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new products

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.

Lawrence G. Rubin

Focus on nanoscience and technology

Nanostructured coatings

To aid production of nanostructured coatings, Tethis has completed a new system based on the technology of supersonic cluster beam deposition (SCBD). The nanoparticles are created by means of a pulsed microplasma cluster source process. The PMCS operation is based on the localized microplasma erosion of a rotating conductive cathode. The material vapors condense by nucleation and form clusters that are carried up to the substrate in a process gas. The system, called Calliroe, provides for the growth of nanoparticle thin films on every kind of substrate. It is the most advanced in the PMCS-SCBD family, allowing the deposition of coatings both for prototyping and for starting pilot productions. The materials that can be deposited include transition metals and their oxides, noble metals, graphitic carbon, doped semiconductors, and composite materials. *Tethis S.r.l., Via Franco Russoli, 3, 20143 Milan, Italy, <http://www.tethis-lab.com>*

Nanoparticle size measurement

Malvern Instruments' new Zetasizer auto plate sampler delivers automated protein and nanoparticle size measurements using dynamic light scattering (DLS). Unlike other systems, the APS does not require microwell plates to be flat bottomed or to have specific optical properties, but it still offers repeatable and accurate size and molecular weight data with only a 20- μ L sample. Programmable dual-temperature controls maintain optimal conditions for sam-

ples in the well plate and enable automatic temperature trend measurements for melting-point determinations and protein purity, for example. DLS data can also be used to solve problems in bioprocessing, drug target development, and protein therapeutics. DLS measures the thermal diffusion of proteins and nanoparticles in solution and uses that property to determine an absolute size. *Malvern Instruments Inc, 117 Flanders Road, Westborough, MA 01581-1042, <http://www.malvern.com>*

Diamond AFM probes

Advanced Diamond Technologies has introduced NaDiaProbes, atomic force microscope (AFM) probes made from ultrananocrystalline diamond material in a microfabrication process that deposits diamond onto silicon wafers. The probes are constructed as monolithic cantilevers and tips with a radius of 15–50 nm; they can consistently image with resolution better than 20 nm and occasionally better than 10 nm. Because of diamond's intrinsic hardness and inertness, the new devices are able to overcome problems associated with silicon and silicon nitride probes, such as wear resistance and reactivity. NaDiaProbes also provide enhanced imaging performance on soft, sticky samples because of the low adhesion and low surface energy of diamond. They have a chip geometry, which allows for their use in most standard AFMs, and an aluminum reflective coating. *Advanced Diamond Technologies Inc, 429 B Weber Road #286, Romeoville, IL 60446, <http://www.thindiamond.com>*



Small-sample AFM/SPM

Asylum Research has announced the Cypher AFM, a new small-sample atomic force microscope/scanning probe microscope. It achieves closed-loop atomic resolution by using the company's third-generation nanopositioning system sensors in all three axes. With positioning accuracies better than 60 pm in *x*, *y*, and *z*, users get the most accurate measurements, positioning, and nanomanipulation. The Cypher AFM also offers SpotOn automated laser alignment, interchangeable light-source modules that allow laser spot

sizes down to 3 μm for broad application and scan mode flexibility, and support for high-speed AC imaging with cantilevers smaller than 10 μm . The system's integrated enclosure provides thermal control and acoustic isolation to optimize image and measurement stability. The company's optional ORCA module makes possible conductive AFM. *Asylum Research, 6310 Hollister Avenue, Santa Barbara, CA 93117, <http://www.asylumresearch.com>*

Atomic layer deposition system

Cambridge NanoTech has added the S300 system to its line of Savannah atomic layer deposition solutions. Each Savannah is designed for maximum experimental flexibility with configurations of up to six precursor lines, a compact ozone generator, and integrated ALD Booster low vapor pressure precursor delivery system. It provides digital control of thin films from the nanoscale to the microscale; the films grow one layer at a time and can be controlled to accurate thicknesses. The S300 has two deposition modes: The exposure mode enables conformal film growth on ultra-high aspect ratio features of greater than 2000:1; the continuous mode allows the high-speed growth of dense, uniform films. The system features a substrate size of up to 300 mm and a substrate temperature range from room temperature to 400 $^{\circ}\text{C}$ but that can go optionally higher. *Cambridge NanoTech Inc, 143 Binney Street, Cambridge, MA 02142, <http://www.cambridgenanotech.com>*

Nanofabrication system

NanoInk has developed the DPN 5000, the next-generation Dip Pen Nanolithography system for desktop nanofabrication. It offers versatile nanopatterning capabilities coupled with high-performance atomic force microscope imaging for immediate characterization of the deposited patterns. The DPN 5000 is equipped with a full range of MEMS-based ink-delivery consumable items and features single probes, 1D passive probe arrays, 2D probe arrays with up to 55 000 pens, inkwells for coating tips, and substrates to be written on. System highlights include an ultralow-noise scanner with closed-loop flexure technology; a low-coherence laser with a reduced spot size to ensure high-quality lateral force imaging; and the company's lithography software, InkCAD 4.0, which allows users to pre-



cisely position multiple features even when working with different materials. *NanoInk Inc, 8025 Lamon Avenue, Skokie, IL 60077, <http://www.nanoink.net>*

