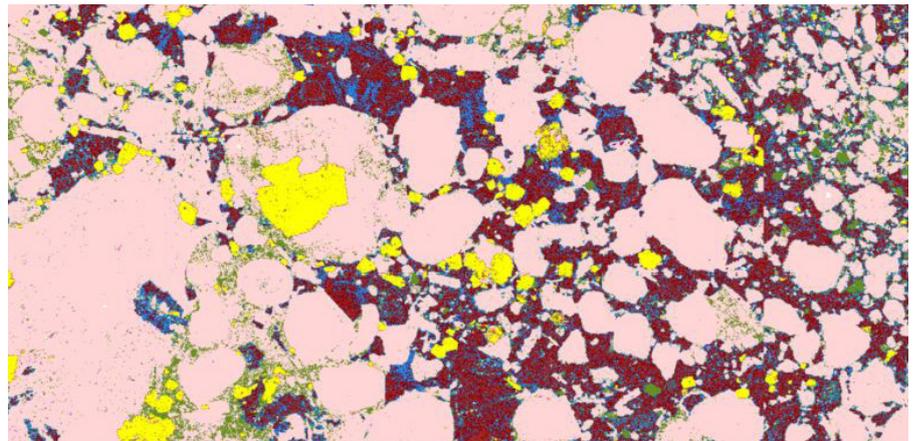


FACT SHEET

APPLIED MINERALOGY

Mineralogy services for the mining industry

Minerals represent some of earth's most important natural resources and are geological resources of major economic importance. Applied mineralogy has significant applications in mineral exploration, mineral processing, mineral waste disposal and treatment, hydrometallurgy, pyrometallurgy and refining.



Our Expertise

Intertek's leading expertise and state-of-the-art facilities offer a range of mineralogical services. Technical specialists in XRF and XRD support local and global operations, producing quality reliable data with the reassurance of years of experience and a proven track record.

Bulk Mineralogy

Powder X-ray diffraction (XRD) is an analytical technique primarily employed for the identification and quantification of crystalline materials in bulk samples, both natural and synthetic. Each crystalline solid has its unique characteristic X-ray powder pattern which may be used as a "fingerprint" for its identification. Interpretation of the crystalline phases present requires a search-match of the peak positions against an international database (ICDD) that contains data for over 200,000 phases. The results given are either qualitative (descriptive of the sample make-up) or quantitative. Quantitative results can include the noncrystalline (amorphous) content of the sample.

Infra-Red Spectroscopy

TerraSpec Near-Infrared Spectroscopy (NIR) offers a rapid scan for the identification and characterisation of minerals visible in the NIR range. Minerals and mineral groups include hematite, goethite, garnet, pyroxene, amphibole, epidote, apatite, tourmaline, topaz, clay, mica, chlorite, serpentine, carbonates, hydrous silicates and rare earth minerals. The scan information can be used

to identify, characterise and map alteration zones associated with various ore forming processes. For best results, it is recommended that the characterisation of the mineral analysis be confirmed by XRD analysis on either a continuum or a selected subset of samples.

Fourier-Transform Infrared Spectroscopy (FT-IR) offers a rapid scan technique for the qualitative and quantitative analysis of organic and inorganic materials. Regression and calibration methods enable quantitative determination of mineralogy. This non-destructive technique requires minimal sample preparation.

Micro Mineralogy

Automated mineralogy via QEMSCAN (Quantitative Evaluation of Minerals by Scanning Electron Microscopy) is used to identify mineral phases, in situ, at the micron scale on polished blocks or thin sections. As well as identifying the minerals present, the processing of the data allows the visualization of the textural and spatial arrangements of the minerals. The processing can thus determine grain sizes and shapes as well as provide information for mineral associations, mineral liberation, elemental deportment and elemental mapping. The technique is best used in conjunction with the bulk mineralogical data obtained from XRD.

Clay Mineralogy

Clays are important constituents of soils, mudstones, shales and some ores that often

require specialist attention. The presence of clays can be either beneficial or detrimental to recovery processes. For example, the swelling of clays in shales can induce micro fractures in the rock that could improve oil recovery.

A range of analytical tests are available, including:

- Clay separation from bulk materials
- Qualitative or quantitative XRD analysis from the bulk sample
- Clay mineral identification (XRD) (from glycolation and heating regimes)
- High resolution microscopy analysis via SEM-EDS/QEMSCAN
- Swelling Index of clays in water (adapted from the ASTM method)
- Swelling Index of clays in solutions of specific interest
- Cation Exchange Capacity (CEC) analysis

FOR MORE INFORMATION

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