

NEW PRODUCTS

Focus on materials, semiconductors, vacuum, and cryogenics

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. For all new products submissions, please send to Rnanna@aip.org.

Andreas Mandelis



Conductive nickel epoxy

Featuring a nickel filler, Master Bond's EP21TDCN-LO is an electrically conductive, two-component adhesive and sealant for grounding, shielding, and static dissipation applications. The epoxy can withstand rigorous thermal cycling, mechanical vibration, and shock. It passes ASTM E595 tests for NASA low outgassing, so it is suitable for

the aerospace, electronics, and specialty OEM industries, including in vacuum and clean-room environments. The epoxy has a low volume resistivity of 5–10 Ωcm and a thermal conductivity of 1.59 W/(m·K). It bonds well to substrates such as metals, composites, ceramics, and many plastics; features a high strength profile, with tensile lap shear, tensile, and T-peel strengths of 1400–1600 psi, 3000–4000 psi, and 15–20 pli, respectively; and resists exposure to various chemicals such as fuels, organic solvents, and water. Easy to handle, the EP21TDCN-LO can cure at room temperature or more rapidly at elevated temperatures. It is serviceable from -73°C to $+135^\circ\text{C}$. **Master Bond Inc**, 154 Hobart St, Hackensack, NJ 07601, www.masterbond.com

Semiconductor test system

National Instruments (NI) has released its NI PXIe-6570 Digital Pattern Instrument and Digital Pattern Editor software for semiconductor test system development. NI combined the digital test paradigm established in the semiconductor industry with the open PXI platform used in the company's Semiconductor Test System (STS) and added a pattern editor and debugger. The innovations provide users with cutting-edge PXI instrumentation that helps reduce test costs and increases throughput for RF and analog-centric integrated circuits. Users can add as many devices as they need to meet the device pin and site counts required in a test configuration. The digital pattern instrument features 100 MVector/s pattern execution with independent source and capture engines and voltage/current parametric functions at up to 256 synchronized digital pins in a single subsystem. **National Instruments Corporation**, 11500 Mopac Expy, Austin, TX 78759-3504, www.ni.com



High-compression turbopump

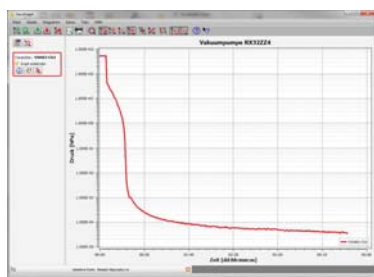
According to Pfeiffer Vacuum, its compact HiPace 300 H is the highest compression turbopump currently available in the pumping speed class of 300 l/s. With a compression ratio of 10^7 for hydrogen, it can produce high and ultrahigh vacuum for applications in research, analytics, and industry. For example, the high compression ratio generates a low residual gas spectrum in the chamber, which is desirable for mass spectrometry applications. The turbopump is also suitable for particle accelerators. A very high backing pressure compatibility of 30 hPa helps it achieve ultrahigh vacuum when operating with diaphragm pumps under high-pressure conditions. An integrated "intermittent operation" function allows the vacuum system's energy consumption to be decreased up to 90%. The HiPace 300 H's robust hybrid bearing combines a ceramic ball bearing on the fore-vacuum side and a permanently magnetic radial bearing on the high-vacuum side. **Pfeiffer Vacuum Inc**, 24 Trafalgar Sq, Nashua, NH 03063, www.pfeiffer-vacuum.com

Vacuum pumps for scientific applications

Edwards has unveiled new vacuum pumps for analytical instrument and R&D applications. Building on the company's EXT75DX model, the nEXT85 turbomolecular pump offers improved performance in a smaller package, with the same high level of reliability. The flexible device also delivers the benefits, such as field serviceability and built-in intelligence, of the company's larger nEXT pumps. The nEXT85 is offered in split-flow and other customized versions. The air-cooled, single-phase nXLi dry pump operation is based on the iXL range currently used in semiconductor applications. It is a suitable backing pump for Edwards' nEXT hybrid bearing and STP maglev turbomolecular pumps. The nXL110i and nXL200i are optimized for various scientific applications, including liquid chromatography–mass spectrometry and inductively coupled plasma mass spectrometry. They can handle gas loads of up to 25 slm in a compact footprint. **Edwards Limited**, Manor Royal, Crawley, West Sussex RH10 9LW, UK, www.edwardsvacuum.com

