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new products

Focus on spectroscopy

The descriptions of the new products listed in this section are based on information supplied to us by the manufacturers. PHYSICS TODAY can assume no responsibility for their accuracy. For more information about a particular product, visit the website at the end of the product description.

Andreas Mandelis

Miniature CCD spectrometer

According to B&W Tek, its new Exemplar is the first miniature spectrometer with an embedded processor to allow for onboard data processing, including averaging, smoothing, and automatic dark subtraction. The Exemplar also offers high speed: USB 3.0 communication provides data transfer of 900 spectra/s. Multichannel capabilities deliver



a trigger delay of 14 nanoseconds and a gate jitter of ± 1 ns. The ability to control the CCD exposure time to within one microsecond allows users control over the spectra signal-to-noise ratio. With the ability to support up to 16 channels at once, the Exemplar can perform simultaneous multichannel analysis, such as multipoint sampling, and laser-induced breakdown spectroscopy. The Exemplar is suitable for most UV, visible, and near-IR applications with spectral configurations from 200 to 1050 nm and resolutions between 0.5 and 4.0 nm. B&W Tek Inc, 19 Shea Way, Newark, DE 19713, <http://www.bwtek.com>

Time-of-flight mass spectrometer

UltrafleXtreme is Bruker's enhanced matrix-assisted laser desorption/ionization tandem time-of-flight (MALDI TOF/TOF) mass spectrometry system. With increased analytical power and new functionality, it extends the applications of MALDI TOF/TOF beyond the conventional concepts of what is possible in molecular histology, glycoprotein, and biopharmaceuticals analysis. The system incorporates the Bruker patented Smartbeam laser, with up to a 2-kHz repetition rate and true-pixel image resolution at 20 μm for proteins. The ultrafleXtreme platform



makes high-resolution intact biomolecule analysis feasible. By generating multiply charged intact protein ions, it can perform electrospray ionization with mass resolution greater than 30 000. That can yield isotopic information for 30-kDa proteins and larger protein molecular weight assignments with better than 15-ppm mass accuracy. The system can perform intact-protein bioanalysis, which allows for biological discovery, development, and quality control. Bruker Daltonics Inc, 40 Manning Road, Manning Park, Billerica, MA 01821, <http://www.bruker.com>

Microreactor mass spectrometer

The Hidden Catlab integrated micro-reactor and mass spectrometer system is specifically optimized for continuous quantitative real-time analysis of catalytic activity and reaction components. The close-coupled mass spectrometer samples directly from the reactor zone for fast response and precise process characterization. It provides overall response times of less than 0.5 s with data accumulation rates at up to 500 data points/s. Operation is fully preprogrammable, allowing for total control of temperature, temperature ramp rate, and gas flow with up to eight gas streams. The quartz reactor and cartridge-style sample insertion system are available for use with sample volumes from 0.15 to 2.5 mL, with the fast-response, low-thermal-mass furnace able to operate to 1000 $^{\circ}\text{C}$ with ramp rates of up to 20 $^{\circ}\text{C}$ per minute. Applications include temperature programmed desorption, reduction, oxidation, and reaction. The mass spectrometer module may be

decoupled to provide standalone operation for general laboratory gas analysis applications. *Hidden Analytical, 420 Europa Boulevard, Gemini Business Park, Warrington, WA5 7UN, UK, <http://www.hiddenanalytical.com>*

Mini CCD spectrometer

Horiba Scientific designed the new VS-7000+ mini CCD spectrometer to address the need for improved performance from CCDs available for OEMs. The company claims it outperforms front-illuminated and low-cost back-illuminated CCDs. The miniature device is an ultracompact spectrograph that features a back-thinned CCD with a very deep full well, two height options, and a USB 2.0 interface. The VS-7000+ is suitable for industrial low-light applications such as fluorescence, emission, absorbance, and reflectance. It offers coverage for three spectral ranges: UV-visible (200–860 nm), visible (380–750 nm), and UV-near-IR (200–1050 nm). Although it is an uncooled CCD, it has a high signal-to-noise ratio; however, it can be thermoelectrically cooled. Its single optic design with concave grating offers light purity. With no moving parts or shutter, it is reliable for OEM integration. *Horiba Scientific, 3880 Park Avenue, Edison, NJ 08820-3097, <http://www.horiba.com/us/en/scientific>*

