Focus on semiconductors and software

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Andreas Mandelis

Semiconductor wafer defect review

Park Systems has designed its new automatic defect review (ADR) atomic force microscope (AFM) specifically for the semiconductor market. Compared with traditional manual AFM methods, the ADR process speeds up and improves the way defects on 300-mm bare wafers are imaged and analyzed; according to the company, throughput is improved up to 1000%. Park's novel remapping process does not require any reference marker on a sample wafer, so it does not create often damaging marks like some traditional methods. With its true noncontact mode technology, the ADR AFM also offers a tip life that is 10–20 times longer than that found in competitors. Its advanced coordinate translation with enhanced vision uses the wafer edge and notch to automatically link a defect inspection tool and the Park AFM. *Park Systems Inc, 3040 Olcott Street, Santa Clara, CA 95054, http://www.parkafm.com*

Automated spectrometer adjustment

TopSolids is Bruker's intuitive, workflow-based software package for solid-state nuclear magnetic resonance in structural biology. It provides menu-based, automated setup and acquisition of data from advanced multinuclear, multidimensional experiments. TopSolids encompasses a library of such experiments and their semiautomated preparation steps, including guided magic angle adjustment and shimming. Fully automatic measurements of 1H and 13C RF pulses can be rapidly made using a novel proprietary method. After automatic software calibration, 1H, 13C, and 15N pulses are fine-tuned on the sample. The steps ensure correct parameter adjustment for the potentially differing conditions of wet and dielectric samples, with the typically dry setup sample used as a reference. All multidimensional experiments can be queued and combined with nonuniform sampling techniques for high productivity and a flexible, efficient workflow. *Bruker BioSpin Corporation, 15 Fortune Drive, Billerica, MA 01821-3991, http://www.bruker.com*

Interlayer detector for ion-beam milling

The vacuum-based ion-beam milling and etching process depends on precise monitoring of breakthrough across multiple stacked thin-film layers, each only a few angstroms thick. The Hiden IMP-EPD endpoint detector system can be used to routinely monitor and control the total etching process in both research and production environments. The differentially pumped, ruggedized secondary ion mass spectrometer directly monitors the surface ions generated in the etching process, identifies the species present and their relative abundances, and precisely defines the interlayer boundary to just 2.5 Å. It also determines species with molecular weights up to 300 amu. Operation is fully automated, so users can adapt and optimize programs for specific processes. The system also operates as a highly sensitive residual gas analyzer to measure system background gases and as a gas leak detector that uses appropriate search gases. *Hiden Analytical, 420 Europa Boulevard, Gemini Business Park, Warrington, WA5 7UN, UK, http://www.hidenanalytical.com*

Wireless prototyping platform

National Instruments (NI) has announced an integrated software-defined radio solution for rapidly prototyping high-performance, multichannel wireless communications systems. The NI Universal Software Radio Peripheral reconfigurable input/output (RIO) platform is built on the NI LabVIEW RIO architecture. According to the company, it is already a popular platform for industrial and academic research because it enables users to rapidly iterate designs via programmable software. The platform combines a high-performance 2 × 2 multiple input and output RF transceiver capable of transmitting and receiving signals from 50 MHz to 6 GHz through an open LabVIEW field-programmable gate array architecture. It is suitable for a wide range of application areas, including 5G wireless communications research, active and passive radar development and exploration, communications intelligence, and connected smart devices. *National Instruments Corporation, 11500 North MoPac Expressway, Austin, TX 78759-3504, http://www.ni.com*

Software update for USB transducers

Omega has updated the software for its PX409-USBH series transducers by adding a charting window for viewing data graphed in real time. The *y*-axis can be configured to allow simultaneous graphing of multiple engineering units. A data image can be outputted to

a png file. A new xls file type output option presents preformatted data for readability. Live statistics, including sensor information, start and stop times, number of samples taken, current reading, and high and low readings, are displayed. With the logging window, data can be captured for later analysis. The PX409 transducer connects directly to a computer. Its micromachined silicon sensor gives it stability, resulting in accuracy of ±0.08% and a broad compensated range of −29 °C to 85 °C. Included are the software, NET and LabVIEW drivers, and a set for command line access. *Omega Engineering Inc, One Omega Drive, P. O. Box 4047, Stamford, CT 06907-0047, http://www.omega.com*

