
**Supermini200 – the performance of WDXRF in a benchtop instrument**

**Elemental analysis of solids, liquids, powders, alloys and thin films**

As the world's only high-power benchtop sequential wavelength dispersive X-ray fluorescence (WDXRF) spectrometer for elemental analysis of oxygen (O) through uranium (U) of almost any material, the Rigaku Supermini200 uniquely delivers low cost-of-ownership (COO) with high resolution and lower limits-of-detection (LLD). **For more >**

**Micro-Z ULS – Measure ultra-low sulfur (ULS) in petroleum fuels by ASTM D2622-10**

**Wavelength dispersive X-ray fluorescence sulfur (S) analyzer**

Designed for ultra-low level sulfur analysis of diesel, petrol (gasoline) and other fuels, the Rigaku Micro-Z ULS wavelength dispersive X-ray fluorescence (WDXRF) instrument features a novel design that measures both the sulfur peak and the background intensity. The ability to measure and correct for changes in background intensity delivers a better net peak intensity measurement, resulting in superior calibrations and enhanced real world precision.
**For more >**

**Conferences and Workshops**

**Join Rigaku at future meetings**

In late October, Rigaku held an XRF school at its Woodlands, TX, USA facility. Participants enjoyed hands-on training with our talented application staff. A good time was had by all. **For more photos >**

Rigaku will be sponsoring, attending or exhibiting at the following conferences and trade shows:

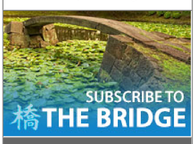
**Materials Research Society**
Boston, MA, USA
November 30 – December 5

**American Geophysical Union**
San Francisco, CA, USA
December 15 – 19

**The University of Tokyo-Rigaku Collaborative Research Center Seminar**
Tokyo, Japan
December 16

**See the complete list >**

**Rigaku's Materials Analysis eNewsletter, The Bridge**




**Join us**

Each month, Rigaku distributes two eNewsletters: *The Bridge*, which focuses on Materials Analysis, and *Crystallography Times*, which concentrates on life sciences.

**Register >**

## Welcome

If you are reading this newsletter, there is a high probability that you are somehow involved in materials analysis. Perhaps synthesizing new materials with interesting properties, exploring and utilizing the composition of our planet or measuring mankind's impact on our surroundings. I thought it would be interesting to look at Google News and see if materials analysis showed up in the top stories. As it turned out, the particular moment I checked the news, the top three articles involved issues that touch materials analysis: the top story concerned an agreement between China and the US to reduce greenhouse gases, the second story concerned the European Space Agency's Rosetta spacecraft successfully landing on a comet, and the third story was about the Keystone pipeline, a politically controversial project in the US that involves building a crude oil pipeline from Canada to Texas.

Each of these stories has a level of interest in the broad field of materials analysis, but I found the story about landing a spacecraft on a comet to be particularly fascinating. **Joel W. Parker**, a planetary scientist at the Southwest Research Institute in Boulder, Colo., described the mission in a **recent interview**: "We have only observed comets from afar. Even the previous spacecraft flybys have been brief and could only study the comet by what they saw remotely. It is like the difference between what you can learn taking pictures from an airplane versus a geologist digging directly into the ground. We will learn about the chemical and physical properties of the surface. We will measure gases as they directly escape from the ground. We will pick up samples from the surface and put them in an oven to bake out and analyze the chemicals. We will learn the 'ground truth' of how the chemicals we measure in the gas around the comet are related to the chemicals in the comet. I should also mention, it will take those samples from *below* the surface, so it will be able to see how the surface differs from deeper layers (up to about 23 centimeters, or a little more than nine inches, below the surface)." It is hard to have more fun than that.

Enjoy the newsletter.

