

TESTING CHARACTERIZATION

BRIEFS

Agilent Technologies Inc. has acquired the **Nano Instruments** business unit of **MTS Systems Corp.** The acquisition will strengthen Agilent's portfolio of instrumentation for imaging, characterizing, and quantifying nanomechanical material properties.
www.agilent.com

Adept Technology Inc. has developed a new system that integrates high-resolution inspection with high-speed solar cell handling, and features the Adept Quattro s650 robot along with a Bernoulli gripper. The combination creates an effective method for manipulating solar cells without the potential for product damage.
www.adept.com

Bodycote Accutest Laboratories Ltd., a full-service environmental analytical laboratory in Ontario. Accutest offers a broad range of analytical services in support of landfill monitoring, environmental site assessments, remediation, drinking water quality, regulatory compliance, and more.
www.bodycotetesting.com

Extreme high resolution SEM enables 3D surface imaging

A new class of instruments that enables 3D surface images at many different angles and at resolutions below one nanometer has been introduced by FEI Co., Hillsboro, Oregon. Called extreme high-resolution scanning electron microscopes (XHR SEMs), the Magellan XHR SEM images samples at very low beam energies, avoiding distortions otherwise caused by the beam penetrating into the material below.

Performance derives from the integration of new electron optical elements, proprietary electron gun technology, a highly accurate five-axis piezo-ceramic stage, and a high-stability platform with fully configurable analytical chamber. The stage readily accommodates large samples or multiple smaller samples, while providing fast, accurate navigation and unequalled stability.

The ability to provide sub-nanometer resolution over a broad range of beam energies, from less than one kilovolt to 30 kV, allows semiconductor manufacturers to see critical detail on complex three-dimensional structures in 32 nm nodes and below, with unprecedented clarity and contrast. Researchers in materials science will now have the ability to generate high-resolution, surface-sensitive images of carbon nanotubes, nanowires, and catalysts without the image distortions caused by electrical charging from higher-energy electron beams.

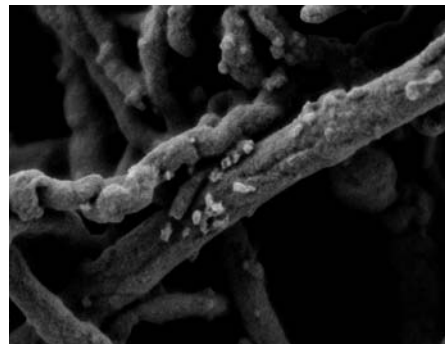
For more information: FEI Co., 5350 NE Dawson Creek Drive, Hillsboro, OR 97124; tel: 503/726-7500; www.fei.com.

Image processing analysis to evaluate continuous-cast slabs

A nondestructive image processing method for evaluating the soundness of continuously cast slabs that had been accelerated-cooled prior to completion of the alpha-to-gamma transformation has reportedly been developed at the University of Pittsburgh, Pa.

The increasing demand for high-quality cast steel slabs requires faster casting and cooling speeds without sacrificing overall quality, according to a presentation at MS&T 2008 in Pittsburgh, Pa., Oct. 5–9. Titled *Using NDT Image Processing Analysis to Study the Soundness and Cleanliness of Accelerated Cooled Continuously Cast Steel Slabs*, it is to be presented by C. Isaac Garcia, University of Pittsburgh.

Factors such as operating techniques and slab width have a strong effect on casting rate and increased productivity. One area that has received limited attention is the accelerated cooling of slabs. To evaluate soundness of the slabs, a nondestructive testing technique was developed to assess the level of anomalies or defects found in the slabs.



This image shows carbon nanotubes imaged at 200 V, at 600k magnification.

Band excitation SPM enables 100X faster data acquisition

A scanning probe microscopy (SPM) technology that allows 100 times more rapid probing of energy dissipation at the nanoscale than previously possible has reportedly been developed at Oak Ridge National Laboratory, Oak Ridge, Tenn.; and Asylum Research, Santa Barbara, Calif. Called Band Excitation (BE), the technology enables characterizing a sample's electrical, magnetic, and mechanical energy conversion and dissipation properties at standard imaging rates.

In BE, a conventional sine wave is replaced by a synthesized digital signal that spans a continuous band of frequencies and monitors the response within the same frequency band. This allows a 100 times improvement in data acquisition speed without reducing the signal to noise ratio. A full response spectrum can then be collected in the amount of time required for a single pixel in standard SPM.