Circular sputtering source

Kurt J. Lesker has designed its Torus Mag Keeper circular magnetron sputtering source to be flexible, user-friendly, and suitable for a broad range of R&D applications. It has a quick target change feature, an enhanced cooling design, a low operating pressure capability, and a compact footprint. Since it is engineered with no O-rings and all-ceramic insulators, the source is UHV compatible. For magnetic film deposition, the Mag Keeper offers enhanced high-strength magnet options for sputtering iron up to 3 mm thick. Its configuration conforms to the standard used in the company's other products, so it can be used in existing systems. A broad range of options allows the source to be integrated to any existing mounting arrangement. The new Mag Keeper is offered in 2-, 3-, and 4-inch target sizes. **Kurt J. Lesker Company**, 1925 Rte 51, Jefferson Hills, PA 15025, www.lesker.com



Vacuum leakage software

VacuGraph software from Thyracont Vacuum Instruments can be used to calculate, without elaborate programming, the leakage rates of vacuum pumps. In combination with the company's vacuum gauges, the software can visualize, analyze, and save measurements on a PC. The program's base has been changed to C++, and according to the company, Vacu-

Graph 11 is lean, stable, and fast. A new, intuitively operated user interface offers a choice of languages and many improvements. The software can communicate simultaneously with any amount of active gauges, VD8 compact vacuum meters, and display and control units. Users can track measurement data online in real time and read out VD8 data loggers for quality assurance at a later time. The leakage calculation feature can determine the application's tightness. The software calculates the leakage rate by means of the rate-of-rise method and can make leak detectors unnecessary. **Thyracont Vacuum Instruments GmbH**, Max-Emanuel-Str 10, 94036 Passau, Germany, www.thyracont-vacuum.com

Terahertz on-wafer probe arm

Lake Shore Cryotronics now offers a terahertz-frequency probe-arm option for its CPX, CPX-VF, CRX-4K, and CRX-VF cryogenic probe stations. The arm enables precise probing and measurement of millimeter-wave devices at 75–110 GHz or 140–220 GHz frequencies within a tightly controlled cryogenic test environment. It allows users to perform calibrated S-parameter and other high-frequency measurements as a function of low temperature and in high magnetic field. According to the company, the probe arm is especially suitable for the development of next-generation electronics, including new monolithic microwave integrated circuits, MEMS, low-noise amplifiers, and terahertz detector devices. It uses cryogenically rated ground-signal-ground T-Wave probes from Cascade Microtech for wafer probing. Various versions are available depending on the frequency band and probe pitch needed for the device being measured. **Lake Shore Cryotronics Inc**, 575 McCorkle Blvd, Westerville, OH 43082, www.lakeshore.com



Smartline Vacuum Transducers



Thyracont's Smartline vacuum transducers have set new standards for wide range measurement with precision, functionality, reliability and affordability.

- Models offer a variety of measurement ranges from atmospheric pressure to 5×10^{-10} Torr / hPa / mbar
- Precise, robust sensor combinations include Piezo/Pirani, Pirani/Cold Cathode and Pirani/Hot Cathode
- Choice of communication options: RS485, EtherCAT and 0-10V analog
- Dual, fully configurable process set points
- Models available with a large, intelligent, illuminated display
- Choice of vacuum flange options

THYRACONT
Vacuum Instruments

✉ direct@thyracont-vacuum.com
🌐 www.thyracont-vacuum.com



Semiconductor wafer AFM scanner

Park Systems has announced that its Park NX20 300mm is the first research atomic force microscope (AFM) able to scan the entire sample area of 300 mm wafers. It keeps the system noise level below 0.5 Å rms, and it can improve and compare site-to-site and sample-to-sample height and surface-

roughness measurements. New SmartScan software with automatic scan control and "batch mode" functionality lets users perform unlimited recipe-automated sequential multiple-site measurements over a 300 mm × 300 mm area. A motorized XY stage gives users access to any location on a 300 mm wafer. The AFM has a standard 300 mm vacuum chuck that can hold samples ranging in size from 300 mm to 100 mm, and with a vacuum hole it can support small coupon samples of arbitrary shapes, so it is suitable for laboratories that use various sample sizes. It is compatible with all the modes and options available to Park's other research AFM products. **Park Systems Inc.**, 3040 Olcott St, Santa Clara, CA 95054, www.parkafm.com

