

## New Products

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## New Products

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*In order to supplement manufacturers' information, this Department will welcome the submission by our readers of brief communications reporting measurements on the physical properties of materials which supersede earlier data or suggest new research applications.*

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### NEW INSTRUMENTS AND COMPONENTS

#### Lock-in amplifier-based amplitude and frequency modulation and demodulation

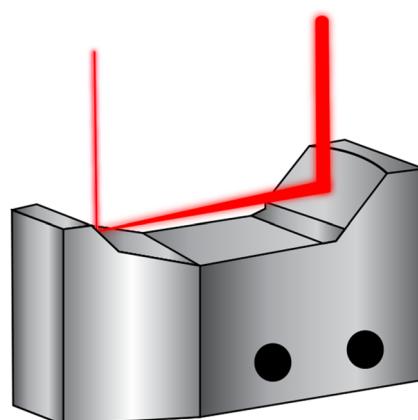
A new option allows all Zurich Instruments lock-in amplifiers to be equipped with amplitude modulation (AM) and frequency modulation (FM) capabilities. The AM/FM option enables coherent generation and detection of signals with multiple frequency components. In contrast to conventional methods in which two cascaded lock-ins are used for tandem demodulation, Zurich Instruments lock-in amplifiers can perform single-stage demodulation using the multiple demodulators available in each instrument. According to the company, that capability overcomes the bandwidth limitation of cascaded demodulation filters and leads to more accurate results. The graphical LabOne user interface facilitates signal generation and acquisition and allows simple adjustment of each component parameter. The integrated toolset—with a scope, sweeper, spectrum analyzer, signal generator, spectrogram, plotter, and more—reduces experiment complexity. The AM/FM option can be used in various applications in which amplitude/frequency modulation and demodulation can improve the signal-to-noise ratio. Those applications include microelectromechanical systems, fluorescence spectroscopy, and Kelvin probe force microscopy. *Zurich Instruments AG, Technoparkstrasse 1, 8005 Zürich, Switzerland. (+41 44 515 0410) <https://www.zhinst.com>*



#### Monolithic reflective-beam expanders

Edmund Optics has made available its Techspec monolithic reflective-beam expanders (Mark I) for applications that require broadband or achromatic beam expansion. They have an all-reflective design and provide  $\lambda/10$  wavefront error for precision broadband performance for ultraviolet (UV), visible, and infrared (IR) applications from 250 nm

to 10  $\mu\text{m}$ . Their monolithic form ensures minimal wavefront distortion and high stability, independent of temperature changes. Various design elements, including reflective flats and thread and through holes, allow for easy alignment, mounting, and integration into any laser application. The beam expanders are available in 2 $\times$ , 3 $\times$ , and 5 $\times$  magnifications with a choice of enhanced aluminum, bare gold, and protected aluminum coatings. They are compatible with a wide variety of light sources, including UV lasers such as excimer and frequency-tripled neodymium-doped yttrium aluminum garnet (Nd:YAG); IR lasers such as 1064-nm Nd:YAG, carbon dioxide, and quantum cascade; ultrafast lasers such as titanium:sapphire and fiber; and tunable lasers such as Ti:sapphire and quantum cascade. The beam expanders are manufactured from an aluminum 6060-T6 substrate and provide a 4-mm entrance aperture. They are Restriction of Hazardous Substances-compliant. *Edmund Optics, Inc., 101 East Gloucester Pike, Barrington, New Jersey 08007-1380. (800-363-1992 or 856-547-3488) <https://www.edmundoptics.com>*



#### Fast pulse generator and synchronizer

Berkeley Nucleonics offers its model 765 fast rise time pulse generator for use in a wide range of applications that require rapid, accurate pulse edges. According to the company, it is the first analog edge converter that can reach <70 ps rising and falling edges (20%–80%) at 5 V at 50  $\Omega$  with a fully adjustable output voltage. The model 765's novel hardware architecture can generate advanced pulse sequences, such as double pulse or quad pulse, with independent timing parameters. The pulse generator features two or four adjustable channels with

