



# 橋 THE BRIDGE

## MATERIALS ANALYSIS eNEWSLETTER

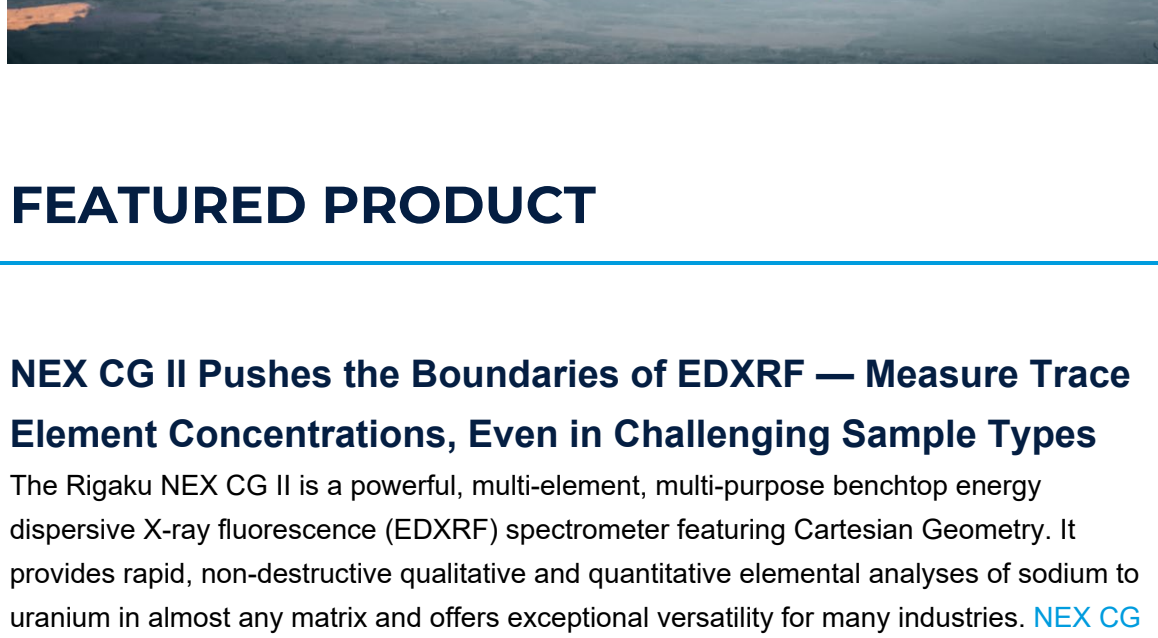
April 2023, ISSUE 117

## WELCOME

The first week of May is Golden Week (ゴールデンウィーク) in Japan. It's an interesting concept—a series of unrelated holidays all occur back-to-back, creating a week-long vacation stretch. Japan also apparently has a rule that any day between two other holidays automatically becomes a holiday, too. Golden Week is a popular travel time, and a number of festivals and sporting events take place, too.

In April, Rigaku celebrated the opening of a new facility in Silicon Valley, our first Semiconductor Metrology Technology Center, which will house several metrology tools that can be used for demonstrations, applications and training. The technologies developed and provided by the Rigaku Semiconductor Metrology Division include TXRF, WDXRF, Hybrid EDXRF/Optical techniques and HR-XRD/XRR.

Rigaku continues to celebrate the fiftieth anniversary of the first MiniFlex benchtop XRD instrument. A number of MiniFlex users have submitted photographs showing the instrument in operation in their labs, as well as videos discussing how the MiniFlex has benefitted their research and analytical requirements. Visit [rigaku.com/miniflex50](http://rigaku.com/miniflex50) to learn more. Perhaps you'll be inspired to make a video to contribute to the site!



HAPPY GOLDEN WEEK  
To all our celebrating customers and friends in Japan

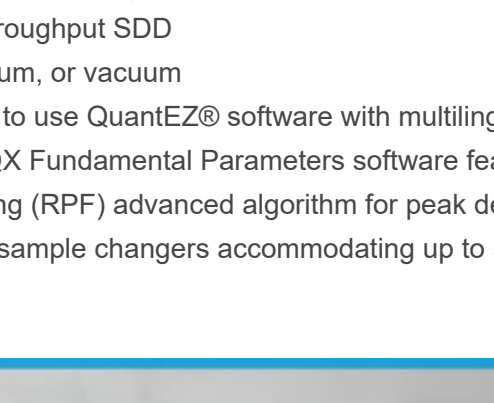
## FEATURED PRODUCT

### NEX CG II Pushes the Boundaries of EDXRF — Measure Trace Element Concentrations, Even in Challenging Sample Types

The Rigaku NEX CG II is a powerful, multi-element, multi-purpose benchtop energy dispersive X-ray fluorescence (EDXRF) spectrometer featuring Cartesian Geometry. It provides rapid, non-destructive qualitative and quantitative elemental analyses of sodium to uranium in almost any matrix and offers exceptional versatility for many industries. NEX CG II is well-suited for trace element analysis for environmental monitoring, industrial waste applications, recycled materials, electronic components, pharmaceutical materials, cosmetics, and many others.