High-resolution near-IR spectrometer

Ocean Optics has released NIRQuest 512-1.9, a new, small near-IR spectrometer with high resolution and a response from 1100 to 1900 nm. It is suitable for applications ranging from monitoring changes in food production and chemical processing to characterizing lasers for semiconductor assembly and medical treatment. The NIRQuest512-1.9 has a high-stability, 512-element Hamamatsu

indium gallium arsenide array detector. Multiple grating and optical bench options are available. The standard NIRQuest512-1.9 comes with a grating of 150 lines/mm, a 25- μ m entrance slit, and a nonfluorescing longpass filter that transmits greater than 1000 nm. The filter helps to mitigate second-order effects. The instrument has external hardware triggering functions that allow users to capture data when an external event occurs or to trigger an event after data acquisition. Spectrometer operation is controlled by SpectraSuite software, a modular, Java-based spectroscopy platform. *Ocean Optics Inc, 830 Douglas Avenue, Dunedin, FL 34698, <http://www.oceanoptics.com>*

Mass spectrometer for quantitation and screening

The new AB Sciex 4500 series is mass spectrometry instrumentation for routine quantitation and screening. The company claims its new TripleQuad 4500 system delivers 10 $\times$ better sensitivity over competitive triple quadrupole systems in the same midlevel class. AB Sciex developed the system based on feedback from scientists and applications experts in analytical science. To create the 4500 system, the company reengineered its API 4000 instrument for liquid chromatography coupled with tandem mass spectrometry. The new platform can be delivered with the option of Qtrap technology for simultaneous quantitation and library searching. The proprietary Qtrap system, with its “linear accelerator trap,” increases full-scan sensitivity by 100 $\times$ over basic triple quadrupoles. The 4500 series is suitable for clinical research, protein identification, and bioanalysis. *AB Sciex, 110 Marsh Road, Foster City, CA 94404, <http://www.absciex.com>*

Diamond ATR probe

Axiom Analytical has made available its DMD-270Fx, a flexibly coupled, diamond attenuated total reflectance (ATR) probe for use in mid-IR spectroscopy. It uses hollow flexible light-guides to provide coupling to a Fourier-transform IR spectrometer and, as a result, gives flexibility without the drawbacks of solid-core mid-IR optical



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fibers. Those limitations include fragility, low throughput, and limited spectral response. In contrast to the solid-core mid-IR fibers, the hollow polymer lightguides provide full-fingerprint-region spectral coverage, high stability, and durability. Extreme chemical resistance is ensured by the use of a diamond ATR element, Hastelloy construction, and energized polytetrafluoroethylene seals. *Axiom Analytical Inc, 1451 Edinger Avenue, Suite A, Tustin, CA 92780, <http://www.goaxiom.com>*

Purged UV spectrometer

McPherson has launched its latest vacuum UV analytical spectrophotometer (VUVAS). According to the company, the new platform provides stable measurements over time and is easy to maintain. With long lamp life at short UV wavelengths of 120 nm, it is suitable for analysis of doped and crystalline materials and deep UV optics and coatings. The VUVAS offers direct optical characterization of transmission and variable angle reflectance; gas cell absorbance is optional. It also achieves precise, reproducible wavelength control throughout the 120- to 350-nm region and sensitive signal recovery with lock-in detectors.



Software provides single-point control for these detectors, enabling scanning and data acquisition. As part of the VUVAS family, corrected and single-beam instruments are available offering vacuum or new purged versions of environmental controls. *McPherson Inc, 7A Stuart Road, Chelmsford, MA 01824, <http://www.mcphersoninc.com>*

UV-visible/near-IR microscopic spectrophotometer

Jasco's new MSV-5300 microscope system incorporates a double-beam scanning spectrophotometer for measurements in the UV-visible to near-IR region. The MSV-5000 series has three microscope systems: a dedicated UV-visible microscope, the MSV-5100 (200–

900 nm); the MSV-5200, which includes a Peltier-cooled lead sulfide detector (200–2700 nm); and the MSV-5300, which incorporates an indium gallium arsenide detector to obtain optimized near-IR measurements (200–1700 nm). Wide-band Cassegrain objectives provide continuous transmittance and reflectance measurements for the entire spectral range needed, without the use of expensive, coated refractive objectives. An optional automated XYZ stage offers mapping or imaging capability for larger samples. A PC-controlled carousel can be used to select any of the available 10×, 16×, or 32× objectives in combination with the standard optical zoom feature to provide enhanced video imaging of the sample by means of a high-resolution CMOS camera. *Jasco Inc, 28600 Mary's Court, Easton, MD 21601, <http://www.jascoinc.com>*

Sphere-based spectral flux analysis

Labsphere has expanded its illumina LED and light measurement range of products with the introduction of illumina lite. The portable system offers the