Oak Ridge and Asylum received a 2008 *R&D 100* award for developing the Band Excitation technology. For more information: John Green, Asylum Research, 6310 Hollister Avenue, Santa Barbara, CA 93117; tel: 805/696-6466; john@asylumresearch.com; www.AsylumResearch.com; www.cnms.ornl.gov.

The results from the NDT analysis were calculated with the aid of software designed to identify the type of defects and their location in the slabs. These results were complemented with a systematic microstructural analysis. This paper will present and discuss the results of this NDT Image Processing Analysis. For more details about this presentation, visit www.matscitech.org.

Workflow solution enables testing nonconductive samples

A newly developed work-flow solution for automated full-scale high-resolution particle analysis has been announced by Carl Zeiss SMT, Cambridge, England. The newly developed system in particular allows for the analysis of nonconductive samples based on proprietary Variable Pressure technology. ParticleScan VP is a further development of the high-vacuum ParticleScan particle detection and analysis system introduced in 2007 and based on the SEM platform. It has been designed for frequently repeated analysis of material samples in industrial production and research environments.

Combined with an optional X-ray analysis tool (EDS), the system can automatically record the morphology of samples, enabling highly efficient and automated process control, yield improvement, and manufacturing capability. Provided with the dedicated SmartPI software, the system can be adapted to a broad spectrum of particulate analysis, from pharmaceutical powders to inclusions in metal alloys. Particle images of specific interest can be reviewed offline, and re-measured or re-located on the original sample for further analysis if required.

For more information: Markus Wiederspahn, Carl Zeiss SMT AG, Germany; tel: 49 7364 20-2194; fax: 49 7364 20-9206; wiederspahn@smt.zeiss.com; www.smt.zeiss.com.

Portable digital force tester has 0.1% accuracy

An advanced force-testing system that incorporates an intelligent load-sensing system with measuring accuracies said to be better than 0.1% full scale has been introduced by Ametek Measurement & Calibration Technologies, Largo, Fla. The Chatillon TCD225 eliminates the need for a personal computer without compromising operational performance or capability.

The frame operates from 0.001 to 50.0-inches per minute (0.01 to 1270 mm/minute) and features an advanced closed-loop PID controller for precision travel (accuracy better than 0.25% unloaded). An innovative thumbwheel drive allows precise control of crosshead position and speed when in manual mode, making fixture preparation and alignment safe and efficient.

Seven interchangeable load sensors

BRIEFS

Edax Inc. has launched the DigiView IV, the latest generation electron backscatter detector. It uses a bellows-based insertion and retraction system for operation while under vacuum and for live-imaging for maximum vacuum and system integrity. www.edax.com

Know for Sure...



Get More Info

innovx.com/amp

On-the-spot alloy identification and chemistry. Ideal for PMI, even hot surfaces (up to 800° F). Elemental analysis for Mg to U, from ppm to 100% in alloys, ores, powders, slurries and more.

...with the all new
**Innov-X Omega
Handheld XRF**



Innovative XRF Technologies

Get results fast! Save time, money and other valuable resources.

When traditional means restrict you, go with the handheld XRF you can count on!

We'll show you what our handheld can do.

- Weatherproof - sealed to moisture & dust
- Superior speed - alloy chemistry & grade match in seconds
- Vacuum upgrade for Al, Si, Mg, P - no gas or tanks to carry
- Field-proven XRF technology - over 5,000 systems in operation

Fabtech
10.6-10.8.08
Booth #4220
Las Vegas, NV

MS&T
10.7-10.8.08
Booth #332
Pittsburg, PA

Call:
(781) 938-5005
(866) 4-innov-x

Email:
sales@innovx.com

Check it out:
www.innovx.com/demoamp

Ask about our rental programs:
rentals@innovx.com

Tougher Design • Faster Testing • Sealed Electronics



Bruker AXS introduces TracerTurbo, the world's first handheld X-ray fluorescence instrument in which a silicon drift detector improves speed, sensitivity, and resolution. XFlashSDD offers unprecedented speed and analytical specificity when integrated into the handheld instrument. www.bruker.com

GE Sensing & Inspection Technologies has released its XL Go VideoProbe. Weighing only 3.8 pounds, it is powered by a lithium ion battery and has no tethers. The system's durable tungsten braided insertion tube has 360-degree articulation, allowing for navigation in tight places. www.ge.com

