 9001, ISO 14001 and ISO 45001 dedicated metallurgical, chemical, mineralogical laboratories and pilot plants:

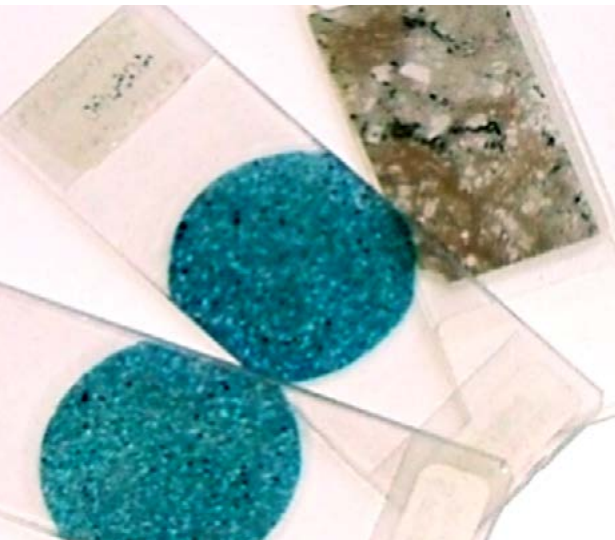
- **Laboratory tests:** grinding, collective and selective flotation, sedimentation, rheology, filtration and hydrometallurgy
- **Pilot tests:** SAG grinding, conventional grinding, flotation, thickening, rheology, transport, pumping loop and deposition
- **Comminution tests:** JK Tech (DWT and SMC), Bond Crushing (LEIT), Bond Abrasion (Ai), SAG Grindability Test (TMS), Bond Bar (Rwi), Bond Ball (BWi)
- **Mineralogical analysis:** QEMSCAN (PMA, BMA, TMS), X-ray diffraction (XRD) and traditional optical microscopy
- Pilot tests of high pressure roller crushing of 800 mm, HRC-800
- Comprehensive operation of metallurgical laboratories and samplers in plants
- Sampling, diagnosis and optimization of plants
- Chemical and metallurgical characterizations
- Metallurgical control of plants

QUANTITATIVE MINERALOGICAL ANALYSIS

This analysis corresponds to a quantitative analysis that delivers the percentage by weight (100%) of the mineralogical species in the sample (minerals versus gangue).

The briquette is systematically run through and the result is expressed as a sulphur base and a mineral base.

The usefulness of this analysis compared to a chemical analysis is that the latter only detects the amount of copper that has been lost, for example in the tailings, but does not say nothing about the mineral species that are being lost.



ANALYSIS BY X-RAY DIFFRACTION (XRD) AND CLAYS

Through x-ray diffraction, we are able to identify the crystalline minerals present in a sample. This can be complemented with separation procedures for clay minerals, in which the sample must be subjected to a centrifugation process and subsequent filtering to achieve separation of the fine fraction. This type of analysis is applicable in:

- Geological explorations
- Clay mineralogy
- Samples of blast holes
- Samples from plant treatments

MINERALOGICAL CHARACTERIZATIONS

Alfred H Knight operates QEMSCAN scanning electron microscopes and XRD equipment, which enables our team of highly-trained experts to carry out mineralogical characterizations, including:

- Preparation of samples and briquettes
- Mineralogical analysis of particles, PMA
- Mass mineralogical analysis, BMA
- Mineralogical analysis of trace minerals TMS/SMS
- Field mineralogical analysis, FieldImage
- X-ray diffraction analysis, XRD
- Traditional optical microscopy analysis

MINERALOGICAL SERVICES

Electron Microscopy QEMSCAN:

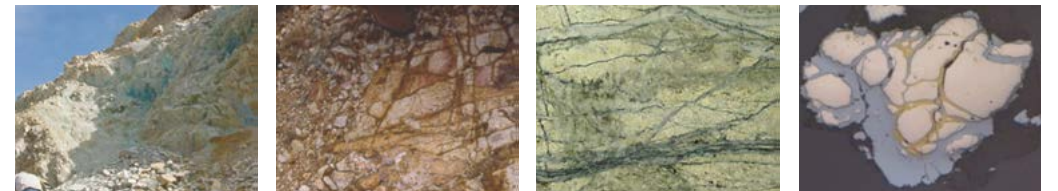
- QEMSCAN briquette making
- Mineralogical analysis of particles, PMA
- Mass mineralogical analysis, BMA
- Mineralogical analysis of trace minerals TMS/SMS
- Field mineralogical analysis, FieldImage

Traditional Optical Microscopy Analysis:

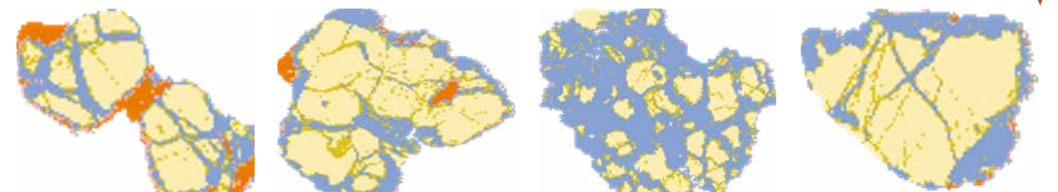
- Preparation of polished, transparent cuts and briquettes
- Petrographic and chalcographic descriptions
- Mineralogical point count in briquettes

Analysis by X-ray diffraction, XRD and clays

CHARACTERIZATION OF MINERALS PRIOR TO EXPLOITATION



OPEN PIT → EXPOSURE → HAND-SPECIMEN → OPTICAL



← QEMSCAN

- Chalcocite
- Pyrite
- Kaolinite
- Chalcopyrite



TRADITIONAL MICROSCOPY

Alfred H Knight's mineralogical experts make use of traditional microscopy in order to identify the mineral components of a rock from its optical properties and characterise its formative processes.

