

NEW PRODUCTS

Focus on analytical equipment, sensors, and detectors

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



Pirani vacuum transducer

Because the filament's nearly indestructible platinum rhodium alloy material is processed in the shape of a helix, Thyracont's model VCP vacuum transducer is suitable for use in corrosive gas applications. The material's relatively smooth surface reduces deposits of oil vapors and other contaminants. According

to the company, the filament's durability has been verified in field tests and the sensor can withstand steam pressure sterilizations. The feedthrough is metal sealed. A stable, interference-free metal casing ensures optimum protection for the compact transducer even in rough conditions. The VCP Pirani sensor works with the company's patented impulse ramp principle. It features optimized temperature compensation, which leads to higher accuracy and excellent stability. The Pirani sensor operates in a measur-

ing range of 1×10^3 mbar to 5×10^{-4} mbar and achieves its highest accuracy below 100 mbar. *Thyracont Vacuum Instruments GmbH, Max-Emanuel-Strasse 10, 94036 Passau, Germany, <http://thyracont-vacuum.com>*

Analyzer for Auger electron spectroscopy



The microCMA from RBD Instruments is designed for analyzing the top-most atomic layers of materials in research into surface chemistry and thin films. The compact cylindrical mirror analyzer, which measures the kinetic energies of electrons emitted from materials in a vacuum chamber, can be used to conduct the Auger electron spectroscopy (AES) surface characterization technique. According to the company, the microCMA can provide surface analysis at lower cost than larger cylindrical mirror analyzers. The instrument can be added to the small open port in many analytical

vacuum chambers, which allows the chambers to use the AES technique without additional vacuum hardware. The analyzer's small size makes AES practical for small vacuum chambers used in research applications such as thermal desorbed spectroscopy and atomic layer deposition. *RBD Instruments Inc, 2437 Northeast Twin Knolls Drive, Suite 2, Bend, OR 97701, <http://www.rbdinstruments.com>*

Microscope for nanoscale materials characterization

Park Systems now offers a scanning ion-conductance microscopy (SICM) module to add to its NX10 atomic force microscope. According to the company, SICM can benefit materials characterization in liquids such as hydrogels. Examples include live cells, electrochemical reactions, and in-liquid surface charge detections.



The technique uses a nanopipette as an ionic-current-sensitive probe for repeatable, reliable in-liquid imaging. It can potentially advance nanoscientific research by enabling users to image extremely delicate cells, such as neuronal cells, at high resolution, and it can measure a cell's tiniest features in its aqueous environment without making physical contact and causing sample deformation. The SICM module can also be used in pipette-based applications such as nanoinjection and nanobiopsy, patch clamping, scanning electrochemical microscopy, and potential measurement. *Park Systems Inc, 3040 Olcott Street, Santa Clara, CA 95054, <http://www.parkafm.com>*

Analog vacuum gauges

Pfeiffer Vacuum's compact CenterLine series of analog vacuum gauges allows for space-saving installation in vacuum process systems, analytical instruments, leak detectors, and other applications. The state-of-the-art CenterOne, CenterTwo, and CenterThree controllers have one, two, and three measurement channels, respectively, and allow communication via USB and Ethernet interfaces. The gauges—which include Pirani, Pirani/Bayard-Alpert hot cathode, Pirani/cold cathode, Penning, and capacitive gauges—are automatically detected by a controller for safe, easy installation. They are equipped with either an 8-pin flat cable connector or a 15-pin D-sub connector. Users can choose among various measuring sensors, from ultrahigh vacuum up to atmospheric pressure. In addition to the analog output, some gauges have set points for better process control. *Pfeiffer Vacuum Inc, 24 Trafalgar Square, Nashua, NH 03063-1988, <https://www.pfeiffer-vacuum.com>*



Laser Wavelength Meters

1552.37486
± 0.0003 nm



- Accuracy as high as ± 0.0001 nm
- Continuous calibration with a built-in wavelength standard
- Operation from 350 nm to 12 μ m

