



## Bauxite analysis with Niton XRF analyzers

### XRF analyzers enable speedy light element analysis

#### Introduction

Globally, bauxite is the primary source of aluminum (Al) ore and anchors a major industry in many countries, including China, Australia, and Brazil. As such, grading Al concentration is of paramount interest in the mine as is the need to determine concentrations of penalty elements. The desired goal is to conduct all the analysis in a way that maximizes productivity.

#### Application

Analysis of aluminum (Al), silicon (Si), and iron (Fe) presents unique challenges. Accurate analysis of all three is critical for ore grading and understanding their influence on the processing and production of the primary metal of interest. Relying on lab-analysis only in bauxite mining operation often results in costly time delays and reduced productivity while waiting hours if not days and weeks for the results.

With the ruggedized, dust- and splash-proof Thermo Scientific™ Niton™ XL3t GOLDD+ XRF Analyzer, near lab-quality analysis of Al, Si and Fe can be generated on sites, enabling quick decisions in at remote mines. Indeed, the Niton XL3t GOLDD+ analyzer provides rapid and accurate elemental analyses of bauxite ore enabling to map chemical concentrations in real-time, identify excavation hotspots and detect penalty elements.

#### Handheld XRF analyzer

Thermo Scientific Niton Handheld XRF analyzers, including the Niton XL3 GOLDD+ analyzer, easily analyze elements from magnesium (Mg) to uranium (U) to fill all exploration and mining needs. These instruments make it easy to perform trend analysis by averaging readings in real-time 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 chemistry for ore, rock, or drill chips
- Significantly reduce the number of samples sent for lab analysis
- Decision-making tools at your fingertips
- Ore concentration tracked instantly
- Simultaneous analysis of Al, Fe, and Si, plus 26 other elements
- Rapid analysis of impurity concentration

#### Method

Fourteen certified reference materials (CRM) and in-house standards were packed into standard XRF sample cups fitted with polypropylene film and measured for 120 seconds (on the light filter for Al and Si) and 30 seconds (on the main filter for Fe) using the Niton XL3 900 GOLDD analyzer. Analysis time may vary depending on precision requirements.



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

## Results

Figures 1 through 3 show the correlation curves for Al, Si, and Fe, with certified results vs. the Niton XL3t 950 GOLDD+ 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 XL3 950 GOLDD+ analyzer.

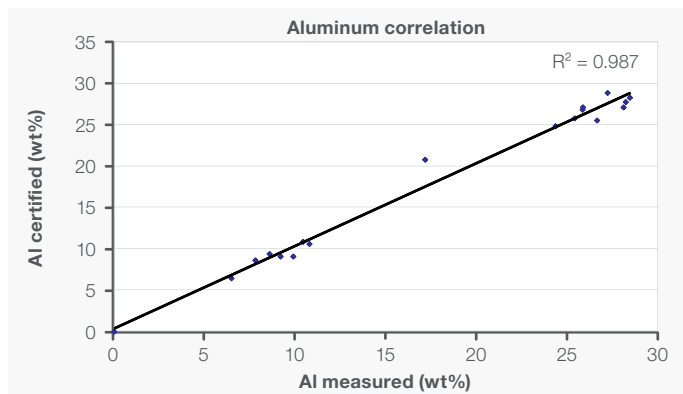


Figure 1. Correlation curve for Al – CRM vs. the Niton XL3 950 GOLDD+.

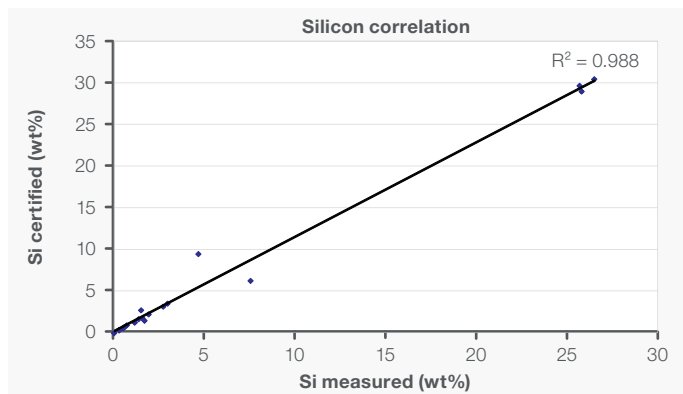


Figure 2. Correlation curve for Si – CRM vs. the Niton XL3 950 GOLDD+.

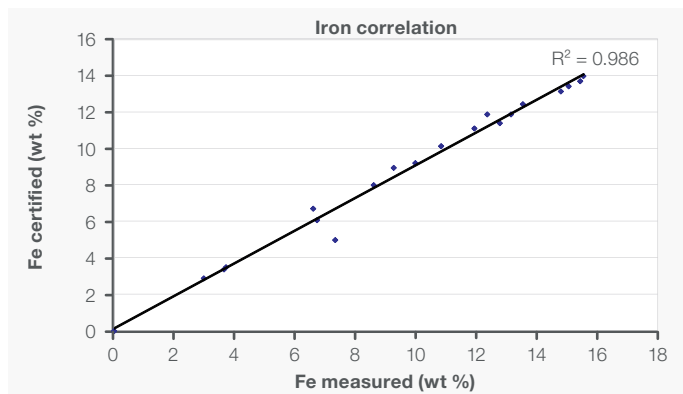


Figure 3. Correlation curve for Fe – CRM vs. the Niton XL3 950 GOLDD+.

## Comments

The correlation coefficients and repeatability data for the key elements in bauxite analysis demonstrate the excellent accuracy and precision of the handheld Niton XL3 950 GOLDD+ analyzer, indicating that the Niton XL3 GOLDD+ instrument is ideal for fast mine or field analysis. The instant chemical information it provides allows the user to make critical decisions with minimal downtime, keeping projects running and productive. Additionally, they provide information that minimizes the expense and time of shipping samples for analysis and increases savings. The Thermo Scientific Niton XRF analyzer is a great addition to any process in the life of the mine.



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

BXT-14	Al	Si	Fe
Average	29.82	1.68	10.31
Standard deviation	0.69	0.025	0.040
%RSD	2.3	1.5	0.4

Table 1. Repeatability data for Al, Si, and Fe in sample BXT-14.

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