



JULY 2020, ISSUE 65

WELCOME

Rigaku introduces the new **ZSX Primus IV** WDXRF spectrometer, especially suited for the analysis of liquids, alloys, and plated metals.

Wavelength Dispersive X-ray Fluorescence (WDXRF) analyzers are known for high sensitivity and spectral resolution, offering non-destructive trace elemental analysis for quality control, and are often employed by research institutions for a variety of applications. The **ZSX Primus IV** spectrometer offers a tube-below configuration optimized for the measurement of a variety of sample types including liquids, alloys, and plated metals. The new spectrometer features a number of new key features including **ZSX Guidance** software that guides the user through automated optimized analysis settings.



We know you might be missing us during what is usually a conference-filled summer season. Due to the COVID-19 induced cancellations of the Microscopy & MicroAnalysis, Denver X-ray, and American Crystallographic Association physical conferences this summer, Rigaku will be live webcasting a 3-day Virtual Analytical X-ray Convention from our laboratory facility in Texas. The webcasts will take place Tuesday, August 4 - Thursday, August 6 and will feature live seminars on X-ray techniques and live instrument demonstrations. We hope you can join us for a very informative three days. Register [here](#).

We are also proud to recognize Law Enforcement Agencies through the new Expanding Capabilities Equipment for Law Enforcement (EXCEL) Program. The Rigaku EXCEL program recognizes law enforcement's continuous effort to battle the opioid crisis, and provides them with the next generation equipment for analysis of narcotics and other illegal drugs. As part of the Rigaku EXCEL Program, five different state/local agencies (U.S. based) will be selected to be presented with standard **Rigaku Progeny ResQ FLX** 1064 nm handheld Raman analyzers. The recipients will be announced on October 30, 2020. All other applicants will receive \$5,000 vouchers to be used towards the future purchase of any Rigaku handheld Raman analyzer (off MSRP). Apply [here](#) by October 1.

UPCOMING RIGAKU EVENTS

Rigaku's Virtual Analytical X-ray Convention Online Event August 4&6, 2020	Kaohsiung International Chemtech & Instruments Expo Kaohsiung, Taiwan August 6 & 9, 2020	ACS Fall 2020 Virtual Conference August 17 & 20, 2020
---	---	---

[VIEW MORE](#)

UPCOMING RIGAKU WEBINARS



TOPIQ | Best Operating Practices for XRF Users Including the Importance of Sample Preparation

August 19, 2 PM (CDT)
 Quality Control in industry is imperative, this webinar will highlight the XRF best operating practices that will ensure the daily monitoring and compliance of quality control data. The fundamentals to stable, reproducible analytical results from your XRF spectrometer is not only a stable, working spectrometer, but also a stable, reproducible sample preparation that is appropriate for the material being measured. Choosing an appropriate sample preparation method depends both on the material itself, and on the limitations of the analytical technique with respect to the elements you wish to analyse. During this 1-hour complimentary webinar, specialists from Retsch and Rigaku will present the background to sampling and sample preparation.

[Read More >](#)

[VIEW MORE](#)

FEATURED PRODUCTS



ZSX Primus IV

The tube-below high-performance model enables uncompromised analysis of samples such as liquids, alloys and plated metals. Providing superior performance with the flexibility for analyzing the most complex samples, the **ZSX Primus IV** WDXRF spectrometer features a 30 micron Be tube window, the thinnest standard tube window in the industry, for exceptional light element (low-Z) detection limits.

[Read More >](#)



SmartLab®

Rigaku SmartLab is the newest and most novel high-resolution X-ray diffractometer (XRD) available today. Perhaps its most innovative feature is the new SmartLab Studio II software, which provides the user with intelligent User Guidance expert system functionality that guides the operator through the intricacies of each experiment. It is like having an expert standing by your side.

[Read More >](#)

FEATURED APPLICATION NOTES



WDXRF

Analysis of S, Fe, Ni and V in Residual Oil According to IP610/13

Rigaku Corporation

Residual oil, which contains S, Fe, Ni, V and other elements, is obtained after distilling crude oil. It is used for marine fuel or electric power plant fuel. When residual oil is burned, some elements can cause damage to marine engines and the environment. For example, sulfur is considered the most harmful element causing air pollution, and metals like Ni, V and Fe are regarded as catalyst poisons, blocking a catalyst's performance. XRF is a powerful tool for analyzing these elements in residual oil. Sample preparation is very simple and analysis results are obtained quickly.

[Read More >](#)



TXRF

Analysis of Trace Elements in Wine

Rigaku Corporation

Wine contains small or trace amounts of K, Ca, Fe, Mn, and Cu. Component analysis of wine is important from the viewpoints of dietary intake of minerals and identification to prevent improper locality and brand camouflage. One advantage of the total reflection X-ray fluorescence (TXRF) method compared with ICP or AAS is the simple sample preparation. The TXRF method does not require acid decomposition of specimens to remove organic components and alcohol. In this report, trace elements in wine were analyzed by the TXRF method.

[Read More >](#)



XRD

Crystal Phase Analysis of a Magnetic Thin Film by In-Plane XRD

Rigaku Corporation

As next-generation ultrahigh-density magnetic recording media, granular thin films in which metal microparticles are dispersed have been a focus of attention. Among these films, the regular phase (tetragonal crystal) of FePt has a particularly high magnetic anisotropy as well as good corrosion and oxidation resistance, so it is expected that it will be applied to actual devices. However, the irregular phase (cubic crystal) is created at the same time, depending on the film-forming conditions. For this reason, a technique to distinguish these crystalline phases at the nanoparticle and thin film level is required.