What makes NEX CG II unique is its advanced three-dimensional (3D) Cartesian Geometry optical kernel, pushing the boundaries of EDXRF. Unlike conventional EDXRF spectrometers, NEX CG II is an indirect excitation system using secondary targets rather than tube filters. Monochromatic and polarized excitation from secondary targets in full 90° Cartesian Geometry eliminates background noise and delivers exceptionally low detection limits. This configuration, combined with a high-performance large-area SDD, offers users superior analytical capabilities for elements in highly scattering matrices like water, hydrocarbons, and biological materials.

NEX CG II excels in complex applications with trace elements and variable-base matrices, such as testing agricultural soils and plant materials, analyzing finished animal feeds, measuring waste oils, and more. Read this month's Featured EDXRF Application Note, demonstrating the analysis of air filters using NEX CG II.



#### NEX CG II Key Advantages and Features:

- 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 50 kV, 50 W X-ray tube
- Large-area high-throughput SDD
- Analysis in air, helium, or vacuum
- Powerful and easy to use QuantEZ® software with 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



*Applied Rigaku Technologies engineers, manufactures, and distributes Rigaku EDXRF products worldwide. Many industries and organizations use Rigaku EDXRF instruments to solve their analytical needs. For more information, watch our NEX CG II video and read our recent 5-star review.*

## UPCOMING EVENTS

**Advanced Semiconductor Manufacturing Conference**  
Saratoga Springs, NY  
May 1-4, 2023

**Ceramics Expo 2023**  
Novi, MI  
May 1-3, 2023

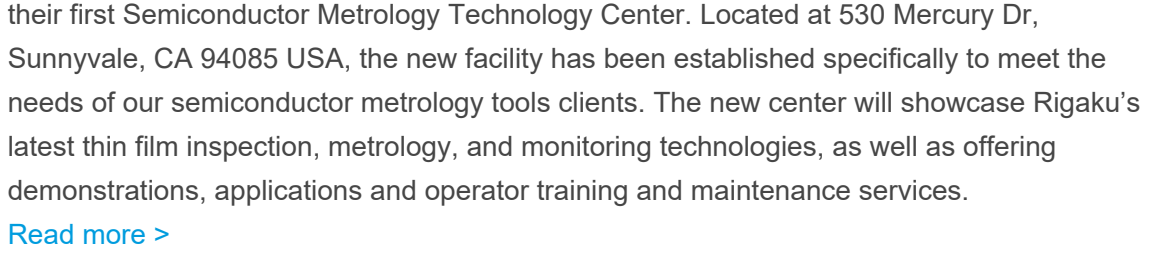
**E-MRS Spring Meeting & Exhibit 2023**  
Strasbourg, France  
May 29 - June 2, 2023

## RIGAKU NEWS

### Rigaku Expands Chemical Threat Analysis With New, Targeted Capabilities

**March 30, 2023** – Rigaku Analytical Devices is pleased to announce the launch of the **CQL Gen-ID handheld 1064 nm Raman analyzer** for the chemical analysis of common threats. The CQL Gen-ID analyzer has the ability to identify unknown solids, liquids, powders, pastes, or gels—through translucent packaging. The CQL Gen-ID contains a comprehensive library of narcotics, explosives, household chemicals, precursors, and more for use by customs agencies, as well as crime and clandestine laboratories.

[Read more >](#)

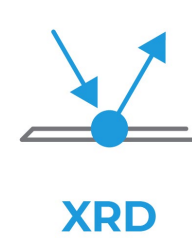


### Rigaku Opens Their First Semiconductor Metrology Technology Center In Silicon Valley

**April 12, 2023** – Rigaku, the leading provider of X-ray metrology solutions for semiconductor in-line processes, research and development, and high-volume manufacturing, has opened their first Semiconductor Metrology Technology Center. Located at 530 Mercury Dr, Sunnyvale, CA 94085 USA, the new facility has been established specifically to meet the needs of our semiconductor metrology tools clients. The new center will showcase Rigaku's latest thin film inspection, metrology, and monitoring technologies, as well as offering demonstrations, applications and operator training and maintenance services.