Bristol
Instruments

The Power of Precision

www.bristol-inst.com
585-924-2620

Detector for energy-dispersive x-ray spectroscopy

Oxford Instruments has launched its X-Max Extreme silicon drift detector for applications used with ultrahigh-resolution field emission guns and focused ion-beam scanning electron microscopes (SEMs). Based on a windowless



100-mm² detector, it uses a radical geometry to enable data collection with energy-dispersive x-ray spectroscopy (EDS) at very low kV—for example, between 1 kV and 3 kV—and at a very short working distance. It can provide elemental analysis under the conditions used to study nanomaterials and surfaces at very high SEM resolution. Imaging and EDS can be performed simultaneously, and the EDS resolution approaches that of the SEM. The sensitivity of the X-Max Extreme allows users to characterize the composition and distribution of surface contaminants and layers a few atoms thick. It also provides sensitive detection of light elements, including lithium. *Oxford Instruments plc, Tubney Woods, Abingdon, Oxfordshire OX13 5QX, UK, <http://www.oxford-instruments.com>*

Benchtop scanning electron microscope

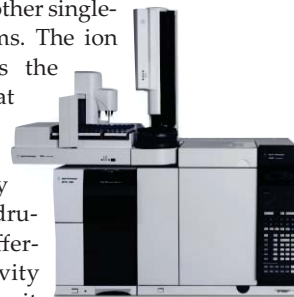
For laboratories with small spaces and modest budgets, JEOL has designed its latest model NeoScope benchtop scanning electron microscopes (SEMs) to provide the basic high-resolution imaging



and analysis features of a full-sized SEM. According to the company, the compact, flexible JCM-6000Plus offers fast, high-magnification electron microscopy with more functionality than other available benchtop SEMs and can complement workflow with optical microscopes or larger SEMs. It features selectable high and low kV, selectable beam currents, and up to 60 000 $\times$ magnification. High-sensitivity detection is possible using a JEOL backscatter electron detector to identify areas of the sample with different chemical compositions. Simplicity of design and touch-screen operation make the NeoScope ergonomic and easy to use for rapid inspection of electronics, pharmaceuticals, forensic evidence, and various materials and organic samples. *JEOL USA Inc, 11 Dearborn Road, Peabody, MA 01960, <http://www.jeolusa.com>*

Tandem gas chromatograph and mass spectrometer

According to Agilent Technologies, its 5977B high-efficiency source gas chromatograph/mass selective sensor system can detect target compounds such as pollutants and contaminants at levels 10 times as low as other single-quadrupole systems. The ion source maximizes the number of ions that are created and transferred out of the source body and into the quadrupole analyzer. Offering high sensitivity and a detection limit as low as 1.5 fg, the 5977B reduces instrument downtime, minimizes solvent usage, and lets researchers use smaller sample volume and spend less time on sample preparation. The system is eco-friendly because it has sleep and wake modes, it does not use a lot of electricity or other resources such as carrier gas, and it has less material to dispose of. Agilent's MassHunter software allows users to simplify method development from instrument settings to data analysis and reporting. *Agilent Technologies, 5301 Stevens Creek Boulevard, Santa Clara, CA 95051, <http://www.agilent.com>*



Electrochemical detector

A redesigned electrochemical detector from Cecil Instruments can be added to the company's modular Adept and Q-Adept high-performance liquid chromatography (LC) and IonQuest ion chromatography systems and employed with many third-party LC systems. Using working electrodes made of gold, glassy carbon, silver, or platinum and a choice of reference electrodes, the system can operate in DC, scanning DC, and pulsed amperometric modes. It can be used in series with others, such as the company's WaveQuest ultrafast scanning UV/visible detector. The instrument can achieve sensitivities of 10^{-15} mol, which makes it possible to detect trace levels of many metabolites, carbohydrates, environmental contaminants, pesticide residues, and other chemical compounds. When used with PowerStream chromatography software, the electrochemical detector is compliant with *Code of Federal Regulations*, title 21, part 11. **Cecil Instruments Limited**, Milton Technical Centre, Cambridge CB24 6AZ, UK, <http://www.cecilinstruments.com>

