Press Release

Quantitative Elemental Analysis of Low-Alloy Steel with the Rigaku ZSX Primus III+ WDXRF Spectrometer

The Woodlands, TX – February 14, 2013. Rigaku Corporation is pleased to announce the publication of a new application report describing the analysis of low-alloy steel. Rigaku Application Note # XRF 5009 details the quantitative analysis of elements in low-alloy steels, with complete information regarding sample preparation, method calibration and repeatability.

Rigaku ZSX Primus III+ Tube-above WDXRF spectrometer

Alloy steel is steel that is amalgamated with a variety of elements to improve its mechanical properties. Steels with up to 8% of alloying elements added are called low-alloy steels. Low-alloy steels are typically designed to achieve better hardenability. Their mechanical properties are determined by the concentrations of the different elements added to the steel, some at very low levels.

Because the concentrations of elements in molten steel are adjusted during the process of steel making, usually in electric furnaces, rapid analysis of the elemental composition is essential. As part of the control of the steel making process, analyses of slag and raw materials such as quicklime and ferroalloys are also required. X-ray fluorescence spectrometers are commonly employed tools due to their rapid analysis capabilities and their ability to measure both bulk metal and powders.

The new application note describes low-alloy steel analysis using the Rigaku ZSX Primus III+ wavelength dispersive X-ray fluorescence (WDXRF) spectrometer, which is optimized for process control. It is ideally suited for the steel industry, where both bulk metal and powder samples are analyzed in the process control protocol during the manufacture of alloy steels. The ZSX Primus III+ has tube above optics, where the X-ray tube is placed above the sample, reducing the risk of instrument contamination or damage that could occur should a sample break inside the spectrometer while being measured or transported to the measurement position.

For the analysis detailed in the report, certified standard reference materials of low-alloy steel provided by NIST (National Institute of Standards and Technology) and JSS (Japan Steel Standard) were used to establish the calibration. Measurements were performed using the ZSX Primus III+ with a 3 kW Rh target X-ray tube. The Kα line was measured for all the elements at a counting time of 20 seconds. The representative calibration curves obtained, as well as goodness-of-fit of the calibration curves and results of the repeatability of the test results, are detailed in the report.

The results show that, high precision and accurate analysis of the elements in low-alloy steel can be rapidly performed using the method. The ZSX Primus III+ spectrometer is also capable of analyzing high alloys such as stainless steel and nickel alloy with excellent precision.

A copy of this application report may be requested at: http://www.rigaku.com/products/xrf/primus3/app5009.

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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