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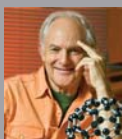
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accuracy of sphere-based measurement in an ergonomic, handheld device suitable for use on the production floor, in the laboratory, or in the field. It incorporates a spectrometer calibrated for absolute spectral flux and employs an integrating sphere. The combination delivers more complete spectral flux measurements than simple illuminance meters that use near-cosine receivers. The instrument measures both the luminous flux and color of devices under test, including LEDs and other sources up to 1 cm in diameter. A built-in auxiliary lamp provides self-absorption correction. The luminous flux range of illumia lite is 0.1–5000 lumens, with a wavelength resolution of <5 nm and an accuracy of <0.5 nm. Data are retrieved via a USB connection to a laptop or PC and analyzed with Labsphere's MtrX-Spec software. The software calculates all industry-standard color parameters such as x, y, correlated color temperature, color rendering index, lumens, and spectral irradiance. *Labsphere Inc, P.O. Box 70, 231 Shaker Street, North Sutton, NH 03260, <http://www.labsphere.com>*

Aberration-free imaging spectrograph

The IsoPlane SCT-320 from Princeton Instruments features a new optical design that eliminates the primary aberrations present in traditional imaging spectrographs. The company claims the device produces clear, sharp images across the focal plane with high signal-to-noise ratio. Czerny–Turner imaging spectrographs are subject to coma, astigmatism, and spherical aberration. According to the company, the IsoPlane SCT-320 greatly reduces coma while preserving spectral resolution at all wavelengths. Astigmatism appears as a vertical distortion of an image, limiting both spectral and spatial resolution; it is eliminated in the IsoPlane SCT-320 spectrograph. Applications include multichannel spectroscopy, microspec-

troscopy, Raman scattering, fluorescence, photoluminescence, laser-induced breakdown spectroscopy, Fourier-domain spectroscopy, and biomedical imaging. *Princeton Instruments, 3660 Quakerbridge Road, Trenton, NJ 08619, <http://www.princetoninstruments.com>*

FTIR instrument to monitor flow chemistry

Mettler-Toledo has launched its new FlowIR high-pressure (HP) sensors for use with ReactIR, a small, dedicated Fourier-transform IR spectroscopy instrument that offers real-time flow chemistry monitoring nearly anywhere within a continuous reactor setup. The addition of durable HP sensors expands the use of flow chemistry by allowing users to gain the enhanced control of critical process parameters provided by FlowIR in HP experiments. Benefits include faster experiment optimization, easier lab-to-plant scaling, reduced costs, and shorter time to market. Interchangeable FlowIR HP sensors, available in DiComp and SiComp models, allow chemists working with HP experiments to quickly and easily swap sensor types to meet the needs of the current application. The new models can be trusted under pressures up to 50 bar (725 psi) and temperatures up to 120 °C. *Mettler-Toledo LLC, 1900 Polaris Parkway, Columbus, OH 43240, <http://us.mt.com>*

Microvolume spectrophotometer

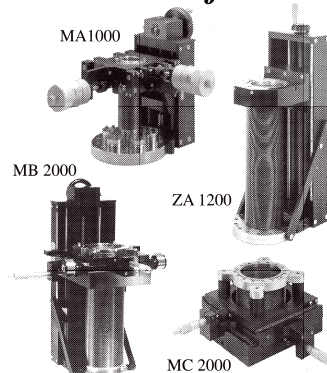
The Genova Nano microvolume spectrophotometer from Jenway measures sample volumes as low as 0.5 μ l with, according to the company, a high degree of accuracy, reproducibility, and speed. It conserves precious samples, reduces the need for dilutions, and eliminates the requirement for cuvettes. The three-in-one spectrophotometer—microvolume, life sciences, and standard—is suitable for DNA, RNA, and protein measurements; it detects DNA concentrations as low as 2 ng/ μ l. Cleaning is quick and simple—wiping the read heads with a microfiber cloth removes all trace of the sample, allowing fast changeover between samples and increasing sample throughput. Its wavelength range is 198–1000 nm. Methods and results are storable in a USB memory stick. *Bibby Scientific Lim-*

ited, Beacon Road, Stone, Staffordshire, ST15 0SA, UK, <http://www.jenway.com>

Embedded endpoint control spectrometer

Verity Instruments has announced that its new fully embedded smart spectrometer, the SD1024X, combines the functionality of a high-performance spectrometer and an applications computer in the same size enclosure as its standard spectrometers. The combination allows for a small footprint, reduction of cabling, and elimination of changes associated with computer components, peripherals, and operating systems. The SD1024X is designed for semiconductor process control applications such as low exposed area contact etch. When coupled with a Verity flashlamp, the SD1024X can be used as a spectral reflectometer for film thickness or depth measurement. Its 200- to 800-nm spectral range optical system employs a high-UV-response thermoelectrically cooled CCD detector with high sensitivity, low noise, and wide dynamic range. *Verity Instruments Inc, 2901 Eisenhower Street, Carrollton, TX 75007, <http://www.verityinst.com>*

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