Cryogenic impedance bridge

The model 54 four-channel cryogenic impedance bridge from Cryogenic Control Systems measures resistance, inductance, and mutual inductance in ultralow temperature thermometry applications. Because of its four control-loop outputs, the bridge can be used as a temperature controller. Each of the four input channels is made with the company's proprietary signal processing chip that measures impedance by means of an auto-balancing, ratiometric AC bridge. Advanced functions are built into a digital signal processor. Model 54 uses a differential voltage-mode excitation scheme followed by bi-phase lock-in detection to prevent electrical noise pickup currents from flowing through the sensor. Thus it can achieve low-level excitation followed by precision signal recovery, which is often required to measure impedance in cryogenic systems. With an appropriate sensor, the instrument operates from less than 100 mK to more than 1200 K. **Cryogenic Control Systems Inc.**, 17279 La Brisa, Rancho Santa Fe, CA 92067, www.cryocon.com



Flow cryostat scanning probe microscope

The STREAM from Sigma Surface Science and its partner Mantis Deposition is a UHV low-temperature flow cryostat scanning probe microscope (SPM) built for high-resolution scanning tunneling microscopy, qPlus atomic force microscopy (AFM), and spectroscopy experiments in a temperature range between less than 10 K and 420 K. The cryostat can operate under conditions of stability with either liquid helium (less than 10 K) or liquid nitrogen (less than 90 K). The efficient thermal shielding allows for low liquid-helium consumption, provides high temperature stability, and results in low drift. STREAM combines an economical low-temperature flow cryostat platform with the company's TRIBUS SPM head and includes 3D coarse motion, high intrinsic stability, easy tip and sample exchange, and optical access. It is available as a complete research solution or as a bolt-on upgrade to an SPM-compatible UHV system. **Mantis-Sigma**, 10200 E Girard Ave, Bldg A, Ste 300, Denver, CO 80231, www.sigma-surface-science.com

Cryogen-free fluorescence spectrometry

Originally designed for low-temperature spectroscopy applications, Oxford Instruments' optical cryostat, the OptistatDry, is now available as an upgrade to Edinburgh Instruments' FLS980 fluorescence spectrometer. Users of the upgraded spectrometer can perform experiments over a wide temperature range, from less than 3 K to 300 K, without the need for cryogenic liquids. Measurements at those temperatures are essential for many applications; for example, they are helpful for studying semiconductors and nonlinear crystals, both of which have weak photoluminescence at temperatures above 70 K. Integrating the cryofree OptistatDry with the FLS980 eliminates the need for a continuous supply of liquid helium for steady-state and time-resolved photoluminescence. New software allows the cryostat operation to be controlled directly by the FLS980's operating software, so users can run long experiments without interruption. **Oxford Instruments plc**, Tubney Woods, Abingdon, Oxfordshire OX13 5QX, UK, www.oxford-instruments.com **PT**

NEW LITERATURE

Surface technology catalog

Hidden Analytical's *Mass Spectrometers for Thin Films, Plasma & Surface Engineering* describes the company's mass spectrometry-based products for vacuum coating and etching processes and for surface evaluation studies. New products include a UHV temperature-programmed desorption system for thermal desorption studies and two secondary ion mass spectrometer systems—the AutoSIMS and Compact SIMS—that provide surface diagnostics to the atomic-layer level and can be operated either automatically or manually. The RGA-series products address residual gas analysis through pressures from 1 mbar to full UHV/XHV. Direct plasma ion monitors—the EQP, PSM, and IMP series—provide real-time plasma ion diagnostics and etching end-point determination. The HPR-60 system with multistage pressure reduction extends the plasma diagnostics capability to pressures as high as 5 bar. The catalog can be downloaded at <http://tinyurl.com/thin-films-184-3> or a free print copy requested at <http://tinyurl.com/request-print-copy>. **Hidden Analytical Inc.**, 37699 Schoolcraft Rd, Livonia, MI 48150, <http://hiddeninc.com>

