Application Note 98: Analysis of Copper in Mineral Samples using a FOP-38 Fibre Optic Probe Analyser.

NIR Technology Systems

Introduction:

This study was undertaken to determine the feasibility of measuring the recoverable copper and non-recoverable copper in mineral ore samples. For the purposes of this study the FOP-38 Fibre optic probe analyser was used to scan the samples in reflectance.

Procedure:

19 samples of mineral ore were placed in a standard petrii-dish and were then scanned over the wavelength range of 720nm to 1100nm collecting 10 scans per sample. The samples were then represented and the scanning process repeated. The spectra were uploaded into NTAS (NIR Technology Analysis Software) and Partial Least Squares Regression (PLS) was used to develop a calibration for recoverable and non-recoverable copper.

Results:

Figure 1, below, shows the NIT spectra, over the wavelength range of 720nm to 1100nm, for the 19 samples.
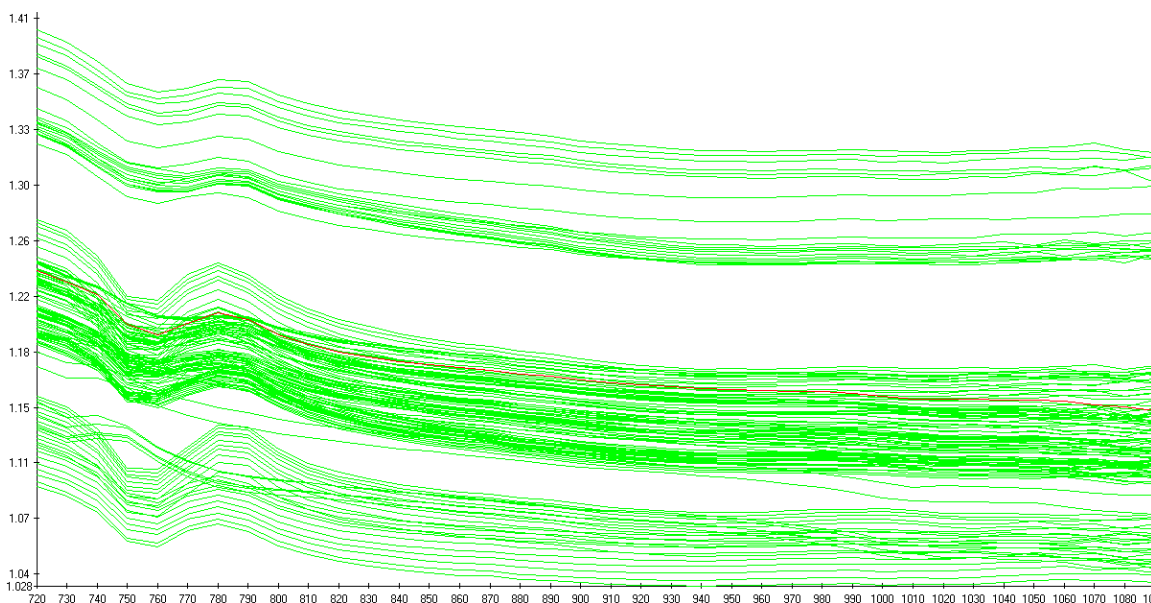

Figure 1: Plot of NIR spectra for mineral ore samples.