Thermogravimetric analyzer

Mettler-Toledo has added the TGA/DSC 3+ to its thermal analysis portfolio. It provides simultaneous thermogravimetry (TGA) and differential scanning calorimetry (DSC) analysis of sample composition, phase transitions, and chemical reactions. Along with DTA sensors to measure the sample and the reference temperatures, the analyzer is available with various TGA and DSC sensors with optimized balance beams that offer low baseline, reliable weighing, and simultaneous heat flow results at temperatures from ambient to 1100 °C or 1600 °C. It features excellent weighing performance and precise temperature control, even when positioned near a furnace operating at very high temperatures.

A modular design allows each instrument to be individually configured. Options include microbalances and ultramicrobalances, a sorption accessory, and

interfaces for techniques such as mass spectrometry, Fourier transform IR spec-

troscopy, and gas chromatography/mass spectrometry. **Mettler-Toledo LLC**, 1900 Polaris Parkway, Columbus, OH 43240, <http://us.mt.com>

High-responsivity photodiode

Opto Diode, an ITW company, has launched the UVG12 photodiode with a 4.1-mm-diameter active area. Under test conditions at 254 nm, the minimum responsivity is 0.105 A/W. Typical response is 0.115 A/W, with a maximum of 0.125 A/W. The 13-mm² photodiode is designed for detection between 193 nm and 400 nm. It operates at 100% internal quantum efficiency in the UV and visible regions. The UVG12 exhibits less than a 2% drop in responsivity after exposure to MJ/cm² levels of 254-nm light. Thermal parameters for storage and operation range between -20 °C to 80 °C. The maximum junction temperature is 80 °C and the lead soldering temperature is 240 °C (0.0625 inches from the case for 10 s). The photodiode is suitable for applications such as laser-power monitoring, photolithography, and other high-power-density applications that use UV light. **Opto Diode Corporation**, 1260 Calle Suerte, Camarillo, CA 93012, <http://optodiode.com>

Optical analyzer

Based on its AQ6375 model, Yokogawa's new AQ6375B optical spectrum analyzer adds features such as gas purging, a cut-off filter, data logging, and a double-speed mode. The instrument operates in the short-wave IR (SWIR) region, from 1200 nm to 2400 nm, and achieves accuracy of ± 0.05 nm from 1520 nm to 1580 nm and of ± 0.50 nm over its full range. It provides a wavelength resolution of 0.05 nm, a wide close-in dynamic range of 55 dB, and a measurement level range of +20 dBm to -70 dBm. The monochromator design helps separate spectral signals in close proximity to one another and improves dynamic range by reducing the influence of stray light. The AQ6375B provides a measurement speed of up to 0.5 s per 100 nm. A purging feature minimizes the influence of water-vapor absorption on spectral measurements carried out in the SWIR range. **Yokogawa Corporation of America**, 12530 West Airport Boulevard, Sugar Land, TX 77478, <http://www.yokogawa.com>



Dr. Adam Heiniger, Sales

Expand Your Horizon

Lasers that support wide and mode-hop-free wavelength tuning are beneficial for applications like resonant excitation of quantum dots or microcavities, as well as molecular spectroscopy or component testing.

TOPTICA's new CTL is developed for such demanding tasks. It guarantees completely mode-hop-free wavelength tuning across a range of up to 110 nm and highest resolution.

Combined with its narrow linewidth, high power and full digital control the CTL sets new standards for tunable lasers. This is the perfect chance to **expand your horizon!**

Continuous Tuning @ TOPTICA

- ▶ Up to 110 nm mode-hop-free wavelength tuning
- ▶ Scan resolution down to 5 kHz
- ▶ Available at 950 nm, 1500 nm, and 1550 nm
- ▶ Up to 80 mW output power



www.toptica.com

NEW PRODUCTS

Charge Sensitive Preamplifiers

CoolFET®



Noise @ 0 pF: 670 eV FWHM (Si)
~76 electrons RMS

Noise Slope: 13 eV/pF with Low C_{iss} FET
11.5 eV/pF with high C_{iss} FET

Fast Rise Time: 2.5 ns

FEATURES

- Thermoelectrically Cooled FET
- 3 FETs to match detector
- Lowest Noise and Noise Slope
- AC or DC coupling to the detector
- Both Energy and Timing outputs
- Optional input protection
- Easy to use