Optical modeling software

Photon Engineering has designed a new version of FRED, its software for

optical system engineering, to make it more usable, diverse, and efficient. FRED 13.20 incorporates new features and changes to the underlying framework. When a change is made in a user interface dialog and the user presses the OK or Apply button, FRED undergoes a document update cycle to ensure that all the interdependencies between elements are properly accounted for and that the model is updated into a valid state. The cycle also applies to updates made through the scripting language. When the user wants to keep track of all individual raypaths in a model, a period of postprocessing takes place at the conclusion of the raytrace in order to sort the raypaths. In systems in which there are large numbers of raytrace paths, the postprocessing time can be significant. FRED 13.20 implements a new raypath sorting algorithm that significantly reduces the processing time. *Photon Engineering LLC, 440 South Williams Boulevard #106, Tucson, AZ 85711, http://www.photonengr.com*

Raman, AFM, and SNOM imaging software

New WITec Suite software is now available for all the company's imaging systems. It was developed to acquire and process sizable data volumes of large-area, high-resolution measurements and 3D imaging while providing speed, performance, and usability. Various techniques and measurement modes are incorporated: Raman, atomic force microscopy (AFM), scanning near-field optical microscopy, fluorescence, and luminescence. An intelligent computer resource management system provides the capabilities to generate and visualize large data sets. Even sets including several million image pixels, such as those that contain the information of a complete Raman spectrum or an AFM pulsed force mode curve, can be generated, processed, and imaged smoothly with WITec Suite. For example, high-speed data acquisition allows for measuring and recording more than 1300 Raman spectra in only one second. *WITec Instruments Corporation, 130G Market Place Boulevard, Knoxville, TN 37922, http://www.witec.de*

Data acquisition module

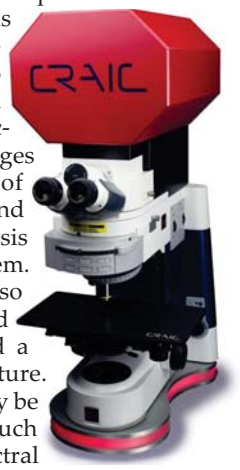
According to Data Translation, its new DT9844 model offers the highest accuracy and throughput of any data acquisition (DAQ) module. It features 20-bit resolution and accuracy at a throughput of 1 MHz. The new design minimizes noise and crosstalk between channels, despite the high bandwidth needed to achieve the speed and accuracy benchmark. It employs trisectional galvanic isolation of ±500 V between the analog portion, the digital section, and the USB connection. The isolation further prevents digital interference by using precise analog signals to preserve signal integrity. The high-speed DAQ module provides 32SE or 16DI analog input channels, 32 digital input/output, and five counter/timers that can be synchronized with the analog input data. Users receive full software support and a QuickDAQ application that allows them to use the module right away. *Data Translation Inc, 100 Locke Drive, Marlboro, MA 01752-1192, http://www.datatranslation.com*

Rapid image visualization software

Bitplane has launched a new iteration of Imaris, its image processing software. Imaris 7.7 uses parallel processing to enable performance improvements in both visualization and analysis. Enhancements to the native IMS file format provide lag-free access to statistics. A redesigned cells detection wizard and rendering engine improve the quality and reproducibility of cellular analyses. Imaris rapidly creates the first interactive visualization and quickly detects and tracks objects. Those features and Imaris's ease of use make it suitable for both novice and advanced microscopy researchers and imaging scientists working in various fields, including biology. *Bitplane USA, 425 Sullivan Avenue, Suite 3, South Windsor, CT 06074, http://www.bitplane.com*

Raman spectroscopy and imaging software

Craic Technologies has written its Lambdafire-R software package to collect, analyze, and process microspectra and images from its Raman microspectrometers. It combines advanced 64-bit software that takes advantage of the company's latest Raman microspectrometers, such as the Apollo Raman, with the most recent versions of Windows. Designed for the production environment as well as the laboratory, the software allows users to control Craic Raman microspectrometers, acquire high-quality images and Raman spectra of microscopic samples, and use advanced data analysis features to examine them. The software package also includes touchscreen and automation control and a native Windows 8 feature. Additional modules may be incorporated to add such capabilities as the spectral mapping of surfaces. *Craic Technologies Inc, 948 North Amelia Avenue, San Dimas, CA 91773, http://www.microspectra.com*



Gridding and mapping software

Golden Software's Surfer is a gridding and contour mapping software used by geologists, hydrologists, and engineers to transform data into presentation-ready maps that, according to the company, are clear, vibrant, and accurate. The latest version of the software package, Surfer 12, offers 12 gridding methods, including Kriging with variograms, to convert irregularly spaced *xyz* data into a uniform grid. A grid or digital elevation model can be displayed in one of eight fully customizable 2D and 3D grid-based map types: contour, watershed, image, shaded relief, one- and two-grid vector, 3D wireframe, and 3D surface maps. Displays can be enhanced by adding post and base maps. New features include the ability to grid and display data using a logarithmic scale, create contour maps with logarithmically scaled contour intervals, and fill maps with a logarithmically scaled color gradient for accurate mapping when the data set spans several orders of magnitude. *Golden Software Inc, 809 14th Street, Golden, CO 80401-1866, http://www.goldensoftware.com*