### Thin Film Training Textbook

*High-resolution X-ray Diffraction Method (Part 11)*
*Rigaku Corporation*

This month we finish the chapter on multiple crystal methods with a section that describes an actual monochromator system that embodies the principles of the multiple crystal method. In addition we include a summary of the entire chapter, which covered high-resolution optics for measuring crystals with high perfection, such as Si, Ge, and GaAs. **For more >**

### Featured Rigaku Journal Article

*Evaluation of polymorphic forms by powder X-ray diffraction and thermal analysis methods*
*Y. Namatame and H. Sato, Application Laboratory, Rigaku Corporation*

X-ray powder diffraction (XRPD) and differential thermal scanning calorimetry (DSC) are fundamental techniques for distinguishing polymorphic forms in active pharmaceutical ingredients (APIs). This paper introduces methods for identifying crystal forms in APIs using combined XRPD and DSC, then presents a strategy for examining the polymorphic forms of candidate compounds.
**For more >**

### EDXRF Application Note

*Analysis of Lead in Gasoline*
*Applied Rigaku Technologies*

This Application Note details performance for the measurement of lead (Pb) in gasoline as per ASTM D5059. The results shown in the attached note indicate that the Rigaku NEX QC EDXRF analyzer can be used to satisfy ASTM D5059-14 Part C. Given higher level calibration ranges, parts A and B can also be met.
**For more >**

### WDXRF Application Note

*Analysis of Ultra Low Sulfur in Automotive Fuels According to ASTM D2622-10 by Sulfur Analyzer Micro-Z ULS*
*Rigaku Corporation*

Recent developments in ultra-low sulfur (ULS) fuel have improved fuel efficiency and created cleaner exhaust gases. The permitted sulfur limit in fuel oils has been decreased to 10 ppm in many countries and regions. For compliance verification, X-ray fluorescence (XRF) spectrometry is the definitive analysis tool for use at distribution terminal and refineries, as well as mobile or stationary testing laboratories. In recent years, there has been an increasing need for an instrument that does not require the use of helium gas; for instance, when acquisition or delivery of helium to the analysis site is difficult.

The Micro-Z ULS (ultra-low sulfur) is a newly developed sulfur analyzer, which does not require helium gas in operation. This application note demonstrates that Micro-Z ULS can meet the requirements of ASTM D2622-10. **For more >**

### Lab in the Spotlight

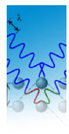
*The R-AXIS RAPID at the Alan Pinkerton Lab in The University of Toledo, OH, USA*

Professor Alan Pinkerton and his group are well known in the highly specialized field of X-ray charge density studies. Charge density studies are a part of small molecule crystallography, but focus on determining the shapes of the electron clouds surrounding the nuclei in a molecule. This work requires very high-resolution data. There are more than twenty groups in the world who are working in this specialized field. In this community, Pinkerton's lab is well known because of their high quality results, results that are generated using a Rigaku R-AXIS RAPID diffractometer. **For more >**

### In Celebration of the UNESCO Year of Crystallography

*IYCr OpenLab at at the Sede Guatiguará de la Universidad Industrial de Santander in Bucaramanga, Colombia*

Rigaku sponsored an IYCr OpenLab at at the Sede Guatiguará de la Universidad Industrial de Santander in Bucaramanga, Colombia at the end of October. Participants learned about crystallography through a series of lectures and hands-on laboratory work. **For more >**



### Material Analysis in the News

*News for November 2014*

Each month we highlight material analysis stories that have been covered in the press. **News for November >**

### Scientific Book Review

*The Innovators: How a Group of Hackers, Geniuses, and Geeks Created the Digital Revolution*
By Walter Isaacson, *Simon and Schuster, New York, 2014, 560 pages, 978-1476708690*

The author starts at the beginning with Charles Babbage and Ada Lovelace nee Byron. While the former conceived of the difference and analytical engines, it was Ada Lovelace who conceived of the idea of a general purpose machine that could be used not just for computation but enhancing all aspects of human existence – in the 1840s. From here the book follows three major trajectories that are deeply intertwined: hardware, software and networking. The hardware path follows the concepts that led to the first general purpose computer, ENIAC, then the developments that made it possible to put a computer in your pocket: development of the transistor by AT&T, the integrated circuit by Fairchild and Texas Instruments and birth of Intel. Individual chips are one thing, but it was Apple who brought the computer home. **For more >**

### Recent Scientific Papers of Interest

*Papers for November 2014*

*Recent Scientific Papers of Interest* is a monthly compilation of material analysis papers appearing in recently released journals and publications. **See papers >**