STATE-OF-THE-ART A250



External FET

FET can be cooled

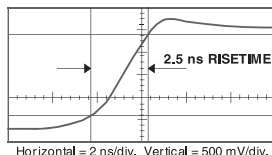
Noise: <100 e⁻ RMS (Room Temp.)

<20 e⁻ RMS (Cooled FET)

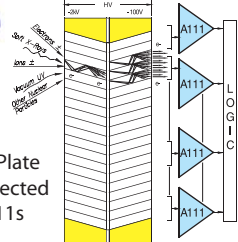
Gain-Bandwidth $f_t > 1.5$ GHz

Power: 19 mW typical

Slew rate: >475 V/ μ s

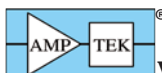


THE INDUSTRY STANDARD A111



A Microchannel Plate
(MCP) Array Connected
to Multiple A111s

AMPTEK - Your complete
source for high performance
preamplifiers and amplifiers



AMPTEK Inc.
www.amptek.com

AMETEK
MATERIALS ANALYSIS DIVISION

Platform for x-ray crystallography

Bruker AXS has announced that its new instrumentation platform for crystallography, the D8 Gen 2 featuring the company's new Photon II detector, will be available in its D8 Quest and D8 Venture



experimental systems. With a large monolithic active area of 10×14 cm² and a high detective quantum efficiency and frame rate, the detector eliminates the charge-sharing noise and parallax issues of pixel array detectors, according to the company. It will include the latest version of the Incoatec microfocus source, I μ S 3.0, which is designed and optimized for x-ray diffraction: It increases x-ray intensity by 70% compared with conventional microfocus sources. The APEX3 software package integrates an intuitive user interface with advanced analysis engines for investigating twinned and intergrown samples and powder data. The Photon II is fast and is suitable for screening, and its single-photon sensitivity helps users collect the weakest reflections. *Bruker AXS Inc, 5465 East Cheryl Parkway, Madison, WI 53711-5373, <http://www.bruker.com>*

Elemental analyzer

Eltra's redesigned analyzer determines the concentration of oxygen, nitrogen, and hydrogen in inorganic materials. At the core of the Elementrac ONH-p is a powerful impulse furnace with an optimized sample drop mechanism that allows for a wide range of sample materials and sizes, from granules to massive particles of materials such as steel, copper, titanium, and silicon. The analyzer's precisely tuned IR measuring system comprises a furnace, a catalyst, and an IR detector for oxygen determination. Oxygen can be measured from ppm level to the percentage range. Nitrogen and hydrogen concentrations are measured by highly sensitive thermal conductivity cells that provide accurate results even for very low measuring ranges. Argon can be used as a carrier gas. The comprehensive software is easy to use and offers



various diagnostic and analysis tools to simplify laboratory tasks. *Eltra GmbH, Retsch-Allee 1-5, 42781 Haan, Germany, <http://www.eltra.com>*

NEW LITERATURE

Gas analyzer brochure

Hidden has published a new brochure on its adaptable QGA-series gas analysis system. Featuring direct, real-time multispecies analysis and quantification of gas and vapor-related processes, the system is suitable for sampling directly from pressure regimes from 100 mbar to 30 bar, with a dynamic range extending from 100 ppb to pure gas or vapor (100%). Process interfaces are suited to various application areas, including top-gas and respiratory analyses, multistream monitoring of gas feed and process exhaust lines, and process and thermal reaction studies. The brochure presents the system's configuration and its technical specifications and describes available software, options, and accessories. It can be downloaded at <http://tinyurl.com/HiddenQGA brochure>. *Hidden Analytical, 420 Europa Boulevard, Warrington WA5 7UN, UK, <http://www.hiddenanalytical.com>*

