



FEBRUARY 2024, ISSUE 126

WELCOME

Even with an extra day this year, February has come and gone in the blink of an eye. It seems like only a few days ago that a furry marmot was telling us there would be an early spring. (Fun fact: They don't use groundhogs to predict the end of winter everywhere. In Barrington, Nova Scotia, for example, Lucy the Lobster is the creature looking for its shadow and, yes, she saw it this year.)

One thing is sure: with the arrival of March, we are definitely entering convention season, as evidenced by the list of events Rigaku will be attending in the coming days. We're just back from Pittcon, where the newest member of our EDXRF product line was announced: the NEX CG II+, about which you can read more below.

Artificial Intelligence continues to be a major topic in just about every facet of our lives. The new Sora project features some impressive videos generated from only text prompts. Who knows where AI will appear next? The news articles below indicate that the possibilities appear to be endless.

Rest assured, though, that a human being wrote this introduction without the assistance of any AI. Which leads me to wonder: do we need a retronym to describe non-artificial intelligence?

UPCOMING EVENTS

APS 2024

March 3, 2024 - March 8, 2024 Minneapolis, MN
[Website](#)

European Workshop on Phosphorus Chemistry
 March 4, 2024 - March 6, 2024 Würzburg, Germany
[Website](#)

Deutsche Kristallzüchtungstagung 2024
 March 6, 2024 - March 8, 2024 Erlangen, Germany
[Website](#)

Chemiedozententagung
 March 11, 2024 - March 13, 2024 Aachen, Germany
[Website](#)

International Battery Seminar 2024
 March 12, 2024 - March 15, 2024 Orlando, FL
[Website](#)

Häko
 March 14, 2024 - March 16, 2024 Stuttgart, Germany
[Website](#)

ACS Spring 2024
 March 17, 2024 - March 21, 2024 New Orleans, LA
[Website](#)

XTOP
 March 17, 2024 - March 22, 2024 Carry Le Rouet, France
[Website](#)

87. Jahrestagung der DPG und DPG-Frühjahrstagung der Sektion Kondensierte Materie
 March 17, 2024 - March 22, 2024 Berlin, Germany
[Website](#)

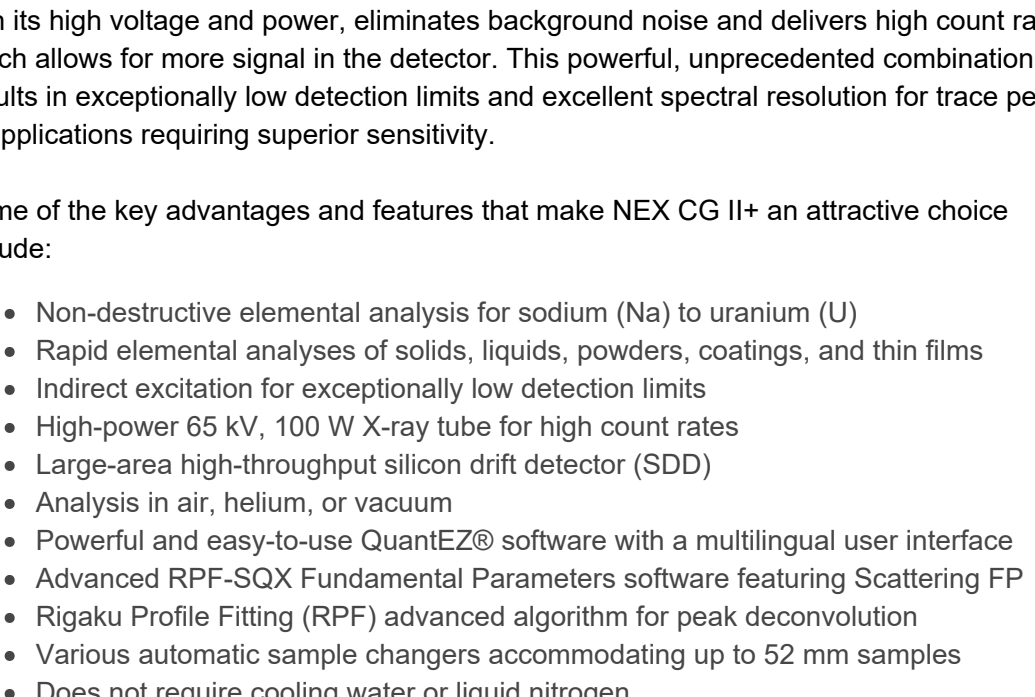
32nd Annual Meeting of the German Crystallographic Society (DGK)
 March 18, 2024 - March 21, 2024 Bayreuth, Germany
[Website](#)

