

Rigaku Publishes Analysis Method for Silicate Rock by Fusion

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Rigaku announces a new application for silicate rock analysis featuring the new ZSX Primus IV WDXRF Spectrometer with new guidance system software

May 27, 2016 – Tokyo, Japan. [Rigaku Corporation](#) has published a new application report for silicate rock analysis by wavelength dispersive X-ray fluorescence (WDXRF) spectrometry. Rigaku Application Note *XRF 1068* demonstrates the low dilution fusion method to determine chemical concentrations in silicate rocks using the new [Rigaku ZSX Primus IV](#) WDXRF spectrometer. The report includes details for sample preparation, method calibration and repeatability, and describes an X-ray fluorescence spectrometry (XRF) method applied to silicate rock samples that can produce a wide range of determinations, from major elements to trace elements, with high accuracy.

Geochemical analysis of silicate rocks is essential for modern petrology. Concentrations of major and trace components in igneous rock samples provide information about rock history including eruption, solidification, magma genesis and evolution, source materials and petrographical classification.

X-ray fluorescence spectrometry is a standard analytical method used to determine the chemical composition of major elements in silicate rocks.

The fusion method is commonly used for quantitative analysis of geological samples, eliminating sample heterogeneity caused by various rock-forming minerals.

Conventional fusion methods have been widely used for the determination of major element concentration because dilution by flux significantly reduces sensitivities of trace elements. The pressed powder method is, therefore, applied to trace element analysis. Applying two preparation methods for each sample is inefficient and time consuming. The low dilution fusion method has been developed to improve sensitivity of trace elements, and can help determine the concentrations of both trace elements and major elements more accurately than by a fused bead alone.



***Rigaku ZSX Primus IV Sequential
WDXRF spectrometer with advanced
Guidance system***

The new report describes the low dilution fusion method for determining chemical concentrations for both major and trace elements in silicate rocks. The measurements reflect analysis by a ZSX Primus IV WDXRF spectrometer equipped with a high-performance 4 kW Rh target X-ray tube and an ultra-thin beryllium window. The tube provides unconventional high sensitivity for light element analysis. The spectrometer has a unique optical configuration designed to minimize errors caused by uneven bead surface, and is engineered to provide reliable analysis results and flexibility for a wide range of applications. The ZSX Primus IV system also includes a dedicated analyzing crystal, resulting in a 30% improvement over conventional configurations, as well as new ZSX Guidance software, which includes a quantitative application auto-configuration feature and error prevention function.

The standard samples used for calibration for the method were 14 certified reference materials supplied by the Geological Survey of Japan. The standards were composed of basic to acidic igneous rocks. Calibrations shown in the report show excellent accuracy, and 20 measurements were performed with certified reference material to demonstrate instrumental precision.

The results demonstrate that X-ray fluorescence spectrometry is a rapid, precise and accurate method that meets the requirements of silicate rock analysis. It can also minimize the requirement of analytical skill and save analysis time in sample preparation compared to other spectroscopic methods. An X-ray fluorescence spectrometer with high reliability and stability, such as the ZSX Primus IV analyzer, is shown to be an essential instrument for determining the chemical properties of geological samples in research laboratories and institutes.

A copy of this report may be requested at:

<http://www.rigaku.com/en/products/xrf/primusiv/app1068>

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 1,400 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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