This technique is widely used in the exploration of deposits in the exploitation, metallurgy and research, as it supports:

- Rapid identification of mineral phases
- Possibility of identifying substances in minimum proportions
- Textural studies

OPTICAL MICROSCOPY

Alfred H Knight is fully capable of conducting optical microscopy in order to provide clients with a better understanding of their minerals and compounds. The techniques we use include:

Petrography

Petrography allows us to determine the mineral content and the textural relationships within client's commodities. Through transmitted light microscopy, we extract geological information from a sample by determining the minerals that make it up, their paragenetic associations, their alteration and mineralogical facies.

This information is used in mapping and geological modelling in the mine, in the exploration of deposits and in the optimisation of metallurgical processes.

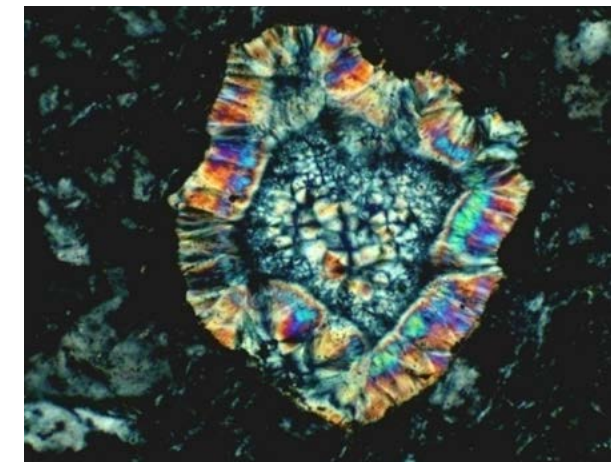
Chalcography

Chalcography allows us to identify metallic and submetallic mineral phases, which make up the ores of deposits. Through reflected light microscopy, we study the occurrence, textures and paragenesis of minerals and their applications in economic geology as well as in industrial mineral processing plants. This information is used in the geological interpretation of a deposit, in its modelling and essential in the design of metallurgical processes for which it provides the required qualitative and quantitative mineralogical data.

Reflected light microscopy is essential in the study of foundry slag before proceeding to an electron microscopy study. By reflecting light on a polished briquette, we can characterise its Cu phases, Fe phases and silicate phases, release association occlusion and granulometric size.

Optical microscopy analysis is used for the study of concrete microstructures such as:

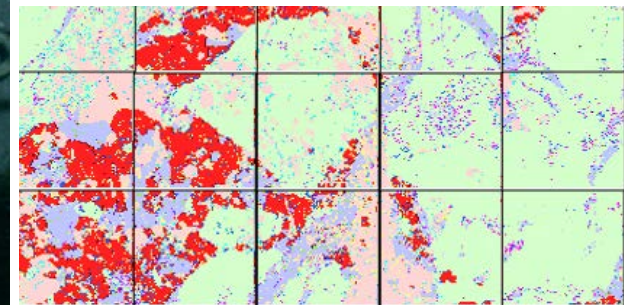
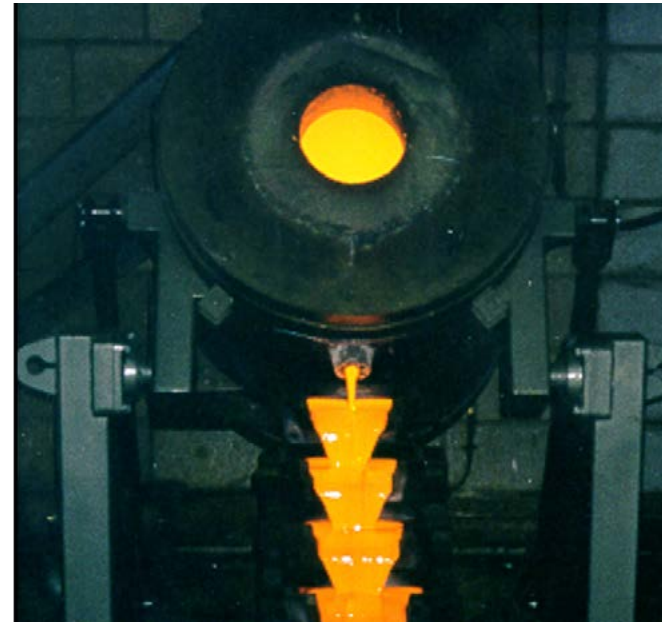
- Type of material (coherent, hard, porous, fractured, homogeneous)
- Type of coarse aggregate, fine size and predominant morphology
- Petrographic identification of the particles and the cement
- Distribution of carbonates and whether they have penetrated through microfractures



KEY LOCATIONS



Alfred H Knight supports organisations at each part of the supply chain, providing expert mineralogical services from strategically located laboratories across South America:





OUR EXPERTISE



ALFRED H KNIGHT (AHK) is a leading provider of inspection, testing and analytical services for the minerals and metals and solid fuels industry and has vast experience with a variety of materials throughout the global supply chain.

AHK operates a global network of experts with a well-earned reputation for providing reliable, professional services.

Whether you need our services at a mine site, load or discharge port receiving works or at other crucial points in the logistics chain, AHK can meet your needs.

-  **INSPECT**
-  **TEST**
-  **TRUST**





**GET IN
TOUCH**

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