NOVEMBER 2022, ISSUE 113

WELCOME

We launched The Bridge nearly a decade ago in a far different world. Pre-Zoom, pre-COVID, pre-many things! In the first issue, released in July 2013, we introduced the newsletter this way:

Thank you for joining us for the first issue of The Bridge, Rigaku's eNewsletter focused on materials analysis through the use of X-ray diffraction and X-ray fluorescence. A bridge is often used to symbolize a connection or link between two places, and thus we felt The Bridge would be the perfect name for our new eNewsletter, as we hope that it will act as a vehicle for the transmission of ideas and information between Rigaku and interested readers around the world. And a bridge is a two-way structure, a concept that we will keep in mind as we not only provide information about Rigaku, but also report on interesting research and the associated laboratories around the world, publish technical book reviews that might help our readers in their work, and highlight general news topics that are of interest to many people involved in materials analysis.

As we speed toward the end of another year, we would like you to let us know how we're doing. Are there topics you'd like to hear more about? Or, conversely, less about? What parts of the newsletter do you like the most and which parts do you tend to ignore? Send a message to media@rigaku.com to let us know your thoughts about the future of The Bridge.

On November 28, Rigaku relocated its Tokyo office, Rigaku's sales base, to a new location near Shinjuku Station, the largest train station in Japan. The new headquarters will be called Tokyo X-Point (TXP or Tokyo Cross Point). The opening ceremony for TXP will be held on December 6, the anniversary of Rigaku's founding. We look forward to meeting employees, customers, suppliers and others in these new surroundings.

IN THE NEWS

November 29, 2022: The world's first sheet of graphene was created in 2004 out of graphite. It is a proven supermaterial, but manufacturing the versatile form of carbon at usable scales remains a challenge. One problem is that the molecular forces holding graphene sheets together in graphite are very strong, and it's hard to pull sheets apart.

November 29, 2022: Researchers have found an innovative way to rapidly remove hazardous microplastics from water using magnets.

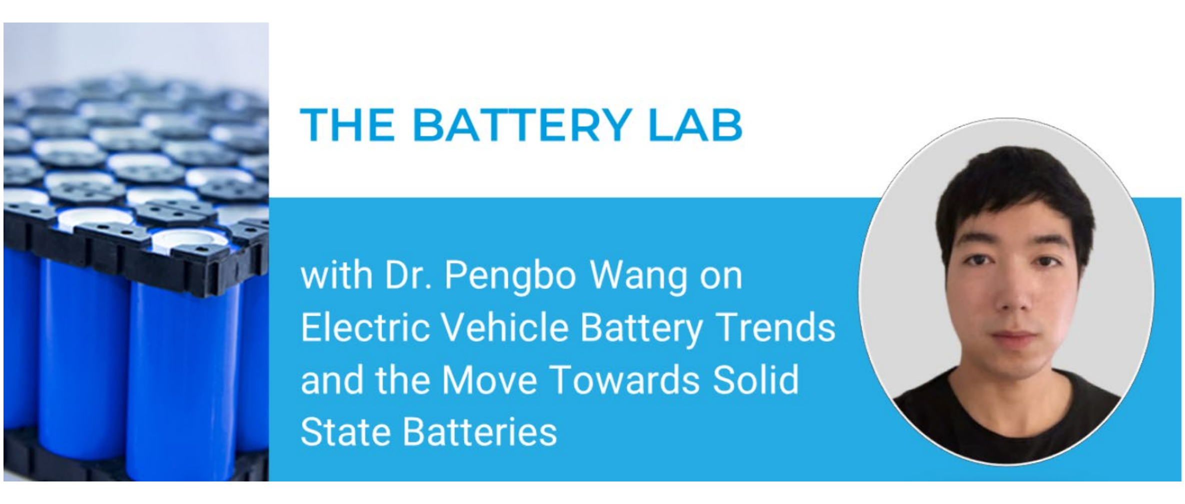
November 29, 2022: Using quantum computing combined with machine learning, scientists were able to design transparent radiative coolers (TRCs), coatings for windows that could help cool the room, use no energy and preserve the view.

November 30, 2022: The impact experiment conducted on the asteroid Ryugu by the Japanese Hayabusa2 mission, which took place two years ago, resulted in an unexpectedly large crater. With the use of simulations, a team has recently succeeded in gaining new insights from the experiment regarding the formation and development of asteroids.