[Read more >](#)

## FEATURED APPLICATION NOTES



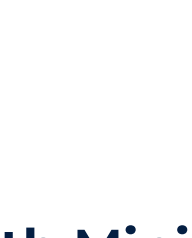
EDXRF

### Analysis of Air Filters: U.S. EPA Sensitivity

*Applied Rigaku Technologies*

In the 1970s, the United States created the Clean Air Act, setting standards to regulate emission of pollutants that "endanger public health and welfare" with oversight by the U.S. Environmental Protection Agency (EPA). In the late 1990s, the EPA issued method IO-3.3 detailing the sensitivity required by EDXRF analyzers for measuring the elemental composition of air filters. To meet these testing requirements, Rigaku offers NEX CG II, a 50 W indirect excitation EDXRF system using secondary targets and polarization in full 90° Cartesian Geometry for superior sensitivity and analysis of elemental particulate matter on air filters.

[Read More >](#)



XRD

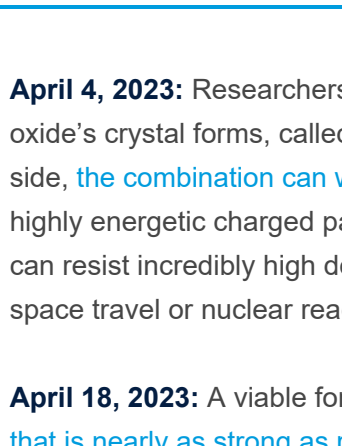
### How to Evaluate Solid Pharmaceutical Drugs (2) – Confirming the Presence/Absence of Amorphous Substance –

*Rigaku Corporation*

Solid pharmaceutical drugs are subject to processing such as grinding, drying, and tableting during manufacturing (formulation), which may lead to polymorphic transition and amorphization. Because amorphous components have physical properties different from crystalline components, confirming the presence/absence of amorphous substances and crystallinity is important in the production of solid pharmaceutical drugs. We introduce a method for determining the presence/absence of an amorphous substance by differential scanning calorimetry (DSC) and powder X-ray diffraction (XRD). In addition, we also introduce the crystallinity calculation method by the multiple peaks decomposition method for powder X-ray diffraction measurement.

[Read More >](#)

## 50th MiniFlex ANNIVERSARY



Since its introduction, the **MiniFlex** has consistently evolved and continually sets the standard with new innovations, despite the imitators that have come along over the years. This is a testament to the dedication of Rigaku's R&D team and their response to customer feedback and commitment to innovation.

[Visit the MiniFlex Anniversary page >](#)

## IN THE NEWS

**April 4, 2023:** Researchers at the University of Oslo have found that when two of gallium oxide's crystal forms, called the beta and gamma phases, exist in the same material side by side, **the combination can withstand extremely high doses of heavy ion radiation**, which are highly energetic charged particles typically ejected from stars as cosmic rays. A crystal that can resist incredibly high doses of radiation could be used to build durable electronics for space travel or nuclear reactors.

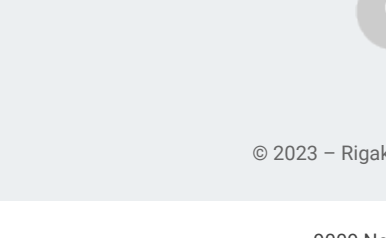
**April 18, 2023:** A viable formula for **a carbon-negative, environmentally friendly concrete that is nearly as strong as regular concrete** has been developed. In a proof-of-concept work, researchers infused regular cement with environmentally friendly biochar, a type of charcoal made from organic waste, that had been developed beforehand with concrete wastewater. The biochar was able to suck up to 23% of its weight in carbon dioxide from the air while still reaching a strength comparable to ordinary cement. The research could significantly reduce carbon emissions of the concrete industry.

**April 24, 2023:** Researchers at Binghamton University partnered with the Center for Functional Nanomaterials (CFN) to get a better look at how **peroxides on the surface of copper oxide promote the oxidation of hydrogen** but inhibit the oxidation of carbon monoxide, allowing them to steer oxidation reactions. The results have been published in the *Proceedings of the National Academy of Sciences*.

**April 24, 2023:** In a new study, North Carolina State University researchers **made a cathode, or the positive end of a battery, in the shape of a thread-like fiber**. The researchers were then able to use the fiber to create a zinc-ion battery prototype that could power a wristwatch.

**April 24, 2023:** Physicists from the University of Groningen have fabricated **an organic solar cell with an efficiency of over 17 percent**, which is in the top range for this type of material. It has the advantage of using an unusual device structure that is produced using a scalable technique. The design involves a conductive layer of tin oxide grown by atomic layer deposition.

## 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 >](#)



**Understanding Semiconductors: Modern Metrology from Lab to Fab**, is a podcast for engineering leaders in characterization, metrology, process, and analytics, looking for discussion around semiconductor metrology challenges. Each episode will feature a conversation with technology experts about problems facing the semiconductor metrology industry.

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