

Press Release

Rigaku Application Note: Cement Raw Meal Analysis by Pressed Powder Method on the ZSX Primus III+

The Woodlands, TX – December 13, 2012. Rigaku Corporation is pleased to announce the publication of a new application report on the Rigaku ZSX Primus III+ wavelength dispersive X-ray fluorescence (WDXRF) spectrometer. Rigaku Application Note XRF 5006 addresses quantitative analysis for cement raw meal by the pressed powder method, including details for sample preparation, method calibration and repeatability.

Cement is one of the most important materials used in construction. Different kinds of hydraulic cements, including Portland cement, have varying physical properties that are produced by changing the mineral composition of clinker. It is, therefore, important to control the chemical composition of cement and interim products. Because of the nature of raw meal and the challenges it presents to chemical analysis, WDXRF has become a prevalent analytical technique in cement plants.

The pressed powder method is the most common sample preparation technique in X-ray fluorescence (XRF) because it does not require an expensive flux, a fusion machine, or highly trained operators. The report demonstrates that cement raw meal samples can be routinely analyzed by the pressed powder method with excellent accuracy and precision on the Rigaku ZSX Primus III+ WDXRF spectrometer.

Measurements were performed on the ZSX Primus III+ with a 3 kW Rh-target X-ray tube. The ZSX Primus III+ is a tube-above sequential WDXRF spectrometer optimized for routine analyses in powder sample analysis. The RX25 multilayer analyzing crystal, included in the standard configuration, has high sensitivity for Mg and Na and is capable of eliminating higher-order lines such as Ca-K α -3rd, which would interfere with Mg-K α .

The tube-above optics, programmable vacuum speed and powder trap of the ZSX Primus III+ enable secure analysis of powder samples and low frequency of maintenance by preventing pressed pellet samples from breaking and falling, and by protecting the vacuum pump and magnetic valves from fine particles scattered from samples.

For this analysis, one of the reference materials used for the calibration was measured consecutively 10 times to demonstrate the performance and short-term stability of the instrument. On the ZSX Primus III+, a sample is evacuated in the pre-evacuation chamber and then transported into the measurement position. During the measurement cycle of one sample, the next sample to be analyzed can be loaded into the pre-evacuation chamber, which reduces the analysis time and prevents contamination of the optical main chamber.

The results show that cement raw meal samples can be routinely analyzed with simple sample preparation and high accuracy and precision on the ZSX Primus III+ by the pressed powder method.

A copy of this application report may be requested on Rigaku's official website at http://www.rigaku.com/products/xrf/appnotes?id=XRF_5006



Rigaku ZSX Primus III+ high power, tube above, sequential WDXRF spectrometer

About Rigaku

Since its inception in Japan in 1951, Rigaku has been at the forefront of analytical and industrial instrumentation technology. Rigaku and its subsidiaries form a global group focused on general-purpose analytical instrumentation and the life sciences. With hundreds of major innovations to their credit, Rigaku companies are world leaders in X-ray spectrometry, diffraction, and optics, as well as small molecule and protein crystallography and semiconductor metrology. Today, Rigaku employs over 1,100 people in the manufacturing and support of its analytical equipment, which is used in more than 70 countries around the world supporting research, development, and quality assurance activities. Throughout the world, Rigaku continuously promotes partnerships, dialog, and innovation within the global scientific and industrial communities.

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