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a maximum 500-MHz repetition rate; pulse width from 300 ps to >1 s with 10 ps resolution; continuous, single, burst, gated, and external trigger modes; a 7-in. touch-screen display; and an intuitive user interface. From trigger to output, the jitter is <35 ps root mean square. *Berkeley Nucleonics Corporation, 2955 Kerner Boulevard, San Rafael, California 94901. (415-453-9955, ext. 250) <https://www.berkeleynucleonics.com>*



## Atomic resolution microscope (ARM) for materials research

JEOL has added the Monochromated ARM200F to its atomic resolution transmission electron microscope family. It is designed for researchers developing new materials and offers ultrahigh-energy-resolution electron energy-loss spectroscopy (EELS) analysis of materials at the atomic scale. This capability is made possible by the development of a spot-in-spot-out double Wien filter monochromator. The filter maintains the spot size of the electron beam and the lattice resolution in scanning transmission electron microscopy by producing an achromatic and stigmatic focus at the exit plane, resulting in a round probe on the specimen plane. According to the company, the Monochromated ARM has superior low-kV performance and an effective design for accurate EELS analysis. It produces a true, round monochromatic beam and atomic resolution at any energy resolution. The ARM can achieve sub-30-meV energy resolution at 200 kV and <15 meV while operating at 30 kV. This energy resolution has the potential to open up research in areas such as phononics, plasmonics, and studies of chemical bonding. *JEOL USA, 11 Dearborn Road, Peabody, Massachusetts 01930. (978-536-2309) <https://www.jeolusa.com>*



## NEW DETECTORS, MEASUREMENTS, AND MATERIALS

### Multi-gas flow meter

Aalborg Instruments' intelligent digital DPM precision multi-parameter gas flow meter is designed to measure mass flow rates, pressure, and the temperature of clean noncorrosive process gases. The unit offers user-defined mixture functionality; up to 20 custom gas mixes with up to five different gases each can be created and stored. It allows for onsite selection of 30 different local gases via the optional organic light-emitting diode/joystick interface or remotely via the RS-232/RS-485 or optional Modbus remote terminal unit interface. The DPM has a flow accuracy (including linearity)  $\pm [0.5\% \text{ reading} + 0.2\% \text{ full scale (FS)}]$  at calibration temperature and pressure; a 200:1 turndown ratio; a 10-ms response time; two programmable mass flow rate totalizers; and free, easy-to-use configuration and calibration software. The maximum measurable flow range is 133% FS. *Aalborg Instruments, 20 Corporate Drive, Orangeburg, New York 10962. (800-866-3837 or 845-770-3000) <https://www.aalborg.com>*



### Cryogenic impedance bridge and temperature controller

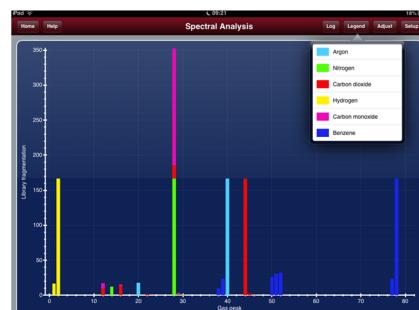
The model 54 cryogenic impedance bridge from Cryogenic Control Systems has four input channels, each of which can measure resistance,

inductance, and mutual inductance. It can be expanded to 28 inputs by connecting up to three Cryo-con temperature monitors to the Ethernet remote interface. The model 54 operates from <100 mK to >1200 K with an appropriate supported sensor, which includes diode, resistance, and mutual inductance. Four control-loop outputs allow the device to be used as a high-accuracy temperature controller. A proprietary signal processing chip in each of the four input channels measures impedance by means of an auto-balancing ratiometric AC bridge. The high-precision sophisticated digital algorithms built into the advanced signal processor replace large amounts of analog circuitry. The model 54 features two dry-contact 10-A relay outputs; a large color display with a touch screen, a full keypad, and a user-programmable web browser-based editor and debugger. *Cryogenic Control Systems, Inc., 17279 La Brisa, Rancho Santa Fe, California 92067. (858-756-3900) <http://www.cryocon.com>*