TOPIQ | High-Pressure Crystallography on the Rigaku XtaLAB Synergy-S Diffractometer

March 22, 2024 Webinar
[Register](#)

BCA Spring Meeting
 March 25, 2024 - March 28, 2024 Leeds, United Kingdom
[Website](#)

PRODUCT IN THE SPOTLIGHT



NEX CG II+

Rigaku's Most Powerful EDXRF Benchtop Spectrometer

Applied Rigaku Technologies announces the release of NEX CG II+, its most powerful benchtop energy dispersive X-ray fluorescence (EDXRF) spectrometer. This next-generation, high-end spectrometer performs non-destructive analysis of sodium to uranium in a variety of sample types. It offers users fast, reliable measuring and monitoring for ultra-low and trace element concentrations up to high weight percent levels.

NEX CG II+ is based on Rigaku's NEX CG II instrument. It offers users all the same features and options, including the advantages of using Cartesian Geometry and secondary targets for trace-level sensitivity. The key difference between the models is that NEX CG II+ features a 65 kV 100 W X-ray tube, giving users a higher-powered system for more demanding applications that require increased sensitivity. As a result, the added power makes NEX CG II+ well-suited for trace element analysis for pharmaceutical materials, catalysts, cosmetics, monitoring for toxic metals in aerosols on air filters, as well as analyzing trace heavy metals and rare earth elements (REE), and other applications requiring a high degree of sensitivity.

This new NEX CG II+ offering is Rigaku's most powerful indirect excitation EDXRF system yet. It reinvents XRF with its high-power 65 kV 100 W X-ray tube, five secondary targets covering the complete elemental range sodium through uranium, and a large-area, high-throughput silicon drift detector (SDD). Like the NEX CG II model, NEX CG II+ features a unique close-coupled Cartesian Geometry optical kernel. This 3D configuration, combined with its high voltage and power, eliminates background noise and delivers high count rates, which allows for more signal in the detector. This powerful, unprecedented combination results in exceptionally low detection limits and excellent spectral resolution for trace peaks in applications requiring superior sensitivity.

Some of the key advantages and features that make NEX CG II+ an attractive choice include:

