APPLICATION NOTE # XE-2015-3276

Quantitative elemental analysis on an iron containing sample.

ABSTRACT

An iron containing sample was quantitatively analyzed using Xenemetrix Genius IF SDD bench top system and Standardless Fundamental Parameter calculations (SLFP).

OBJECTIVE

- Qualitative analysis to determine the elemental content.
- Quantitative analysis using SLFP method to determine the concentration of each component in the sample.

BACKGROUND

EDXRF is a fast and non-destructive technique that can quantify any type of sample solid, powder or liquid. Energy Dispersive X-ray Fluorescence (EDXRF) spectrometers play an important role in assuring that consistent quality of samples is retained throughout a manufacturing process.

ANALYTICAL CONFIGURATION

Table 1: Instrument Analytical configuration

Instrument	Genius IF SDD
Anode	Rh-Anode X-ray tube, 50kV, 50W
Detector	Silicon Drift Detector (SDD)
Environment	Vacuum
Type of analysis	SLFP
Analysis time	90 seconds

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EXPERIMENTAL

A pressed pellet of an iron containing sample was analyzed both qualitatively and quantitatively. The analysis was performed in vacuum, to avoid oxygen absorption of the low energy signals from low molecular weight elements, such as Mg, Al, Si and S. A typical spectrum is shown in figure 1. The spectral data were analyzed using a Standardless fundamental parameter method (SLFP) . The quantitative results are presented in table 2.

RESULTS

Figure 1: Spectrum of the pressed pellet sample showing the different elements.

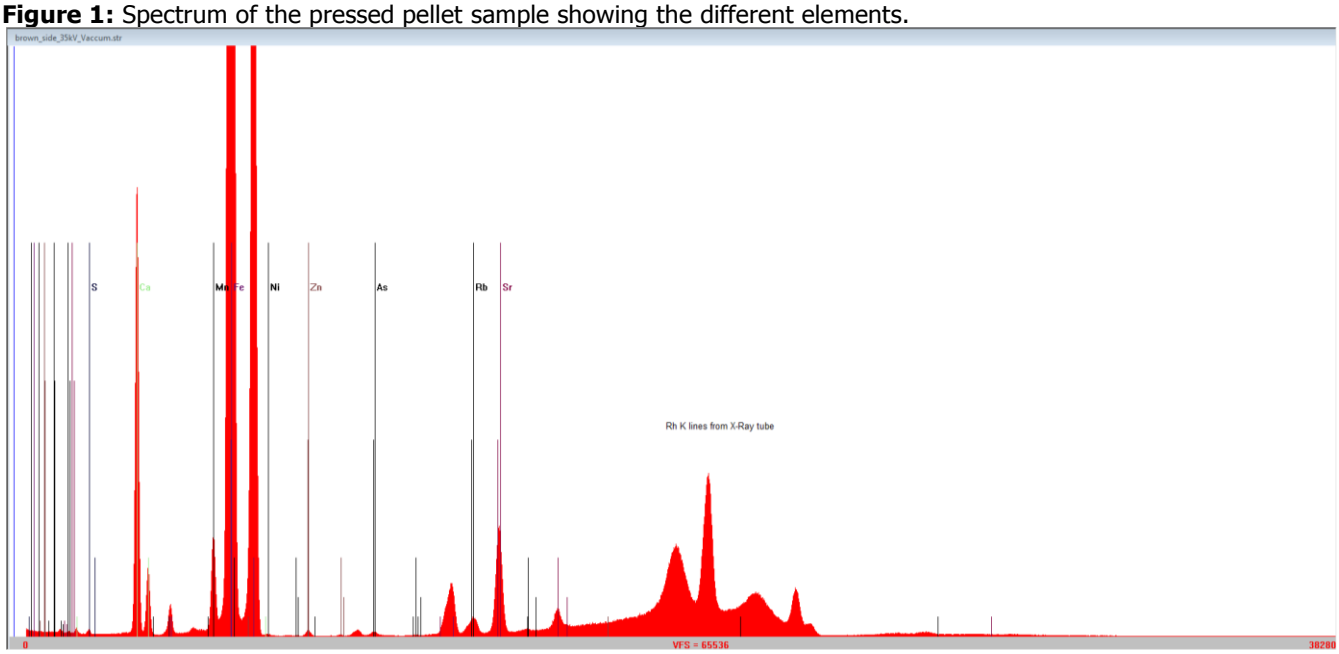

Table 2: Quantitative results

Elements	Conc. [w/w%]
S	2.25
Ca	21.03
Mn	1.17
Fe	70.19
Ni	0.008
Zn	0.044
As	0.018
Rb	0.040
Sr	0.24

CONCLUSION

This application report presents a simple and rapid method for elemental quantitative analysis of iron containing samples using Xenemetrix Genius IF analyzer combined with Fundamental Parameter software. In the absence of calibration standards, Standardless fundamental parameter method is an excellent alternative to perform the quantitative analysis. The accuracy of the SLFP method is about 10%, and can be improved by including one "type standard" (sample with known concentrations of the same or similar matrix as the sample to be analyzed).