Press Release

Sulfur Analysis in Crude Oil and High-Sulfur Fuels by WDXRF According to ASTM D2622-10

The Woodlands, TX – December 4, 2012. Rigaku Corporation has published a new application report demonstrating the capabilities of the Rigaku ZSX Primus, a tube-below sequential wavelength dispersive X-ray fluorescence (WDXRF) spectrometer optimized for routine analysis as performed by today's petroleum laboratories. Rigaku Application Note XRF 5016 demonstrates quantitative analysis of high concentration sulfur in crude oil, high-sulfur diesel fuel and residual fuel oil according to ASTM D2622-10.The report includes complete information about sample preparation, method calibration and repeatability.

Rigaku ZSX Primus wavelength dispersive X-Ray fluorescence spectrometer

Crude oil is a raw material for petroleum products and typically contains sulfur in varying concentrations up to 5 wt%. Sulfur compounds in petroleum can produce various harmful effects including air pollution, metal corrosion and catalyst degradation. Sulfur concentration in crude oil and high-sulfur fuels is therefore monitored or controlled in refinery and production processes within the petroleum industry.

X-ray fluorescence (XRF) spectrometry is an effective tool for quantitative analysis of sulfur in crude oil and high-sulfur fuels including bunker fuel, due in part to its simple sample preparation requirements. In XRF analysis of oils, samples are simply poured into liquid cells; concentration of total sulfur is then obtained without complicated treatments such as digestion or dilution.

As described in the report, measurements were performed on the ZSX Primus II equipped with a 3 kW X-ray tube operating at 30 kV, 80 mA using a germanium (Ge) analyzing crystal and the S4 slit, as included in the standard configuration. Standards comprised of crude oil, "Number 2 diesel fuel" and residual oil were used for calibration. Counting times were 20 seconds for peak and 10 seconds for background. Repeatability tests were carried out using a representative sample for each material.

This application note demonstrates that high concentration sulfur in crude oil and petroleum based fuels can be routinely analyzed with high precision by WDXRF and that the performance of the ZSX Primus meets the requirement of ASTM D2622-10.

A copy of this application report may be requested on Rigaku's official website at
http://www.rigaku.com/products/xrf/primus/app5016

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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