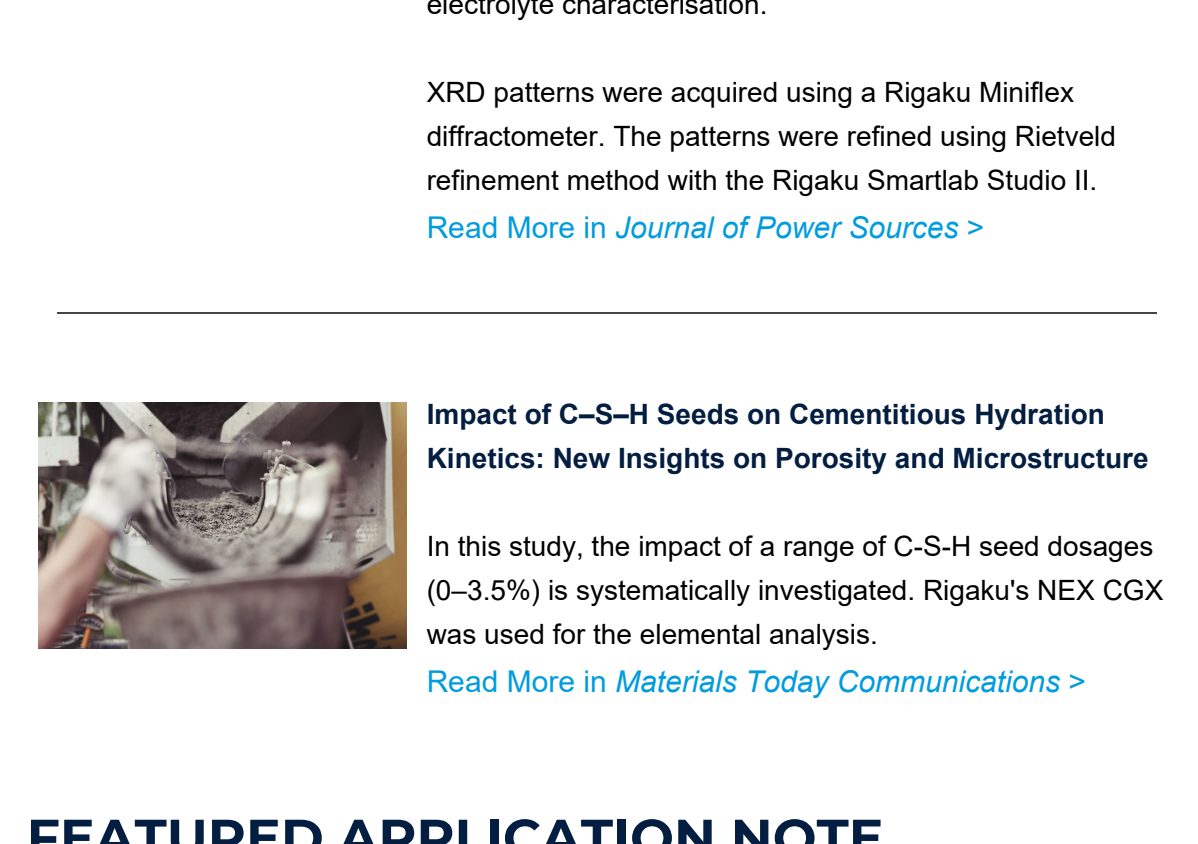
- Non-destructive elemental analysis for sodium (Na) to uranium (U)
- Rapid elemental analyses of solids, liquids, powders, coatings, and thin films
- Indirect excitation for exceptionally low detection limits
- High-power 65 kV, 100 W X-ray tube for high count rates
- Large-area high-throughput silicon drift detector (SDD)
- Analysis in air, helium, or vacuum
- Powerful and easy-to-use QuantEZ® software with a multilingual user interface
- Advanced RPF-SQX Fundamental Parameters software featuring Scattering FP
- Rigaku Profile Fitting (RPF) advanced algorithm for peak deconvolution
- Various automatic sample changers accommodating up to 52 mm samples
- Does not require cooling water or liquid nitrogen
- Small footprint, freeing up valuable lab space

[Read more >](#)

VIDEO IN THE SPOTLIGHT

NEX CG II+

Rigaku's Most Powerful EDXRF Benchtop Spectrometer



Rigaku EDXRF NEX CG II Series for Ultralow and Trace Element Analyses

NEX CG II Series elemental analyzers provide excellent analytical sensitivity. They are powerful second-generation benchtop energy dispersive X-ray fluorescence (EDXRF) spectrometers for non-destructive elemental analysis of sodium to uranium in almost any matrix. They transform XRF technology with their unique close-coupled Cartesian Geometry optical kernel, making them ideal for measuring ultralow and trace element concentrations up to high weight percent levels. Applications include testing agricultural soils and plant materials, analyzing finished animal feeds, measuring waste oils, environmental monitoring, pharmaceuticals, cosmetics, analyzing trace heavy metals and rare earth elements, etc.

[Watch Now >](#)

IN THE NEWS

January 16, 2024: Researchers from Microsoft and Pacific Northwest National Laboratory narrowed a list of **32 million candidates for new battery materials to 23 promising options** (five of which were already known) using artificial intelligence and supercomputers...in just 80 hours. They then synthesized one of the materials and tested it to create a working battery prototype, a discovery that could reduce lithium use in batteries.

February 8, 2024: Researchers at the National Institute for Materials Science (NIMS) and the University of Tsukuba in Japan are using generative AI to help **design cellular materials that have specific characteristics, including porosity, stiffness and elasticity**. One possible application of this research is the design of novel bone implant materials.

February 13, 2024: A team from three universities and NIST are working on a platform to generate **new optimized superalloys to be used in a wide range of applications**, including the electronics and energy fields. The system, called DRAGONS (Data-driven Recursive AI-powered Generator of Optimized Nanostructured Superalloys), will be used to examine how material microstructures are affected by the manufacturing process.

February 14, 2024: Researchers from the U.S. Department of Energy's (DOE) Argonne National Laboratory are using generative AI to dream up **environmentally friendly metal-organic framework materials for use in carbon capture**, a technique used to reduce greenhouse gas emissions from industrial facilities. The team assembled over 100,000 new MOF candidates in half an hour and then ran molecular dynamics simulations to determine which of these were the most promising.

