Small Footprint, Wavelength Dispersive XRF Benchtop Powerhouse Produces High Quality ASTM 2622 Compliant Sulphur Analysis

The practice of cost containment in the petroleum industry is an ongoing cycle. The balance between the declining quality of incoming crude oil and the heavily regulated quality of outgoing product makes refining a very cost-conscious operation. The refiner has to have excellent control over the process in order to maximise margin dollars on each barrel of crude processed. Sulphur is removed through a process called hydro-desulphurisation treatment, which adds considerable cost to the refining process. Thus the sulphur content of crude oil determines its price. Sweet crude oil (low sulphur content) can cost as much as one and a half times the price of sour crude oil (high sulphur content) because it is more expensive to refine and is therefore in high demand.

One of the major considerations in the cost control process is how much treatment each barrel of crude oil will need to remove the naturally occurring sulphur to operational levels that will make a product that meets federally mandated standards for sulphur content. Part of the required testing consideration to keep products in specification with the mandated sulphur levels is the overall cost of ownership of testing and measurement equipment for refiners, pipeline operators and product distributors. This cost includes capital expenditure, operating costs and life expectancy.

In designing and manufacturing the new Micro-Z sulphur, Rigaku has built a bottom-up solution to this regulated testing requirement, creating an instrument that meets the needs of the industry for cost-effective performance, ease of maintenance and use, and robustness.

The Micro-Z sulphur is designed to first and foremost meet performance requirements of the industry, so this benchtop wavelength dispersive XRF (WDXRF) analyser has the capability of measuring both the sulphur peak and associated background for every analysis as specified in ASTM 2622-08. The instrument has been designed to take advantage of industry-leading optics, using curved crystals to improve X-ray intensity captured by the sealed proportional detector, allowing unparalleled sensitivity and meeting industry mandated detection limits. The close coupled geometry of the excitation source and sample allows for the use of low-powered X-ray tubes. This excitation system, while still producing high intensity X-ray fluorescence from samples containing sulphur in low concentration levels, has no need for external cooling chillers.

The Micro-Z sulphur is self-contained and requires only external power connection for operation. The reduction of all of the normal peripherals associated with higher powered WDXRF instruments, such as external P-10 and helium gases and water chillers, makes the Micro-Z sulfur a low maintenance analyser with a small footprint, and also reduces the cost of ownership of the analyser to the refiner, pipeline operator or petroleum distributor. The significant cost reduction comes without sacrificing performance, making the Micro-Z sulphur a very attractive addition to any process control or quality assurance program.

The instrument is capable of measuring sulphur content in a diverse range of petroleum products, from ultra low sulphur diesel, with sulphur currently mandated to be less than 15 ppm, to crude oil where sulphur can range up to 5%. Its fixed channel geometry is associated with very precise analysis, so the instrument shows good repeatability for sulphur analysis in a variety of matrices across a wide concentration range of sulphur.

In order to offer a turnkey solution, the Micro-Z sulphur is calibrated using the Rigaku Petro-Pak product to deliver ASTM 2622-08 compliant data in all of the products currently produced in the modern refinery and covered in the scope of applicability of the ASTM standard.

To find out more about this product visit www.rigaku.com/xrf/microz.html and request a brochure or contact us to find out about our Rigaku Total Petro Solutions Initiative seminar series running this summer. The Micro-Z sulphur is currently only available in North America.

AUTHOR: Laura Oelofse,
Product Marketing Manager,
Rigaku Americas Corporation

Reader Reply Card No 72

EDX-GP Energy Dispersive X-ray Fluorescence Spectrometer for RoHS/ELV Screening

The EDX-GP, from **Shimadzu Scientific Instrument's** (USA) EDX series, offers fast, high-sensitivity measurements optimised for RoHS/ELV hazardous element screening with easy, automatic operation for first-time users. The EDX-GP uses the same proprietary semiconductor detector as Shimadzu's EDX-720 to deliver high sensitivity, high resolution and precision measurement of all light to heavy elements. The optical system, special filters and high count-rate circuit deliver ideal performance for RoHS/ELV screening. Optimal filters are automatically selected, and high-speed mode conditions are now installed by default to allow batch measurements of RoHS/ELV hazardous elements using a single filter. Users can complete a single-filter, high-speed analysis in 30 seconds, or a high-sensitivity analysis with a special filter in 300 seconds. With the EDX-GP, operations that previously relied on a user's judgment are now automated, including instrument start-up and calibration, and the selection of analytical conditions. The software also features a measurement time reduction function for high concentrations of hazardous elements and for samples containing no hazardous elements. This eliminates wasted measurements and achieves more efficient analysis.

In contrast to its compact size, the EDX-GP has a large sample chamber to accommodate as is measurements of any sample shape or size. Users can load samples quickly and easily with a semiautomatic chamber door for high throughput with less workload. Other standard functions include pre-measurement instrument check to determine if calibration is necessary; automatic material evaluation to pre-measure sample materials and select analytical conditions; shape correction to eliminate the effect of shape and thickness on results; and thin-film analysis for single and multi-layer samples.

Reader Reply Card No 70

XRF Standardless Analysis Comes to the Benchtop with Omnian and MiniPal 4

PANalytical (Netherlands) has extended the compatibility of its Omnian advanced standardless analysis software to now include the compact benchtop MiniPal 4 X-ray fluorescence (XRF) spectrometer. This combination offers a premium XRF solution that is both easy to use and extremely powerful. It is ideal for routine lab and field analysis, offering quantification of unknowns in situations where certified standards are not available.

Ready for any sample type, Omnian provides elemental analysis of all materials no matter how they have been prepared. Typical applications include rapid screening, comparative analysis and R&D investigations. In the default 'black box' mode, Omnian provides fast answers for industries such as: healthcare, pharmaceutical, food, environmental, oil, minerals and mining. Unlike traditional standardless approaches, Omnian data is both comprehensive and available for detailed review.

Incorporating cutting-edge technology, Omnian achieves superior accuracy, setting the benchmark for standardless analysis. This is achieved through the automatic use of PANalytical's advanced Fundamental Parameters (FP) algorithm which deals with the analytical challenges posed by differing sample types. Other innovations include the support of multiple excitation conditions and the inclusion of several unique features. Fluorescence Volume Geometry (FVG) and Finite Thickness (FT) corrections, for example, improve accuracy when analyzing heavier elements in low density samples or samples with varying thicknesses. In addition, Adaptive Sample Characterisation (ASC) minimizes particle size and mineralogical effects. This results in greater accuracy approaching the quality only achievable with dedicated calibration methods and standards.

Reader Reply Card No 71