

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. To facilitate inquiries about a particular product, a Reader Service Card is attached inside the back cover of the magazine.

LAWRENCE G. RUBIN

FOCUS ON SEMICONDUCTOR TECHNOLOGY

Electron-Beam Melting Services

ALD Vacuum Technologies offers, on a job-shop basis, an electron-beam (EB) melting service for companies that do not have their own systems. ALD's new furnace in Germany has two EB guns for melting and refining, an important process in the production of nickel-based super alloys, specialty steels, titanium, some refractory metals, and other materials. Purification of the materials is done by removal of the volatile elements during the melting process under vacuum. The services available include making metal buttons or remelting bars or scrap materials into ingots; ingot diameters range from 40 to 150 mm, and slabs of different sizes are offered. *ALD Vacuum Technologies Inc, 18 Thompson Road, East Windsor, Connecticut 06088, <http://www.ald-vt.com>*

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Semiconductor Wafer Handling

Adept Technology has announced the AdeptVicon 310D, a four-axis, dual-arm robot designed to handle two semiconductor wafers simultaneously. The robot's dual-arm configuration is said to enable semiconductor manufacturers to reduce wafer swap time and improve tool use in systems that are limited by traditional three-axis robots. Both of the 310D's arms allow for straight-line motion in all directions. The new robot is driven by the company's AdeptWindows controller, which includes integrated support for multiple robot mechanisms, additional motion axes, and machine vision, as well as a common programming language and application layer. The 310D offers class-1 wafer handling in current 200-mm production, and new 300-mm wafer inspection, metrology, and process tools. *Adept Technology Inc, 150 Rose*

Orchard Way, San Jose, California 95134, <http://www.adept.com>

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300-mm Wafer Carriers

Engineering Plastics Inc (EPI) has introduced 300-mm wafer carriers that are molded and machined from PTFE (Teflon®) resins into seamless, one-piece carriers that incorporate SEMI (Semiconductor Equipment and Materials Institute) standard kinematic couplers and can fit inside dry transport systems to minimize wafer handling. Featuring a detachable handle, the EPI carriers are free of microvoids and porosity and have no pins, screws, or dovetails that can loosen or trap contaminants. They are said to exhibit virtually no degradation from photoresists or from harsh chemicals such as aqua regia, sulfuric acid, hydrochloric acid, and ammonia; they can also withstand ultrasonic cleaning and prebake operations to 240°C. *Engineering Plastics Inc, 190 Turnpike Road, P.O. Box 1440, Westboro, Massachusetts 01581-6440, <http://www.engineeringplastics.com>*

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Parametric Software

Keithley Instruments' KRM and PCM software modules are for use on the company's APT (automatic parametric test) systems that run KTE v4.2 software and higher. A large semiconductor fabrication facility often has hundreds of test plans, recipes, and probe cards for diverse wafer designs and process control programs. These may be undergoing constant changes as processes are refined to improve device reliability, yield, and production throughput; there is a possibility of mistakes being made in matching the wafer under test to the correct recipe and probe card. The KRM and PCM modules were designed to eliminate the potential of an operator selecting the wrong program or probe card. They also provide absolute historical correlation of test program changes, process control anomalies, and product field failures. *Keithley Instruments Inc, 28775 Aurora Road, Cleveland, Ohio 44139-1891, <http://www.keithley.com>*

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VCSEL Wafer Probe System

Labsphere has announced an optical and electrical measurement probe system for full characterization of vertical-cavity, surface-emitting lasers (VCSELs) at the wafer level. Designed by Labsphere in partnership with Karl Suss America, the system provides measurement of devices emitting at 850 nm and 980 nm and relies on a cast-base frame and rugged machined components to provide a stable probing environment. Precise resolution and



accuracy are said to result from the use of ground slides, a ball-screw drive, and closed-loop positioning. Measurements of the VCSEL under test include forward voltage, forward current, kink voltage/current curves, optical power, and spectral characterization of peak wavelength and FWHM (full-width/half maximum). *Labsphere Inc,*

P.O. Box 70, Shaker Street, North Sutton, New Hampshire 03260, <http://www.labsphere.com>

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Stackable Burn-In Chambers

Despatch Industries has introduced the RBC1-50 stackable burn-in chamber for reliability testing, burn-in, and R&D in the semiconductor industry and other production environments. These modular burn-in chambers allow users to run concurrent tests using different temperatures and cycle times. They are useful for qualification testing with small lot sizes because a new test can be started in a second chamber while a first test is still in progress. The 4.7-cubic-foot stainless steel chamber is available in temperatures up to 150°C and fits most standard burn-in boards. The stacking capability can save floor or counter space. The RBC1-50 features the company's Protocol Plus controller, and when used with Despatch's Oven Tracker software, the controller can be networked and connected to a host computer. *Despatch Industries, 63 St. Anthony Parkway, Minneapolis, Minnesota 55418, <http://www.despatch.com>*