Figure 2 shows the calibration statistics for the NIR recoverable copper values versus the reference values. The Standard Error of Prediction (SEP) is 2.38% with a correlation (R^2) of 0.92.
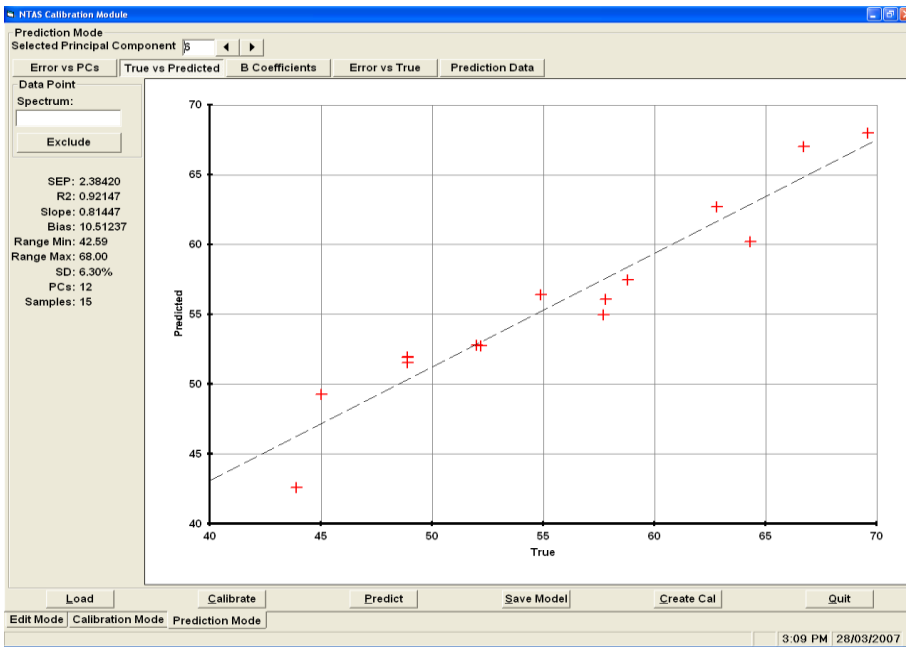
Figure 2: Plot NIR recoverable copper values versus the reference values.

Figure 3 details the calibration statistics for the non-recoverable copper versus the reference values. The SEP is 0.05% with a correlation (R^2) of 0.89.
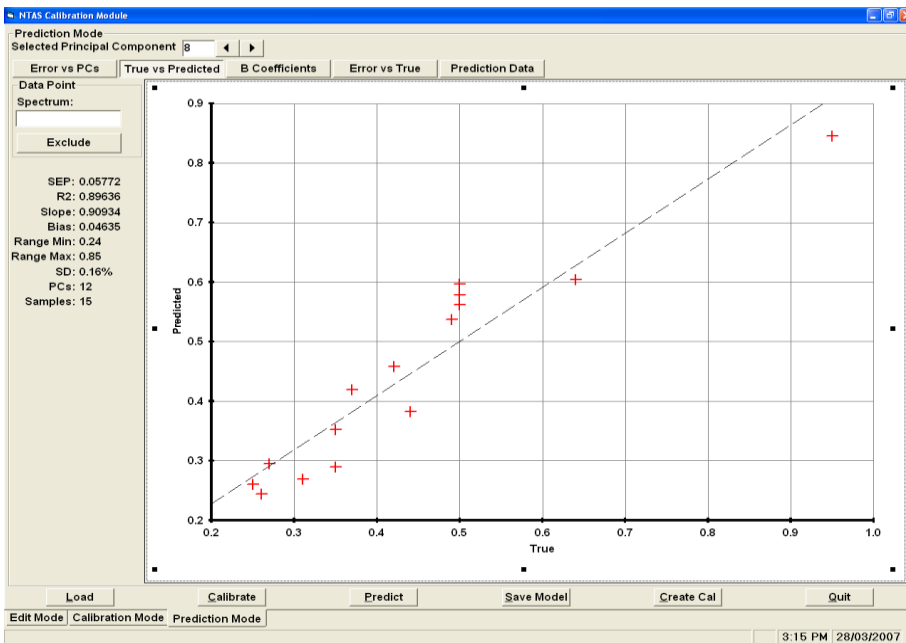

Figure 3: Plot of NIR non-recoverable copper versus reference values.

Conclusion:

It can be seen from the above details that the FOP-38 Fibre Optic Probe analyser can be used to measure recoverable and non-recoverable copper in mineral ore samples. The errors in these measurements can be reduced by improving the sample presentation to the FOP-38 Analyser.