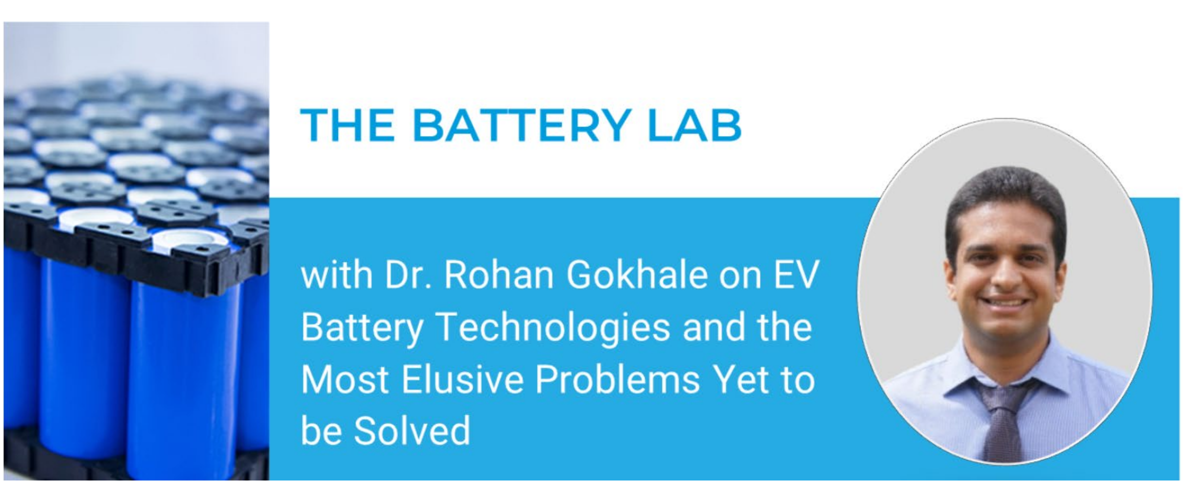
November 30, 2022: A research group in China has developed a bromine-assisted-MnO_2-based hybrid single flow battery that exhibits advantages of high energy density and reversibility.

NEW BATTERY LAB PODCAST

The Battery Lab is a podcast empowering the researchers powering the future. Every episode features insights from 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.



Podcast #1: Dr. Pengbo Wang – Wildcat Discovery Technologies
"Electric Vehicle Battery Trends, Characterization, and the Move Towards Solid-State Batteries"
Listen to Podcast >



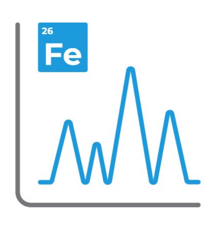
Podcast #2: Dr. Rohan Gokhale - Umicore
"EV Battery Technologies, Manufacturing Methods, and the Most Elusive Problems Yet to be Solved"
Listen to Podcast >

FEATURED ARTICLE

Determination of Atomic-Scale Density of Materials from Total Scattering Profiles
by Masatsugu Yoshimoto and Kazuhiko Omote

Atomic-scale density (microscopic density) for non-crystalline materials is sometimes hard to obtain when the sample contains microscopic grains and/or pores. This is also the case for crystalline materials that contain atomic scale defects. We propose a method for the determination of the microscopic density of an amorphous sample from total scattering data. Theoretically, the microscopic density can be calculated from the slope of the pair distribution function $G(r)$ in the short-distance region from zero to the nearest neighbor. However, the observed $G(r)$ in this region is greatly affected by unphysical modulation of the experimental scattering data and the derived structure factor $S(Q)$. As a result, the estimated microscopic density has a large uncertainty. The proposed method removes the unphysical modulation of $S(Q)$ and obtains a $G(r)$ that satisfies theoretical conditions only using the coherent scattering intensity and the first neighbor distance. We have applied the present method to SiO_2 glass, crystalline Ni powders, and a set of data from germinate glasses whose densities have been reported. The results of the present method are consistent with the reported values within ±5%.
Read more>