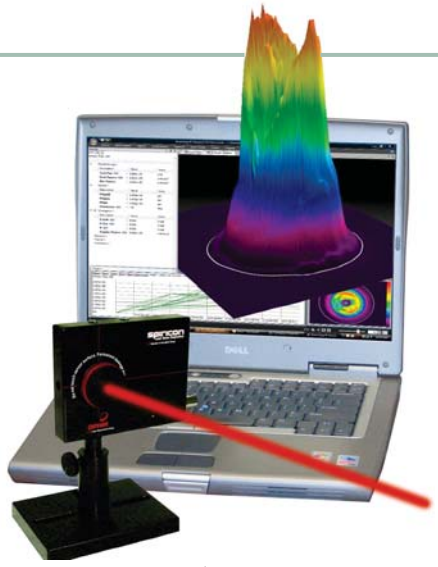
Light measurement software

Labsphere's Integral light measurement software collects, analyzes, and accesses data from Labsphere systems and hardware as well as from other manufacturers' components used for solid-state light testing. It controls and

automates results testing and reporting for electrical, thermal, and optical performance of solid-state lighting. The software supports all of Labsphere's spectrometer products, and the newest version, Integral 1.2, supports a wide range of instruments common in photometry laboratories, including Instrument Systems' CAS 140 spectrometer. By enabling a single user to manage the workflow of multiple light measurement systems, it can increase efficiency in laboratory and production environments. Integral now supports AC and DC power supplies and power meters from several companies, including Keithley Instruments and Agilent Technologies. *Labsphere Inc, 231 Shaker Street, North Sutton, NH 03260, http://www.labsphere.com*

Laser-beam profiling software

Ophir Photonics has announced BeamGage 6.1, the latest version of its beam profiling system. It performs extensive data acquisition and analysis of laser-beam parameters such as size, shape, uniformity, divergence, mode content, and expected power distribution. A major upgrade of the computation engine improves cycle time and the responsiveness of the user interface and enhances BeamGage 6.1's ability to work with apertures and partitions. The increased performance and speed of the software are especially helpful when analyzing different beams or sources of light, such as LEDs and optic fibers, or performing heavy computations, such as measuring multiple beam profiles, comparing key statistics, and viewing



3D images in real time. A new strip chart function allows for zooming and panning, charting of partitions, and storing more than 10 000 data points with no decrease in performance. *Ophir-Spiricon LLC, 3050 North 300 West, North Logan, UT 84341, http://www.ophiropt.com*

Gas source system for semiconductor fabrication

Semi-Gas Systems offers a new Xturion custom gas source system that safely and continuously delivers low-vapor pressure liquefied process gases in vapor phase. Suitable for hazardous and nonhazardous gas applications, VaporX is designed to accommodate many of the low-vapor pressure gases used in semiconductor, LED, and solar cell production; R&D; and other high-purity markets. Xturion VaporX systems are available in one- and two-process cylinder models, each featuring a GigaGuard programmable logic controller and an ergonomically positioned eight-inch touchscreen. The unit's intuitive display schematics allow for easy control over all system operations, including gas delivery, alarms, automatic cylinder switchover, and auto-purge capabilities. *Semi-Gas Systems, 180 Quaker Lane, Malvern, PA 19355, http://semi-gas.com*

Electron-beam evaporation power supplies

Spellman High Voltage Electronics has introduced its EVA series of rack-mounted, high-voltage power supplies for e-beam coating applications. Available in 3-, 6-, and 12-kW versions, the EVA utilizes a rugged, insulated-gate bipolar transistor switch mode design to limit stored energy and provide excellent regulation and ripple specifications. Designed specifically for demanding e-beam applications, the EVA series is tolerant to both transient and continuous arcing. With its low stored energy and low capacitance output, the EVA minimizes power delivered during arcing events and permits rapid arc recovery times, thereby limiting process interruptions and improving product yields. Arc intervention parameters can be optimized via the unit's graphical user interface for maximum arc management performance. Adjustable values include arc quench, reramp, count, and arc rate limiters. *Spellman High Voltage Electronics Corporation, 475 Wireless Boulevard, Hauppauge, NY 11788, http://www.spellmanhv.com* ■