

Press Release

Rigaku publishes new method for analysis of iron, calcium and silicon oxides in electric arc furnace slag

Austin, TX—February 12, 2014. Applied Rigaku Technologies, Inc. is pleased to publish a new application report that details the analysis of iron, calcium and silicon oxides in electric arc furnace slag (EAFS) using the [Rigaku NEX QC+](#) energy dispersive X-ray fluorescence (EDXRF) analyzer. The report includes complete information about sample preparation, method calibration and repeatability.

Electric arc furnace (EAF) steelmaking typically uses direct reduced iron or ferrous scrap as feed materials. Lime (calcium) is added to the electric arc furnace to remove silicates and phosphorus. As oxygen is introduced, ferrous materials are melted, while the remaining material is changed to oxide forms. The slag by-product contains relatively constant levels of these oxides with variable amounts of iron, calcium and silicon oxides. Process efficiency is determined by monitoring the ferrous oxide (FeO) levels, while the ratio of calcium oxide (CaO) to silicon dioxide (SiO₂) gives information on the basicity of the slag. The slag is then collected and either refined for steelmaking or sold as an aggregate.

Rigaku EDXRF Application #1343 further demonstrates the capabilities of the NEX QC series of EDXRF analyzers for screening and quality control in the production processes within steelmaking industries. EAFS samples originate as large, hard chunks. Sample preparation, as described in the report, is required to either break the sample or grind it to a powder

As detailed in the published report, eleven assayed standards were used to develop empirical calibrations for FeO, CaO and SiO₂. High and low calibration standards were measured in 10 repeat analyses to demonstrate precision, and the detection limits for each were determined empirically. Analysis was performed using the Rigaku NEX QC+ high-resolution benchtop EDXRF analyzer.

The results of this study indicate that, given stable samples, proper sample handling and proper calibration technique, the Rigaku NEX QC+ EDXRF can achieve excellent results in screening and monitoring the concentration of FeO, CaO and SiO₂ in EAFS and similar matrices. EDXRF can also be used to measure other elements and oxides, such as magnesium oxide (MgO), aluminium oxide (Al₂O₃), chromium sesquioxide (Cr₂O₃), manganous oxide (MnO) and vanadium (V).

A copy of this application report may be requested at
<http://www.rigakuedxrf.com/edxrf/app-notes.html?id=1343> AppNote

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 life sciences and general purpose analytical instrumentation. With hundreds of major innovations to its credit, Rigaku and its subsidiary companies are world leaders in the fields of small molecule and protein crystallography, X-ray spectrometry and diffraction, X-ray optics, as well as semiconductor metrology. Rigaku employs over 1,100 people globally and its products are in use in more than 70 countries – supporting research, development, production control and quality assurance activities. Throughout the world, Rigaku continuously promotes partnerships, dialog, and innovation within the global scientific and industrial community.

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