### App for mass spectrometry

The overlap evaluator iPad app from Hiden Analytical is a reference tool for users of mass spectrometers operating in the fields of vacuum science and vacuum processing and for advanced researchers using real-time gas analysis systems. The evaluator enables users to create a mass spectral overview of multiple fragmentation spectra. They can identify the mass peaks with the least spectral interference and therefore most suited to species monitoring. A quick mass peak look-up table from a library of common gas and vapor species is included. Based on Hiden's QGA quantitative gas analysis system software, the MS overlap evaluator allows up to 16 gas and vapor species of interest to be added to an analysis "setup." It then automatically provides a simulated analysis and displays the unique mass peaks together with any spectral overlaps. A spectral viewer provides a histogram display of the simulated spectrum of the selected analysis. The concentration levels for each component in the simulation mix can be adjusted to provide a representative simulated mass spectrum of users' selected gas and vapor mixtures. The MS spectral overlap evaluator can be downloaded for free from the Apple app store. *Hiden Analytical, Inc., 37699 Schoolcraft*



Road, Livonia, Michigan 48150. (888-964-4336 or 734-542-6666) <http://www.hideninc.com>

## Automated x-ray diffraction system

Rigaku has released the latest version of SmartLab, its intelligent multipurpose x-ray diffraction system. It couples two of the company's instruments: the PhotonMax high-flux, 9-kW, rotating anode x-ray source and the HyPix-3000 high-energy-resolution two-dimensional (2D) multidimensional semiconductor detector, which supports 0D, 1D, and 2D measurement modes. The configuration lets users manage all applications with a single detector. The HyPix-3000 detector can be used to obtain 2D powder diffraction patterns, which can be processed to deliver reliable qualitative and quantitative analysis by using all the 2D pattern information. The system incorporates a high-resolution 0/0 closed-loop goniometer drive system with an available in-plane diffraction arm. The system's Cross Beam Optics family features fully automated switchable reflection and transmission optics. SmartLab accepts powders, films, and textile samples and allows mapping measurements within a sample. Real-time *in situ* measurements can be performed using Rigaku's new SmartLab Studio II software suite. The system features robust security and validation protocols to ensure that any technology component—software or hardware—fulfills its purpose within regulatory guidelines, including 21 CFR Part 11. *Rigaku Americas Corporation, 9009 New Trails Drive, The Woodlands, Texas 77381-5209. (281-362-2300) <https://www.rigaku.com>*



## Wavelength dispersive x-ray fluorescence (WDXRF) system for elemental analysis

Bruker has closed the gap between the floor-standing WDXRF and benchtop energy-dispersive XRF instruments in its XRF instrument range by launching a benchtop WDXRF spectrometer, the S6

Jaguar. Due to its compact WDXRF goniometer, closely coupled x-ray optics, and 400-W excitation power, the S6 Jaguar delivers high sensitivity and a 50% reduction in measurement times. According to the company, it outperforms other compact WDXRF instruments. Based on the company's solid-state HighSense XE detector with a linear range of  $2 \times 10^6$  counts/s, the S6 Jaguar offers excellent accuracy and precision for quality control (QC). The compact WDXRF goniometer combined with the HighSense detector enhances sensitivity and spectral resolution and provides flexibility for academic and industrial materials research. With up to four sample masks for different sample sizes, up to four analyzer crystals, and two detectors, the S6 Jaguar enables fast multielement analysis for the concentration range from ppm to 100%. Spectra.Elements, the new S6 Jaguar software, provides quick setup of applications, enhanced evaluation, and comprehensive reporting. The standardless Smart-Quant WD quantification software delivers accurate results based on powerful fundamental parameter algorithms, even for unknown samples. Bruker's multilingual Touch-Control interface and EasyLoader sample handling ensure intuitive fail-safe operation. The S6 Jaguar's pre-calibrated application packages and minimal installation requirements, using standard electrical outlets and not needing compressed air, make it a "plug & analyze" tool. It is suitable for a broad range of applications in academic and government research laboratories and industrial research and QC. *Bruker Corporation, 40 Manning Road, Billerica, Massachusetts 01821. (978-663-3660) <https://www.bruker.com>*



