Rigaku Virtual Analytical X-ray Convention

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 8/4 – Thursday 8/6 and will feature live seminars on X-ray techniques and live instrument demonstrations. Register here.

Rigaku TOPIQ Webinars

Rigaku has developed a series of short, 20-30 minute training webinars that cover a broad range of topics in the fields of X-ray diffraction, X-ray fluorescence, and X-ray imaging. You can register here and also watch recordings if you can’t attend the live session.

Crystallography in the News

June 17, 2020: Researchers in Italy and Spain have synthesized a MOF that behaves like a hydrolase and provides the ability to determine the absolute structure of the products.

June 19, 2020: Researchers in China have developed two inhibitors of the SARS-CoV-2 main protease using structure-based drug design methods.
Rigaku Reagents: Wizard Cubic LCP Kit

The Wizard: Cubic LCP Kit™ contains all tools, formulations, and lipid to prepare micro-crystallization experiments according to the LCP micro method.

The tools in the Wizard Cubic LCP (lipidic cubic phase) Kit enable researchers to prepare LCP-type crystallizations by hand. Ideal for low-protein experiments: effective protein volume for a single crystallization experiment is about 80 nanoliters. Wizard Cubic LCP Kit tools work especially well when traditional methods have failed to yield crystals. Lipidic cubic phase has worked well for the crystallization of 7TM membrane proteins (proteins with seven transmembrane helices). Four out of six GPCRs (G-protein coupled receptors), an important membrane protein class, and several microbial 7TM proteins have been crystallized using the LCP approach.

June 24, 2020: Scientists at Argonne and Oak Ridge National Laboratories have determined the structure of the 3CL main protease of SARS-CoV-2 at room temperature in order to understand better how to inhibit this important viral protein.

Product in the Spotlight
Rigaku Oxford Diffraction
XtalCheck-S

The XtalCheck-S is a highly versatile and user-friendly goniometer-mountable x,y,z stage for serial screening of various types of solid samples in 96-well SBS format crystallization plates. Primarily designed for in-situ screening of protein crystals in their crystallization environment, the XtalCheck-S may also be used to quickly screen micropowder samples. Once the powder samples have each been secured in a dedicated well, crystallographers will use the data collection program, CrysAlis®pro, the exact same way they would for single crystals: features such as point-and-click object selection and centering, screening of multiple objects in multiple wells one by one or queuing of a multitude of candidates for subsequent screening without user intervention operate identically regardless of the type of sample.

At Rigaku, an experiment has successfully been performed whereby powder samples were set in dedicated wells that had been previously treated with a very small amount of PARATONE® oil, to prevent powders from falling off when the plate was mounted vertically in front of the beam. The powder grains remained still and stable in the wells, allowing all the time needed for screening multiple grains even with longer exposure times. Importantly, thanks
Survey of the Month

What best describes your face mask usage?

Take the Survey

Last Issue’s Survey Results

Which do you think is the most annoying thing to happen during a Zoom meeting?

Lab in the Spotlight

The Ke Functional Materials Group

Chenfeng Ke
Assistant Professor of Chemistry
Dartmouth College

The Ke group focuses on syntheses and applications of polymeric materials for storage/separation and 3D printing applications. The research scheme overlaps organic synthesis, crystal engineering, polymer synthesis, materials characterization, and 3D printing, with an emphasis on the design of polymeric materials that are non-covalently assembled.

Chenfeng Ke has been awarded the 2020 Cram Lehn Pedersen Prize in Supramolecular Chemistry.

The prize, awarded annually by the International Symposium on Macro cyclic and Supramolecular Chemistry (ISMSC), recognizes significant, original, and independent work by an early-career researcher in the area of supramolecular chemistry.

Ke Functional Materials Group focuses on developing smart materials for 3D and 4D printing applications, elastic crystalline...
porous organic materials for energy and environmental related applications, and carbohydrate receptors for biological applications.

The Cram Lehn Pedersen Prize is named in honor of Donald Cram, Jean-Marie Lehn, and Charles Pedersen, winners of the 1987 Nobel Prize in chemistry for establishing the supramolecular chemistry research field.

Dr. Ke and his group having a farewell party for a colleague

Useful Links

Crystal Growing Tips and Methods for Small Molecules

X-Ray Crystallography Facility
Department of Chemistry
University of Pennsylvania
Brian C. Manor, Patrick J. Carroll

New approach for solving protein structures from tiny crystals

New technique from DOE/Brookhaven National Laboratory opens door for studies of countless hard-to-crystallize proteins involved in health and disease.

To handle the tiny crystals, the team developed sample grids patterned with micro-sized wells. After pouring solvent containing the microcrystals over these well-mount grids, the scientists removed the solvent and froze the crystals that were trapped on the grids.
Book Review

Capital and Ideology

By Thomas Piketty, translated by Arthur Goldhammer

Don’t let the fact that Capital and Ideology is 1104 pages scare you. After all, it is shorter than War and Peace. This book is a sequel to Capital in the Twenty-First Century (2013) (C21). The earlier tome received considerable press because it discussed rather unpleasant facts about capital in modern society and paths societies might take to rectify growing inequality. Like C21, Capital and Ideology (C&I) provides thought-provoking solutions to the problem of inequality. People are much more focused on the CoViD-19 pandemic, so this book hasn’t received the attention of the earlier volume.

C&I surveys the social, economic, intellectual, and political history of inequality regimes with a primary focus on European societies, but also explores societies in Africa, Asia, and the Americas. The hypothesis of C&I is that the drive for equality is what drives society, rather than the more conventional concept of “life, liberty, and the pursuit of happiness.” Piketty acknowledges the utter failure of Communism but suggests that Capitalism is not ideal either, and proposes Participatory Socialism as a means to alleviate inequality and ultimately prevent inversion of society. The elements of this society are described in chapter 17 and includes concepts like fair taxation (think Adam Smith here), recirculation of capital, and a universal basic inheritance.

C&I is divided into four major parts: Inequality Regimes in History, Slave and Colonial Societies, The Great Transformation of the Twentieth Century, and Rethinking the Dimensions of Political Conflict. An Introduction and Conclusion bracket the four main sections. The book is well-referenced and indexed, and includes a Glossary, Contents in Detail, and listing of Tables and Illustrations.

Joe Ferrara