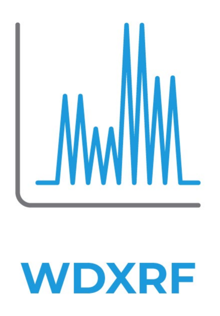
FEATURED APPLICATION NOTES



EDXRF

RoHS PE by Empirical Method
Applied Rigaku Technologies

The Restriction on Hazardous Substances (RoHS) initiative limits the allowable amounts of the toxic elements chromium, mercury, lead, bromine, and cadmium in plastics and consumer goods. EDXRF is an accepted analysis technique for the rapid screening by XRF and quantification of the hazardous element according to RoHS norms. To meet the industry needs, Rigaku offers the NEX DE VS analyzer with automatic collimators and a camera for sample positioning and sample image, giving QA/QC technicians the means for fast and simple screening and analysis of materials that must conform to RoHS and similar directives.
Read More >

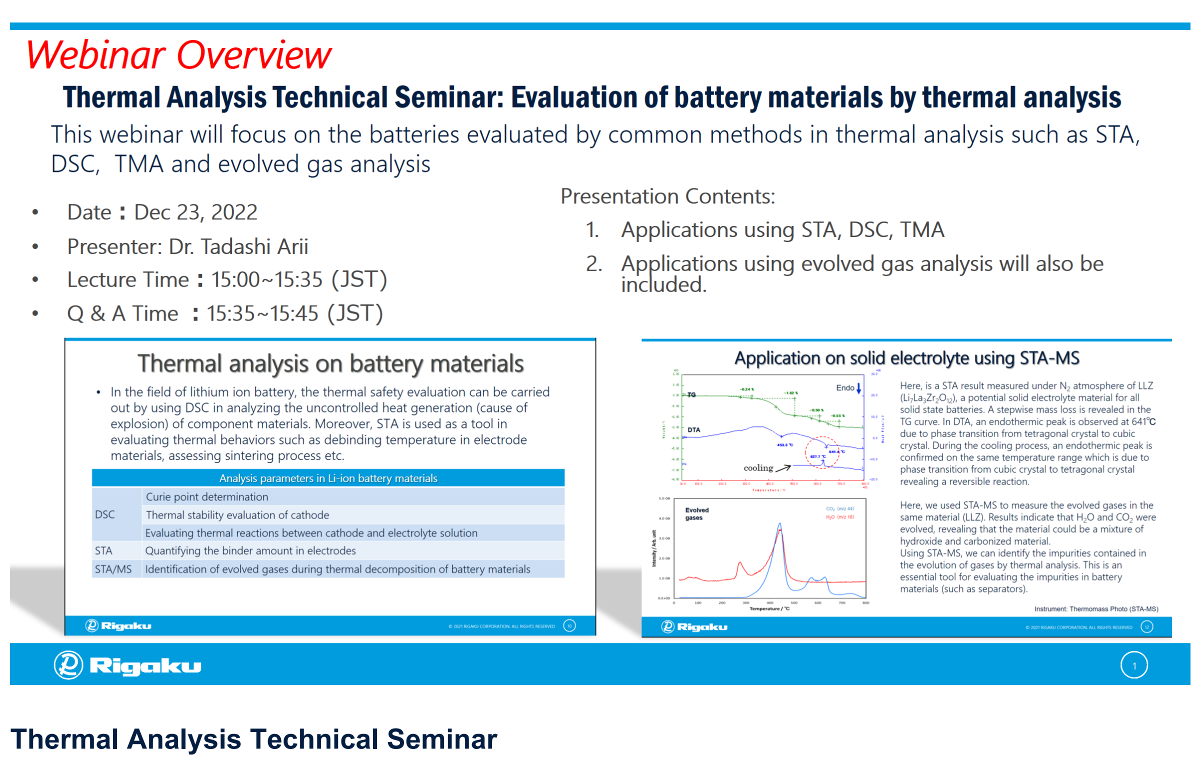


WDXRF

Analysis of Hazardous Heavy Elements in Soil and Sediment Using ZSX Primus IV
Rigaku Corporation

For analysis of hazardous heavy elements in soil and sediment, X-ray fluorescence (XRF) spectrometery is used because of its simple sample preparation and short analysis time This application note demonstrates that a unique matrix correction, where the scatter ratio correction and the theoretical alpha correction are combined, can be applied to XRF analysis of heavy elements, including hazardous ones, in soil and sediment.
Read More >

WEBINARS



Thermal Analysis Technical Seminar

Evaluation of Battery Materials by Thermal Analysis

This webinar will focus on the batteries evaluated by common methods in thermal analysis such as STA, DSC, TMA and evolved gas analysis.

Date/time
Friday, December 23, 2022 - 00:00 CST
Register >

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