

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.

Andreas Mandelis

Focus on materials

Plain bearings

The LM76 plain bearings produced by LM-Tarbell employ advanced polytetrafluoroethylene polymers, ceramic, and specialty composites for linear and rotary applications to meet the requirements of motion-system designers. The bearings are chemically and mechanically resistant under harsh conditions. They are compliant with government standards and are suited for food processing and packaging, medical products, pharmaceuticals manufacturing, robotics, assembly and construction equipment, and marine applications. The company provides RC60, 300 series stainless steel, and ceramic-coated shafting and offers pillow blocks and flange blocks in aluminum, ceramic-coated aluminum, and stainless steel. The ceramic-coated series of plain bearings handles high-speed applications and loads up to 10 times faster than linear ball bushing bearings. Also available are custom-blended polymer bearings for extreme applications such as high heat. *LM-Tarbell, 140 Industrial Drive, East Longmeadow, MA 01028, <http://www.lm-tarbell.com>*

Carbon nanotubes for AFM probes

Carbon Design Innovations (CDI) makes atomic force microscope probes from carbon nanotubes. The CNTs offer a method of expanding the depth of profiling from the surface of the probe by several nm to μm . They feature higher resolution, a higher-aspect ratio, and longer lifetimes than typical AFM

probes. The result can be a high-resolution image at a molecular and submolecular scale of structures which are several hundred nm to $1\text{ }\mu\text{m}$ deep. CDI's carbon core high-resolution (CCHR) probes are used for general high-resolution imaging purposes. They are a bit shorter than high-aspect ratio probes, but they are reinforced at the base so they can extend down to about 200 nm. That enables the high-resolution imaging aspects of AFM to be applied to structures of more complicated materials. The CCHR probes' primary focus application is on material characterization and metrology. *Carbon Design Innovations, 1745 Adrian Road, Unit 20, Burlingame, CA 94010, <http://www.carbondesigninnovations.com>*

Aluminum coating for excimer lasers

Excimer lasers operate only in the pulsed mode, so each exposure consists of numerous pulses. The projection optics typically experience fluences in the range of 0.1 mJ/cm^2 to 1 mJ/cm^2 per pulse. Some of the other optics in the system are subjected to fluences in the range of 1 mJ/cm^2 to several mJ/cm^2 per



pulse. Since a production-line system might involve several million pulses per day, the optics must be able to withstand several billion pulses over their lifetimes. Saint-Gobain Crystals has introduced a high-reflectance aluminum coating for excimer laser-based scanning applications. The Alpine Research Optics-brand thin film is UV enhanced and delivers more than 95% reflectivity at 193 nm and an average reflectivity of more than 85% from 400 to 1000 nm. The metal/dielectric coating also delivers better than 90% reflectivity at 193 nm over an angle-of-incidence range of $\pm 10^\circ$. The coating is supplied on various substrates suitable for galvanometer scanners, including rectangular fused silica with chamfered edges. *Saint-Gobain Crystals, 6810 Winchester Circle, Boulder, CO 80301, <http://www.saint-gobain-northamerica.com>*

Barrier properties of PLA films

Sono-Tek offers a system to enhance barrier properties of polylactic acid films based on the company's ultrasonic atomization spray coating line. The system applies an ultrathin layer of clay nanoparticles to compostable films and significantly enhances their barrier properties. It offers the packaging industry an efficient and cost-effective way to prolong the shelf life of compostable packaging films. Nanoparticles have a tendency to agglomerate while being dispensed, which results in an uneven coating-layer thickness. Sono-Tek's ultrasonic nozzles disperse those suspensions with high uniformity by imparting vibrations into the liquid suspension, thereby providing an agglomerate-free, uniform coating. The unpressurized spray cuts down on the amount of overspray, since droplets settle on the substrate rather than bouncing off; the technology reduces waste and generates 30%–60% cost savings. *Sono-Tek Corporation, 2012 Route 9W, Milton, NY 12547, <http://www.sono-tek.com>*

Carbon nanotubes of improved purity

Goodfellow Corp has made available economical, high-purity nanomaterials employing a technique used for carbon nanotube manufacture. The CNTs are developed by Sustainable Carbon NanoTechnology and Engineering in Ohio. Conventionally produced nanomaterials include electrochemically active impurities from the catalysts used in their production. The manufacturing technique developed by SCNTE does not involve such catalysts, so the carbon nanomaterials are free from contaminants found in electrochemically active metals such as nickel and iron. The high purity of the materials, which makes in-house preuse purification unnecessary, can help researchers use carbon nanomaterials in their applications at competitive cost. Standard carbon nanomaterials in the Goodfellow catalog include 50–100-nm nanoclusters, 1- and 2- μm clusters, whiskers with nominal dimensions of 200 nm by 20 μm , and Carbon Nanokit. *Goodfellow Corporation, 305 High Tech Drive, Oakdale, PA 15071-3911, <http://www.goodfellow.com>*

Gas plasma system for powder treatment

Plasmatech has added to its line of low pressure gas plasma systems the AL200-D for treating powder, pellet, and crystalline materials. A specially designed 5-L rotating chamber ensures treatment consistency, even when processing very fine powders and compounds. Production systems with larger chambers are available to accommodate higher-volume requirements.