[Read More >](#)



EDXRF

Plating Baths

Applied Rigaku Technologies

Metal parts are often plated to create a decorative surface finish or to ensure desired physical properties such as corrosion and salt resistance, lubricity, protection from wear and abrasion and to improve the hardness of the plated metal. Electroplating and electroless plating are commonly used in almost every industry, from aerospace and electronics to the gas and oil industry and general construction. Monitoring the bath composition is vital in quality control to ensure finished parts are plated to the correct thickness to achieve desired properties without over-coating and wasting chemical materials.

[Read More >](#)

FEATURED VIDEO & USEFUL LINK OF THE MONTH



Rigaku Webinar: X-ray CT for Materials Science, Food and Pharmaceutical Applications

A number of X-ray CT application examples in the food and pharmaceutical industries will be discussed. Examples to include the analyses of cracks and aggregation inside tablets, tablet and drug particle coating thicknesses, air pocket size distributions in food and sugar coating thicknesses of candies.



Materials Research Laboratory at UCSB - X-ray Basics

The site provides a brief introduction to some of the common X-ray diffraction techniques used in materials characterization. It is suitable for people who are novices in this field but are interested in using the techniques in their research.

MATERIALS ANALYSIS IN THE NEWS

June 24, 2020: An international research team led by the Helmholtz-Zentrum Dresden-Rossendorf (HZDR) has now presented a **new, very precise method of evaluating the behavior of mixtures of different elements under high pressure** with the help of X-ray scattering.

June 30, 2020: A team of researchers led by a Johns Hopkins mechanical engineering professor used X-ray measurements and analyses to show that **velocity scaling and dispersion in wave transmission is based on particle arrangements and chains of force between them**, while reduction of wave intensity is caused mainly from particle arrangements alone.

July 3, 2020: Skoltech researchers, together with their industrial colleagues and academic partners, have cracked a 1960s puzzle about the **crystal structure of a superhard tungsten boride** that can be extremely useful in various industrial applications, including drilling technology. The research, supported by Gazpromneft Science & Technology Center, was published in the journal *Advanced Science*.

July 2, 2020: Researchers at South Ural State University have **synthesized ceramic material that is suitable for creating pressure, temperature, electric and magnetic field sensors**. The material is more environmentally friendly compared to its analogues and belongs to the class of multiferroics. The experiments made it possible to study the features of changes in the crystal structure and physical properties of such materials in phase transitions.

July 13, 2020: Researchers at the National Renewable Energy Laboratory (NREL) have conducted the first global assessment into the **most promising approaches to end-of-life management for solar photovoltaic (PV) modules**.

July 14, 2020: Researchers say they've cracked the code to a **cobalt-free high-energy lithium battery**, eliminating the cobalt and opening the door to reducing the costs of producing batteries while boosting performance.

July 15, 2020: Research led by the University of Michigan suggests that a **new spin on the magnetic: compression of plasmas could improve materials science, nuclear fusion research, X-ray generation and laboratory astrophysics**. The study shows that a **spring-shaped magnetic field reduces the amount of plasma that slips out between the magnetic field lines**.

July 15, 2020: In a new report, Vladislav Kamysbayev, and a team of scientists in chemistry, physics and nanoscale materials at the James Franck Institute, the University of Chicago and the Argonne National Laboratory in the U.S. **introduced a general strategy to synthesize MXenes**. Surface functional groups in two-dimensional (2D) transition-metal carbides can undergo versatile chemical transformations to facilitate a broad class of MXene materials.

July 15, 2020: The European Synchrotron Radiation Facility (ESRF) last week announced the **reopening of their completely rebuilt X-ray source**. The ring-shaped machine, 844 meters around, generates X-ray beams 100 times brighter than its predecessor and 10 trillion times brighter than medical X-rays.

July 16, 2020: A new study from the University of Missouri demonstrates that a **durable coating - made from titanium dioxide - is capable of eliminating foodborne germs, such as salmonella and E. coli**, and provides a preventative layer of protection against future cross-contamination on stainless steel food-contact surfaces.

July 16, 2020: Researchers at the Okanagan Polymer Engineering Research and Applications (OPERA) Lab have developed a **coating that repels nearly all substances off a surface**. Acting like an invisible force field, a new liquid coating being developed by UBC Okanagan researchers may provide an extra layer of protection for front-line workers.

July 16, 2020: By representing the structures of molecules as graphs, scientists built a **machine-learning model that can rapidly predict how atoms absorb X-rays** a process that is key to understanding the structural and electronic properties of materials and molecules.

July 17, 2020: The IAEA is launching a new Coordinated Research Project (CRP) to advance our understanding of **radiation effects on polymer materials commonly used in medical devices** by comparing the effects of gamma, e-beam and X-ray irradiation.

July 17, 2020: New discoveries about the nanostructure of insects, such as the eye of a mosquito, could help engineer enhanced water repellent coatings. Researchers have theorized a **coating that mimics the unique nanostructure could improve virus repellent face masks**.

[Subscribe to Rigaku newsletters!](#)