Nanoscale material identification

The Veeco Instruments thermal analysis module, which was designed for use with the company's line of scanning probe microscopes, combines the power of traditional bulk thermal analysis with the resolution of atomic force microscopy. VITA technology advances nanoscale material identification by providing characterization capabilities through thermal analysis, scanning thermal microscopy, and heated-tip AFM. Together, those techniques enable the precise determination of local transition temperatures and mapping of temperature and thermal conductivity variations. The module delivers quantitative data with nanoscale resolution and is applicable to a wide range of materials, from complex polymer blends to coatings to pharmaceuticals. The VITA accessory is compatible with Veeco's Innova, Caliber, MultiMode, and Dimension systems. *Veeco Instruments Inc, Terminal Drive, Plainview, NY 11803, <http://www.veeco.com>*

Carbon nanotube SPM probes

The carbon nanotube scanning probe microscope probes by NANOSENSORS are designed for high-resolution measurements on nanometer-sized features. The single- or double-walled CNTs at the end of the tips are grown by chemical vapor deposition at the apex of the company's PointProbe Plus tips, which have a diameter between 2 and 3 nm. The probes can be used for measurements in tapping mode or noncontact mode operations in air or vacuum. The probe cantilevers, which are fixed to silicon support chips, have trapezoidal cross sections that offer several advantages. Due to the elasticity and



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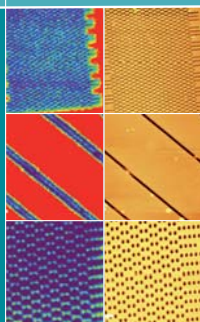


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flexibility of the CNTs, the forces applied to the sample surface are very low and self-limiting, enabling the probes to be used on both soft matter and hard surfaces. Because the probes require special care in use, the company will supply a guideline with every unit. **NANOSENSORS**, Rue Jaquet-Droz 1, C. P. 216, CH-2002 Neuchâtel, Switzerland, <http://www.nanosensors.com>

Nanoparticle characterization system

NanoSight has released the LM10-HS, a new supersensitive system to complement the company's range of instruments for imaging and sizing nanoparticles in liquid suspension. It uses electron multiplication CCD camera technology, which has improved the sensitivity of NanoSight's standard system by a factor of 100. That means that the lower limit of detection for a particular particle type has been improved by a factor of two when compared with the standard LM10 instrument. The new device, unlike the standard one, can identify viruses; it can detect low-refractive index viruses of about 20 nm in size, including bacteriophages, and thus provide absolute virus concentrations. The company claims that that ability had previously been possible only through labor-intensive electron microscopy. The new instrument is supplied with the company's Nanoparticle Tracking Analysis software. **NanoSight Ltd**, Minton Park, London Road, Amesbury, Wiltshire SP4 7RT, UK, <http://www.nanosight.co.uk>

Violet laser scanning microscope

KEYENCE Corp of America has introduced the VK-9700 series 3D violet laser scanning microscope, which offers 18 000× magnification and 1-nm 3D measurement. It examines objects based on an ultradepth image technique that focuses over the entire field of the microscope. The instrument provides the convenience of an optical microscope and the sharpness of a scanning electron microscope. It combines a short wavelength violet laser and a white light source to enable examination based on the high-definition, real-color, ultradepth image technique. The VK-9700 can make 3D measurements of the height, width, shape, angle, and radius of a cross-sectional profile of any

line or curve drawn on the screen. Options include a wide selection of objective lenses, a stage to support wafer sizes as large as 300-mm o.d., and an adjustable stand. **KEYENCE Corporation of America**, 50 Tice Boulevard, Woodcliff Lake, NJ 07677, <http://www.keyence.com>

Detector for confocal microscopy

Nikon Instruments has launched a new confocal imaging method, virtual adjustable aperture system detection, for postacquisition recovery of data normally lost during the course of an experiment. To collect emitted photons, VAAS uses two pinholes, a standard-sized one to enable confocality and one with a diameter three times that size to capture more of the fluorescence without increasing the out-of-focus background detection. The system enables both the collection of photons originating from the selected plane of focus and from adjacent planes in a single scan and the accumulation of the signals into independent channels. Data can then be added back, or the original data can be further deconvolved using the extra information. VAAS detection is offered as an upgrade option to the company's A1 series of confocal microscopes. **Nikon Instruments Inc**, 1300 Walt Whitman Road, Melville, NY 11747-3064, <http://www.nikoninstruments.com>

Cantilever-based NSOM sensor

Nanoscience Instruments is the US distributor for Nascatec GmbH in Germany, which is offering a cantilever-based silicon near-field scanning optical microscope sensor. NSOM uses as its imaging mechanism a quasi-point light source with a diameter much smaller than the light wavelength. The probe must be closer to the imaged surface than the light wavelength; that region is the "near field" and is where the size of the light source is critical. The Nascatec device uses a hollow, aluminum-coated, pyramidal tip with a small aperture at the apex to focus the NSOM beam. The design yields an increase in light transmission claimed to be two orders of magnitude higher than that of a traditional fiber probe. The new sensor comes with apertures of either 50 or 100 nm or is apertureless. **Nanoscience Instruments Inc**, 9831 South 51st Street, Suite C119, Phoenix, AZ 85044, <http://www.nanoscience.com> ■