

XRD. X-Ray Powder Diffraction...

Xstrata Process Mineralogy employs a world class Mineral Science laboratory that includes a Bruker D8 Advance x-ray powder diffractometer (XRD). XRD data is often used in conjunction with other mineral analytical techniques based on electron beam instruments and optical microscopy in the Mineral Science laboratory.

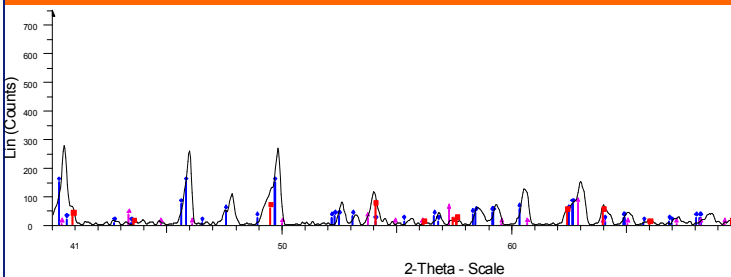
A silicon strip "LynxEye" detector is used for rapid collection of diffraction patterns from crystalline materials. Samples are prepared using a micronizing mill to produce particle sizes between 5 μm and 10 μm to ensure that all samples have the same particle size range for optimized random orientation of crystal planes for diffraction.

An International Centre for Diffraction Data database of 160,000 diffraction patterns is used for a search / match routine to identify candidate phases that match the diffraction pattern. Background history and assay data for the unknown are crucial to reliable interpretation. Pattern phase quantification can be done using Rietveld Refinement with TOPAS software.

Practical Applications

Xstrata Process Mineralogy has added value to our client's operations and projects through XRD work in areas where samples may be friable, damp and otherwise difficult to prepare and polish for microscopy. Some areas are:

- Precipitates and scale in plant lines and pipework
- Dust
- Soils [Ni laterites]
- Checks for asbestos [clinochrysotile]
- Finely ground products
- Element [eg. Ni] speciation as oxide, sulphide, carbonate



Key Advantages:

- Rapid analysis for qualitative results [30 to 60 minutes]
- Ease of sample preparation
- Automated analysis [up to 30 samples]
- Low cost
- Analysis of materials not suitable for microscopy
- Small sample mass required [2 to 4 gms]
- Identifies different phases with the same composition



Bruker D8 Advance XRD in operation at XPS



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"Adding value...
...Reducing risk"