

Zinc, Silver, and Lead Analysis with the Thermo Scientific Niton XL3t Series

Niton XL3t Series XRF Analyzers Enable Rapid Elemental Analysis



Introduction

The many industrial uses for zinc (Zn) create a strong global demand for the metal from major producers in Asia, Australia, and the Americas. Sphalerite (ZnS) is the primary source of Zn ore with 95% of the world's supply coming from this single mineral. Other elements associated with Zn ore, such as lead (Pb) and silver (Ag), offer another opportunity to capitalize on refinery by-products. Accordingly, grading concentration of all three metals is of paramount interest in the mine and processing plant. Conducting all the analysis in a way that maximizes productivity is extremely important.

Application

Thermo Scientific Niton analyzers are ideal for exploration, grading of Zn ore in the mine, or determining the amounts of Zn, Pb, and Ag present in the concentrates. Accurate analysis of all three is critical to maximize efficiency across all parts of the mining process. Elemental concentration information is achieved with a minimum of sample preparation, enabling quick decisions in the mine. Now, concentrations of all elements of interest are at your fingertips, minimizing downtime of any kind.

Handheld XRF Analyzer

Our advanced Niton® XL3t Series analyzers, including the feature-leading Niton XL3t 500, easily analyze elements from chlorine (Cl) to uranium (U) to fill most all mining needs, with options available that add Mg, Al, Si, P, and S to the analytical suite. These instruments make it easy to perform trend analysis by averaging readings in real-time directly on the analyzer, or by downloading results later to a PC. They deliver fast, accurate elemental analysis for intensive metals exploration and production, whether base metals, precious metals, or even rare earth elements.

These superior instruments provide the following key benefits:

- Instant geochemistry for ore, rock, drill core, chips & rock face
- Drastically reduce the number of samples sent out for outside testing
- Decision-making tools at your fingertips
- Ore concentration tracked instantly
- Instant, simultaneous Zn, Pb, Ag analysis, plus 25 other elements

Method

Twenty-four certified reference materials (CRM) and in-house standards were packed into standard XRF sample cups fitted with Mylar film and measured for 90 seconds. Analysis time may vary depending on precision requirements. Due to low concentrations (non-detectable) of certain element in some samples, different numbers of samples were used for each data plot displayed in Figures 1 through 3.



The Thermo Scientific Niton XL3t 500 is an ideal instrument for fast mine or field analysis.

Results

The figures below show the correlation curves for Zn, Pb, and Ag, with certified results vs. the Niton XL3t 500 handheld XRF results. The coefficient of determination (R^2) for each element is provided in the figures. The R^2 value is a measure of how closely the data sets correlate with each other, where a perfect correlation would have an R^2 of 1. Additionally, Table 1 displays repeatability data detailing the robust precision of the Niton XL3t analyzer.

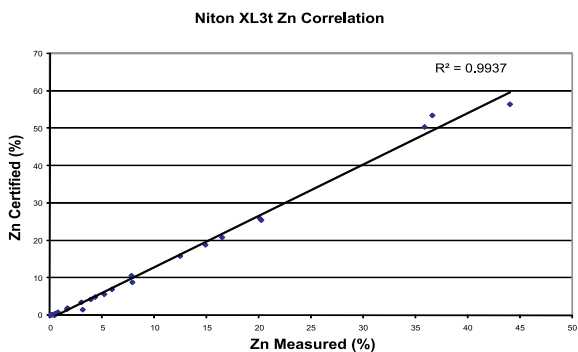


Figure 1. Correlation curve for Zn – CRM vs. the Niton XL3t 500.

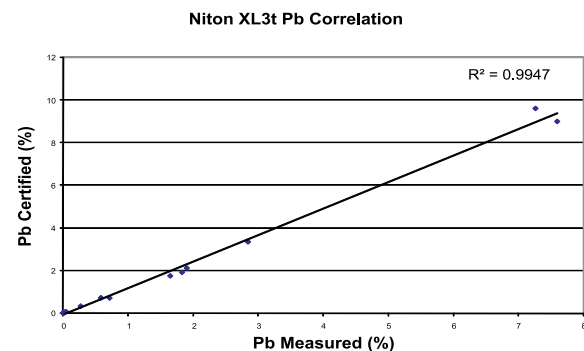


Figure 2. Correlation curve for Pb – CRM vs. the Niton XL3t 500.

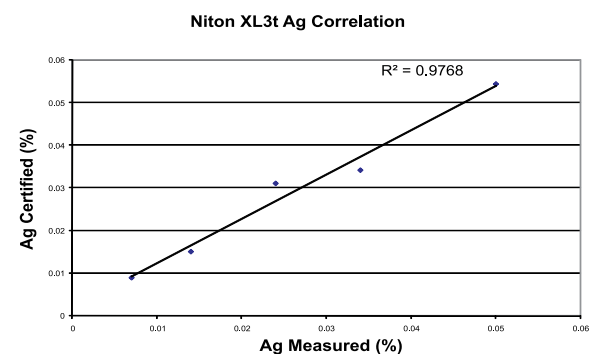


Figure 3. Correlation curve for Ag – CRM vs. the Niton XL3t 500.

B26	Zn	Pb	Ag (sample SB1)
Average	3.96	0.030	0.030
Standard deviation	0.05	0.002	0.001
%RSD	1.36	5.000	3.280

Table 1. Repeatability data for Zn, Pb, and Ag in samples B26 and SB1. Eleven analyses were performed on samples B26 and SB1.

Comments

The correlation coefficients and repeatability data for the key elements in Zn ore analysis demonstrate the excellent accuracy and precision of the handheld Niton XL3t 500, indicating that it is an ideal instrument for fast mine or field analysis. The instant chemistry it provides allows the user to make critical decisions with a minimum of downtime, keeping projects running and productive. Additionally, they provide information that minimizes the expense and time of shipping samples off-site for analysis, which increases savings. The Thermo Scientific Niton XRF analyzer is a great addition to any process in the life of the mine.

To discuss your particular applications and performance requirements, or to schedule an on-site demonstration and see for yourself how Niton analyzers can help save you time and money, please contact your local Thermo Scientific Niton Analyzer representative or contact us directly by email at niton@thermofisher.com, or visit our website at www.thermoscientific.com/niton.



Thermo Scientific Niton XL3t 500 analyzers deliver fast analysis for intensive metals, precious metals, or even rare earth elements.

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