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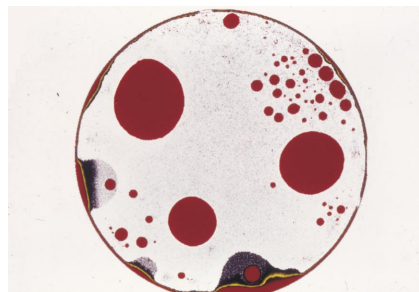
Dry Photoresist Strip System

ULVAC Technologies has introduced the ENVIRO 300-mm advanced dry strip system, a multichamber, single-wafer tool designed to remove resist and polymer residue by using microwave and low-energy RF plasmas. The ENVIRO eliminates the need for wet-stripping processes that use hydroxylamine-based solvents, traditional acid treatments, or alcohol rinses, thus reducing the need to store and dispose of chemical waste materials. The wafer to be stripped is placed on either a hot plate or a chiller-cooled cold plate, which is also an RF electrode, located downstream from the microwave discharge tube. Resist removal is monitored by optical emission with automatic endpoint detection. Up to six process gases can be used for resist stripping and residue cleaning. *ULVAC Technologies Inc, 401 Griffin Brook Drive, Methuen, Massachusetts 01844, <http://www.ulvac.com>*

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Bonded Wafer Inspection System

Sonoscan has introduced the AW2000 automated bonded wafer inspection system. Based on the company's C-SAM technology, the AW2000 handles



wafers up to 8 inches in diameter, scanning them for voids, microvoids, and other defects such as particles and cracks. The voids can form between the bonded wafer pairs used for silicon-on-insulator applications. At the high ultrasonic frequencies the company uses, the detectable voids can be as small as 5 μm in diameter and with a vertical dimension less than 10 nm. Acoustic imaging has reportedly been especially useful after initial Van der Waals bonding, where the wafers are joined only by weak chemical forces and can be easily separated (see photo). The imaging can also be performed after annealing and after thinning. *Sonoscan Inc, 2149 East Pratt Boulevard, Elk Grove Village, Illinois 60007, <http://www.sonoscan.com>*

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Analysis of the SiLK Cure Process

Rudolph Technologies has developed an optical modeling algorithm for monitoring the SiLK cure state. SiLK is an aromatic hydrocarbon-based polymer manufactured by Dow Chemical. It shows great promise as a possible replacement for silicon dioxide, the traditional interlayer dielectric (ILD) for semiconductor devices. Compared with SiO_2 , SiLK's lower dielectric constant would lead to a lower resistance-capacitance time constant for the ILD. However, SiLK must be thermally cured to achieve the appropriate electrical, thermal, and mechanical properties; the curing rate must be monitored and controlled. Rudolph's modeling algorithm accurately predicts SiLK's reflectance spectrum across the deep UV to NIR wavelength range. It was

found that, at 340 nm, the reflectance and extinction coefficient of SiLK films are well correlated with the degree of cure. *Rudolph Technologies Inc, One Rudolph Road, Flanders, New Jersey 07836, <http://www.rudolphtech.com>*

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Mass Spectrometer for Light Gas Species

Hidden Analytical has announced the LoMASS series quadrupole mass spectrometers for precise determination of low molecular weight species. The systems are available with mass range options 1 amu (atomic mass unit) to 20 amu and 1 to 50 amu, with a choice of mass filter-pole diameters of 6, 9, and 12 mm. Peak tail contribution from mass 4 (helium and deuterium, for instance) is less than 1 ppm at adjacent masses. Typical



applications include low abundance and impurity measurement, gas-mixture quantification, and precise isotope-ratio measurement. The small swept volume is an asset for analysis of minimal gas samples. The company's software suite features fast analysis rates, multichannel monitoring, and a 10-decade dynamic range. *Hidden Analytical Ltd, 420 Europa Boulevard, Warrington WA5 7UN, England, <http://www.hidden.co.uk>*

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On the Web

University Wafer offers online new stocks of germanium, gallium arsenide, gallium antimonide, gallium phosphide, indium phosphide, indium antimonide, indium arsenide, silicon carbide, gallium nitride, silicon nitride, zinc selenide, and other semiconductor wafers in a variety of sizes. Also available are thermally grown oxides for 2- to 8-in wafers with thicknesses from 50 nm to 10 μm . *University Wafer, 55 Tall Oaks Drive, Suite 704, Weymouth, Massachusetts 02190, <http://www.universitywafer.com>* ■

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