The AL200-D, which is clean room compatible, is available in a tabletop version or with a freestanding enclosure so users can incorporate a vacuum pump in the system cabinetry. To ensure process repeatability, the system is equipped with programmable logic control, recipe storage, error monitoring, and mass-flow controllers for precise gas measurement. Plasma generation via microwave frequency results in very low chamber temperatures, which eliminates the need for cumbersome, leak-prone liquid electrode cooling. *Plasmatech Inc, 1895 Airport Exchange Boulevard, Suite 190, Erlanger, KY 41018, <http://www.plasmatechnology.com>*

Heated glass for outdoor cameras

Abrisa has announced its new LuxVu heated optical windows for cameras and displays operating in rugged, wet, or cold outdoor environments; for imaging and sensing devices in the field, such as traffic, ground security, and unmanned aerial vehicle cameras; and for optical instrumentation panels on air and ground vehicles. The windows are made of transparent conductive coatings designed to keep the optical glass free from moisture and fog. The heated

windows also aid in deicing in extreme weather conditions. They may be combined with various custom display enhancements and coatings. For example, antireflection coatings help protect the display while providing higher performance and improved transmission. Abrisa also offers additional glass fabrication and optical coating services for the heated optical windows. Customized solutions include screen printing, busbar, epoxy, glass strengthening, etching, and special masking. *Abrisa, 200 South Hallock Drive, Santa Paula, CA 93060, <http://www.abrisa.com>*

Optical coatings on plastics

Deposition Sciences Inc (DSI) has introduced optical thin-film coatings for plastic materials and substrates such as Ultem, Zeonex, and various polycarbonate plastics. The rugged, reliable coatings for plastic optics operate from the visible through the IR spectral wavelengths. Thin-film plastic coatings are suitable for applications for which lightweight and low-cost optics are specified, such as LED lighting, medical devices, unmanned aerial vehicle optics, and photovoltaic solar systems. The company's optical thin-film coatings include bandpass filters, dichroic coatings, and high reflectors. DSI's sputter deposition technology generates coatings on plastics, metals, and other thin-film materials and creates multilayer thin-film coatings for optics, MEMS, and other nanotechnologies. The company says its coatings will pass the stringent 24-hour humidity, adhesion, and moderate abrasion environmental tests. *Deposition Sciences Inc, 3300 Coffey Lane, Santa Rosa, CA 95403, <http://www.depsci.com>*

Laser drilling of wafer-based solar cells

The Jenoptik lasers and material processing division has developed a laser processing technology for drilling minute through holes in wafers for solar cells. One of the crucial factors in the photovoltaic industry is the so-called grid parity, a comparison of the costs of generating electricity via solar energy versus conventional methods. Achieving grid parity requires either an

increased level of efficiency or a reduction in production costs. The Jenoptik-Votan Solas 1800 laser system improves solar-cell electrical efficiency through the use of metal wrap through and emitter wrap through technologies. To increase the active surface area of the cells, in both technologies the contacts are laid from the front side to the rear side of the cell. Therefore, users can dispense with the contact fingers, currently used as standard, that cover parts of the active surface area. *Lasers & Material Processing Division, Jenoptik Laserdiode GmbH, Goeschwitzer Strasse 29, D-07745 Jena, Germany, <http://www.jenoptik.com>*

Portable microviscometer

Petrolab's MiniVis 445 can precisely determine dynamic and kinematic viscosity over a wide temperature range. Reflection sensors provide coverage for a wide range of applications; even samples as dark as used or heavy oil can be measured with high accuracy and repeatability. The viscometer includes a small sample volume and automatic sample feeding. The measuring chamber is a rugged glass tube that contains



a metal ball. The sample is fed into the tube by the automated system or manually with a syringe. The temperature of the whole sample cell and of the sample introduction system is controlled by a thermoelectric (Peltier) system, which allows for quick determination of viscosity indices. After the ball accelerates to a constant velocity, its time of descent is measured with two reflection sensors. The MiniVis 445 repeats the procedure by rotating the sample cell and measuring in the opposite direction. *Ametek Petrolab, 2001 North Indianwood Avenue, Broken Arrow, OK 74012, <http://www.petrolab.com>* ■