February 27, 2024: Researchers at North Carolina State University created a new tool that uses AI and other automated systems to **examine catalytic reactions used in research and manufacturing**. The goal is to improve the yield and selectivity of catalysts to improve the outcome of specific chemical reactions. The system continuously runs reactions and analyzes the results with no human intervention, monitoring the effect of changing experimental variables.

RIGAKU APPLIED



Porosity Characterization of Solid-state Battery Electrolyte with Terahertz Time-domain Spectroscopy

This paper is a demonstration of the sensitivity of terahertz time-domain spectroscopy (THz-TDS) combined with effective medium theory to quantify the porosity or density of sodium superionic conductor (NaSICON)-based solid-state electrolyte (SSEs) pellets prepared at densities in the range of 2.2–2.9 g cm⁻³, corresponding to 50–90 % relative densities sintered at 900–1150 °C. The results of which, have been validated against complementary Archimedes analysis and mercury porosimetry highlighting the potential of THz-TDS for rapid, contactless, non-destructive electrolyte characterisation.

XRD patterns were acquired using a Rigaku Miniflex diffractometer. The patterns were refined using Rietveld refinement method with the Rigaku Smartlab Studio II.

[Read More in Journal of Power Sources >](#)



Impact of C–S–H Seeds on Cementitious Hydration Kinetics: New Insights on Porosity and Microstructure

In this study, the impact of a range of C-S-H seed dosages (0–3.5%) is systematically investigated. Rigaku's NEX CGX was used for the elemental analysis.

[Read More in Materials Today Communications >](#)

FEATURED APPLICATION NOTE



EDXRF

Analysis of Rare Earth Elements in Clay

Applied Rigaku Technologies

Mining for Rare Earth Elements (REEs) is spread globally. The REEs are typically dispersed rather than concentrated in rare earth ores. However, various groups of REEs can be profitably mined and extracted from minerals such as bastnäsite, monazite, loparite, and lateritic clays, as well as several other mineral and rock formations. XRF is ideal for analyzing REEs in mining, throughout processing and extraction, as well as in the final uses or products and recycling. In this application note, the analysis of lateritic clay rich in the rare earth elements La, Ce, Pr, Nd, and Y is demonstrated. Also shown is a demonstration of analyzing an expanded REE group in the more concentrated forms during processing and extraction.

[Read More >](#)

WEBINAR

TOPIQ | High-pressure Crystallography on the Rigaku XtaLAB Synergy-S Diffractometer

In this Webinar, the process of conducting a high-pressure crystallographic experiment on the XtaLAB Synergy-S will be explained and software features in CrysAlis^{Pro} relevant to the technique will be covered. High-pressure crystallography provides a tool for researchers to effect changes in the structure of matter and ultimately understand the phenomena such changes can induce.

Date/time
 Mar 22, 2024 03:00 PM London

[Register >](#)

Free Grant Assistance for Illicit Narcotics Interdiction Technology

Rigaku Analytical Devices launched its new **narcotics identification grant assistance program** in partnership with Lexipol's PoliceGrantsHelp.com. Rigaku's new service is designed to provide law enforcement departments and agencies that qualify for Rigaku devices, but may not have the funding, with the resources required to successfully identify and apply for federal, state, corporate, and private grants to purchase these critical tools.

[Find Out More >](#)

PODCASTS

The Opioid Matrix is a podcast for anyone looking for the latest information in the illegal drug supply chain—beginning to end. Each episode will feature a discussion with industry experts about the current opioid crisis, including drug trafficking, drug manufacturing, drug identification, drug addiction, as well as the role of government, law enforcement, new health and social programs, and more.

[Listen to New Episodes >](#)

The Battery Lab is a podcast empowering the researchers powering the future. Every episode features insights from the industry experts, leading academics and cutting-edge research advancing batteries — and society — to the next level of safety and efficiency. From raw materials to analysis to state-of-the-art designs, if you care about fueling the future, you've come to the right place. Welcome to the Battery Lab!

[Listen to New Episodes >](#)

Subscribe to Rigaku newsletters!

© 2024 – Rigaku Corporation and its Global Subsidiaries. All Rights Reserved.

9009 New Trails Drive, The Woodlands, TX 77381, United States