Multi-channel X-ray fluorescence spectrometer

Simultix 15

1. Introduction

X-ray Fluorescence Analysis (XRF) has been used in a wide range of fields as an instrumental analysis method that enables quick and easy elemental analysis. Compared with other methods, sample preparation is simpler and analysis accuracy is higher, and therefore it is not only used for quality control but also for research and development.

Simultix is a simultaneous wavelength dispersive X-ray fluorescence (WDXRF) spectrometer, which can simultaneously measure multiple elements (up to 40) and is widely used as an elemental analyzer for process control such as in steel and cement industries that require high throughput and precision.

Since the release of the first Simultix a half-century ago in 1968, over 1200 Simultix systems have been delivered to customers around the world so far. Improvements have continually been made over these years. The recently released Simultix15 has the most advanced performance, functions and operability to meet diverse and modern needs realized by continued technological innovation.

2. Features

2.1. Doubly curved crystal

Doubly curved crystals are installed on a fixed channel to obtain higher sensitivity than conventional single curved crystals for the first time in a simultaneous X-ray fluorescence spectrometer system (option).

Fig. 1. Doubly curved crystal.

2.2. High throughput and high precision analysis

High-speed sample loading and data processing systems in combination with the powerful and stable X-ray generator realize high throughput and high precision.

2.3. Simultaneous measurement of 40 elements

Simultix15 can measure up to 40 elements simultaneously (30 in standard spec.). The analyzable elemental range is from beryllium through uranium.

2.4. Stable vacuum system

The stability of vacuum level has a very large impact on X-ray intensities of ultra-light elements (Be through O). The Auto Pressure Control (APC) system maintains

a constant vacuum level in the optical chamber to dramatically improve analytical precision of ultra-light elements. The evacuation speed of the vacuum speed is selectable to reduce dispersal of powder for certain samples to ensure reliability of vacuum system and minimizing instrument downtime.

2.5. Newly developed synthetic multilayers

RX85, one of the newly developed synthetic multilayers, gives 30% higher sensitivity for beryllium and boron compared to the conventional multilayer.

2.6. Automation system

Instrument is optionally available with a 48-position Automatic Sample Changer. Optional Sample Loading Unit allows belt-in feed (right or left) from a third party sample preparation system.

2.7. Scanning goniometer

Scanning goniometers for light and heavy elements ranging from oxygen to uranium or for heavy elements from titanium to uranium are available for additional flexibility.

2.8. Improved software

Based on Rigaku's easy-to-use flow-bar interface, Simultix15 software walks the user through the required steps for simplified setup of quantitative applications.

In addition, routine quantitative analysis, maintenance and setting of quantitative conditions, etc. can all be accessed from a tool bar visually arranged on the software main screen. In order to prevent the database from being changed or deleted due to an operational mistake, the software access level can be set for each operator to protect integrity of valuable data.

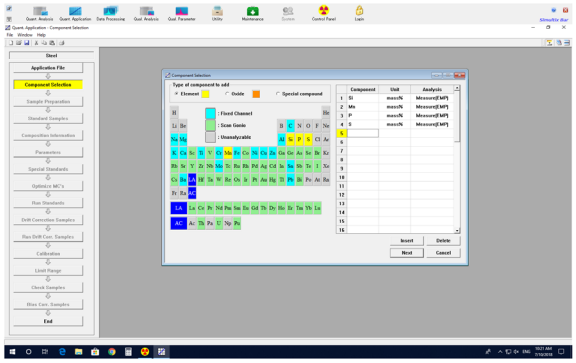

Fig. 2. New software screen of Simultix15.

3. Analysis examples

3.1. Fe analysis in galvanneal zinc (GA) plating

Combination of a specialized optical configuration and thin film FP method enables accurate analysis of Fe content in GA plating (option, patented in nine countries).

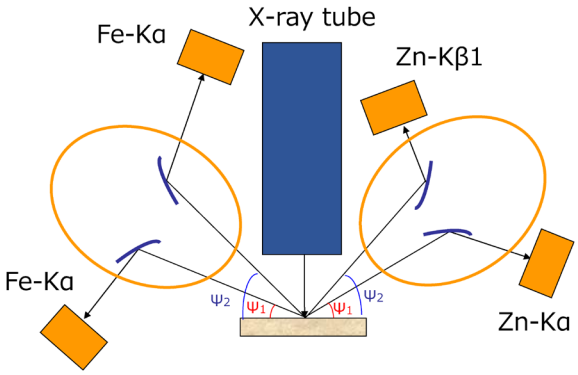

Fig. 3. Unique optics for galvanneal Zn–Fe alloy coating analysis.

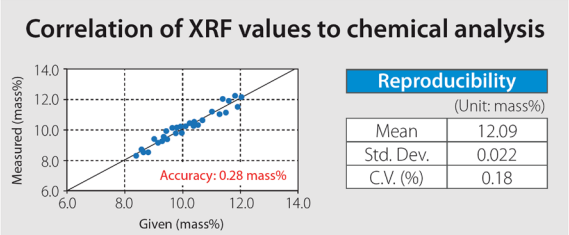

Fig. 4. Fe content analysis in galvanneal alloy (GA) coatings.

3.2. XRD channel

By installing an optional XRD channel, quantitative analysis by XRF and XRD can be performed with one system. Quantitative analysis of FeO in sintered ore or free lime (f.CaO) in cement clinker is possible.

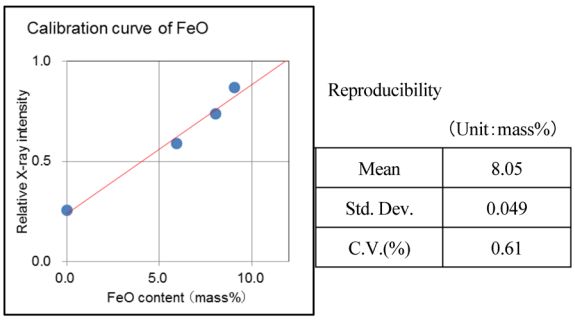

Fig. 5. Quantitative analysis of FeO in sintered ore.

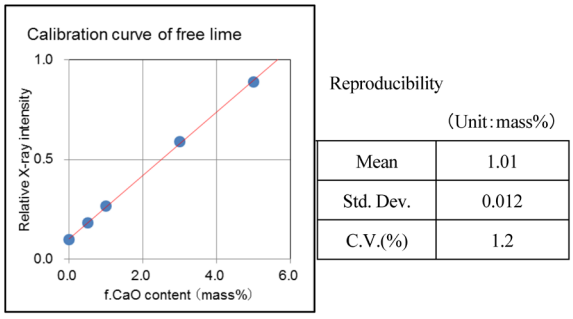

Fig. 6. Quantitative analysis of free lime in cement clinker.