Press Release

Rigaku Application Note: Silicate Rock Analysis by Fusion Method

The Woodlands, TX – January 22, 2013. Rigaku Corporation today announced a new method for silicate rock analysis by wavelength dispersive X-ray fluorescence spectrometry (WDXRF). Application Note XRF 5018 describes silicate rock analysis by the fusion method, highlighting the performance of the Rigaku ZSX Primus II WDXRF spectrometer, and includes details for sample preparation, method calibration and repeatability. The report demonstrates that an X-ray fluorescence spectrometry (XRF) method with a low dilution fusion technique applied to silicate rock samples can make a broad range of determinations, from major elements to trace elements, with high accuracy. The method covers most trace elements required for modern geochemical investigation, as well as rare earth elements.

Geochemical analysis of silicate rocks is an essential part of modern petrology. Concentrations of major and trace components in igneous rock samples provide important information about rock history, such as eruption or solidification, magma evolution and source materials, aiding in petrographic classification. XRF has been used for several decades for silicate rock analysis and is a standard technique for the determination of the chemical composition of major elements in silicate rocks.

Highly accurate rock analysis, however, requires the fusion method to eliminate sample heterogeneity, such as grain size and mineralogical effects. The conventional fusion method has been primarily used for the determination of major elements in silicate rock because dilution by flux significantly reduces sensitivity to trace elements. Because the pressed powder method typically employed for trace element analysis is relatively inefficient and time-consuming, however, a low dilution fusion method was developed. The low dilution fusion bead technique is designed to improve sensitivity for trace elements. This advanced method of determining the chemical composition in silicate rocks by XRF is demonstrated in Application Note XRF 5018.

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. The ZSX Primus II WDXRF spectrometer was used for measurement.

The 4 kW high-power X-ray tube of ZSX Primus II is shown to be advantageous in the determination of trace elements. The report shows that XRF is a rapid, precise and accurate method to meet the requirements of silicate rock analysis. It can also minimize skill and time requirements for sample preparation compared to other spectroscopic analysis methods that use wet chemical techniques. The method is widely applicable for geological applications, such as environmental assessment of soil, resource exploration, and process and quality control in mining.

A copy of this report may be requested at: http://www.rigaku.com/products/xrf/primus2/app5018

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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