## Ionization-assisting substrates

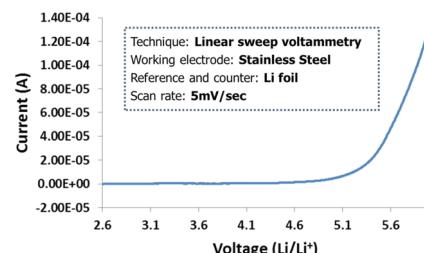
A new ionization-assisting substrate series from Hamamatsu Photonics, called DIUTHAME for desorption ionization using through-hole alumina membrane, uses porous alumina to significantly reduce the pretreatment time needed to ionize samples or analytes for analysis by imaging mass spectrometry (MS). Users need to only place the DIUTHAME substrate on the sample



to complete pretreatment in about one-tenth of the time required in matrix-assisted laser desorption/ionization, or MALDI, which is a mainstream ionization technique for MS. DIUTHAME can also be employed for measurements with existing MALDI time-of-flight (TOF) mass spectrometers. The substrates are suitable for use by university and company researchers currently using MALDI-TOF-MS in drug discovery and industry. *Hamamatsu Corporation, 360 Foothill Road, Bridgewater, New Jersey 08807. (908-231-0960) <http://www.hamamatsu.com>*

## Polymer–ceramic composite solid electrolyte

NEI has introduced its solid electrolyte, Nanomyte SE-50, a polymer-ceramic composite material for use in solid-state lithium batteries. It has high ionic conductivity, is compatible with 5-V cathode materials, and provides a very low resistance in the cell. NEI claims that the material is unique among solid electrolytes currently on the market. Nanomyte SE-50 is compatible with lithium metal and offers excellent electrochemical stability and a very low interfacial resistance. Available as a solid or a solution, it exhibits a thermal stability up to 150 °C and outputs up to 5.2 V and is stable at room temperature. *NEI Corporation, 400 Apgar Drive, Unit E, Somerset, New Jersey 08873. (732-868-3141) <https://www.neicorporation.com>*



## BIOINSTRUMENTATION AND BIOTECHNOLOGIES

### Light sheet microscope for cleared tissue

The ct-dSPIM is an easy-to-use single plane illumination microscopy (SPIM) configuration made from Applied Scientific Instruments (ASI)'s flexible modular microscope components. It allows dual views of large samples of cleared tissue. When it is employed with ASI and Special Optics' new objective optimized for light sheet imaging of cleared tissue, imaging depth can exceed 5 mm into flat samples. The objective accommodates media refractive index from 1.33 to 1.56 (aqueous or organic media). The ct-dSPIM has successfully imaged various cleared tissue samples from microtome-cut slices to whole mouse brains. Unlike other light sheet techniques, the SPIM concept uses two objectives, oriented 45° from vertical, at right angles to one another above a horizontally mounted sample in an open dish. A light sheet is created from one objective and imaged through the other. A stack

of images can be collected by moving the light sheet through the sample. In the case of the ct-dSPIM, the sample is normally moved through a stationary light sheet using an XY stage. As a dual-view system, the roles of the objectives can then be reversed to collect another stack from a different perspective. Computationally merging the two stacks yields a 3D dataset with  $\sim 2\times$  improvement in axial resolution. *Applied Scientific Instrumentation*, 29391 West End Road, Eugene, Oregon 97402. (800-706-2284 or 541-461-8181) <http://www.asiimaging.com>



## UV-visible spectrophotometer

The UV-1900 UV-vis spectrophotometer from Shimadzu has an ultrafast scan function with a data acquisition rate of 29 000 nm/min. It takes about 3 s to measure in the visible region. The spectrophotometer has a photometric repeatability accuracy of 0.0002 absorbance (Abs) maximum (0.5 Abs and 1.0 Abs), an improvement of five times the conventional performance levels, according to the company. This high photometric repeatability accuracy suppresses variance in measurement results and enables more accurate quantitation and detection of low-concentration samples. With a photometric range of  $-4$  to 4 Abs and stray light significantly reduced at 0.5% maximum (198 nm), accurate and fast measurements of highly absorbing samples are easily achieved. The UV-1900 incorporates the company's Low-Ray-Ligh diffraction grating technology, which ensures low stray light, high resolution and sensitivity, and a large linearity range, so the instrument can perform high-accuracy quantitative analysis and detect low-concentration components. The UV-1900 features a large easy-to-use color touch panel that can be controlled with a finger or the stylus pen provided. All functions are directly reachable with large icons that are easy to understand, and operation is intuitive. Shimadzu's LabSolutions UV-vis control software has been released simultaneously with the UV-1900. The software provides integrated data management with other analysis instruments and contributes to data pass/fail judgments via its spectral evaluation functions. Measurement modes include photometric, spectrum, quantitation, kinetics, time course, and biomethod. The UV-1900 is compatible with various regulations and guidelines including FDA 21 CFR Part 11. It is



suitable for analysis in life sciences, chemistry, foods, pharmaceuticals, and electronics applications. *Shimadzu Scientific Instruments, Inc.*, 7102 Riverwood Drive, Columbia, Maryland 21046. (410-381-1227) <https://www.ssi.shimadzu.com>

## NEW FACILITIES AND HARDWARE

### Thermocouple data logger

CAS DataLoggers has announced its WF-TC WiFi-enabled thermocouple data logger from Accsense VersaLog. The eight-channel battery-powered wireless device measures and monitors temperature from thermocouple sensors. The current logger records eight external current sources and saves data onto its 8-MB memory. The 16-bit analog-to-digital converter makes the logger suitable for science and laboratory applications in which precise, accurate measurements are critical. For unattended data collection in "stand-alone" mode, the rugged aluminum enclosure ensures reliable performance even in harsh environments. For remote monitoring applications, the logger's embedded WiFi module allows wireless data monitoring and downloading. If powered in a WiFi-covered area, it can be accessed from a personal computer for configuration, data download, graph viewing, and more. The data logger features E, N, J, K, and T thermocouple types; user-set input ranges; a 10-yr battery life; and universal serial bus and WiFi interfaces. Sampling intervals from 1 s to 12 h can be selected. Accsense VersaLog Siteview software is required and sold separately (limit one license per site, which can be used with multiple data loggers). The software offers a user-friendly graphic interface, full functionality that suits both new and advanced users, and the versatility of custom equation

and custom-line equation to handle complicated measurement requirements. *CAS DataLoggers*, 8437 Mayfield Road, Unit 104, Chesterland, Ohio 44026. (800-956-4437 or 440-729-2570) <https://www.dataloggerinc.com>

## NEW LITERATURE AND SOFTWARE

### Raman spectral database software

WITec now offers its TrueMatch software component for accessing and creating Raman spectral databases. According to the company, the software can make it easier for users to interpret their Raman images and can simplify the process of searching through Raman spectral databases. The software can search existing libraries of Raman spectra to identify sample components and lets users create their own catalog of acquired spectra. TrueMatch is available as a fully integrated option with the WITec Project FIVE software environment, and databases can be brought directly into use in post-processing. Multispectral searches enable users to identify several spectra simultaneously and to return hit rates that show the probability of a match for each individual spectrum. This accelerates the process of characterization and complements WITec's standard data analysis features. Demix search uses databases to describe acquired spectra in terms of pure substances, which can then be physically located in an image. Seeing the distribution of pure chemical components matched to sample features gives the researcher a precise visualization. Generated reports can be stored for further use in subsequent measurements. In addition to the proprietary WITec Raman database capability included with TrueMatch, compatible versions of ST Japan's wide range of databases are available. Extensive libraries of Raman spectra can be referenced, while new ones are created, all from within WITec's fully integrated software and hardware environment. *WITec Instruments Corp.*, 130G Market Place Boulevard, Knoxville, Tennessee 37922. (865-984-4445) <http://www.witec-instruments.com>