Instron introduces the 1000HDX Universal Testing Machine that features a dual test space for tension, compression, bend, shear, and flexure testing of high-strength materials. Cost-effectively designed, the machine is ideal for testing materials for the metal, fastener, and construction markets, including rebar, wire, strip, tube, plate and structural steel, as well as concrete. www.instron.com

Manhattan Scientifics has acquired **Metallicum Inc.** and its nanotechnology. The transaction includes all of Metallicum's licensed intellectual property related to the design and high-volume nanofabrication of nanostructured metals for medical components as well as for transportation applications. www.mhtx.com

Test Devices launches a new website that features enhanced information about thermo-mechanical fatigue spin testing, detection of cracks in rotating assemblies during LCF testing, and much more. www.testdevices.com

Thermo Fisher Scientific Inc., announces that an independent judging panel and the editors of *R&D Magazine* selected the handheld Thermo Scientific Niton XL3t XRF analyzer as one of the 100 most technologically significant products introduced into the marketplace over the past year. www.thermo.com/niton

TÜV Rheinland has acquired **Unified Testing Services Inc.**, a full-service testing and consulting engineering firm based in Woodstock, Ala. The acquisition folds a variety of new services into TÜV Rheinland's portfolio and makes UTS a standalone member of TÜV Rheinland of North America Group. www.us.tuv.com

The **University of Illinois Urbana Champaign** has developed a novel testing device for understanding the tensile properties of single nanofibers. In addition to the ability to test single nanofibers, the technology allows for testing in virtually any loading range and temperature. www.uiuc.edu

are available, ranging from 250 gf to 200 lbf. These also can be interchanged with the Chatillon DFS-R-ND Series force gauge. They come standard with a certificate of calibration with NIST data and uncertainty, and can be calibrated to better than 0.5% of indicated reading when calibrated on site in accordance with ASTM E4 or ISO 7500-1.

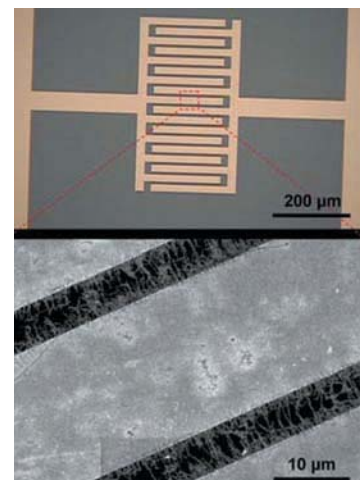
For more information: Ametek, 8600 Somerset Drive, Largo, FL 33773; tel: 800/527-9999; Chatillon.fl-lar@ametek.com; www.chatillon.com.

Super-sensitive detector based on carbon nanotubes

The most sensitive electronic detector yet for sensing deadly gases such as the nerve agent sarin is based on carbon nanotubes, report engineers at the Massachusetts Institute of Technology, Cambridge, Mass. The technology, which could also detect mustard gas, ammonia, and VX nerve agents, has potential to be a low-cost, low-energy device that could be carried in a pocket or deployed inside a building to monitor hazardous chemicals.

To build the super-sensitive detector, Prof. Michael Strano and his team used an array of carbon nanotubes aligned across microelectrodes. Each tube consists of a single-layer lattice of carbon atoms, rolled into a long cylinder that acts as a molecular wire. When a particular gas molecule binds to the carbon nanotube, electrical conductivity changes. Each gas affects conductivity differently, so gases can be identified by measuring the conductivity change after binding.

For more information: Michael Strano, Massachusetts Institute of Technology, Cambridge, MA 02138; tel: 617/324-4323; strano@mit.edu; www.mit.edu.



Top: An optical image of the interdigitated gold electrodes upon which the carbon nanotubes are deposited. Bottom: A scanning electron microscopy image of the gold electrodes (thick gray bars). The carbon nanotubes are the small string-like wires extending into the black regions between the electrodes. Image by Chang Young Lee.

Acoustic method determines porosity in composite coating

A low-cost, simple nondestructive acoustic method to determine porosity for any combination of coatings and substrate has reportedly been developed at the University of Windsor, Ontario. High porosity within a coating can have detrimental effects on many properties including adhesion and corrosion protection. Also, sample data is not always reliable as a fair estimate for sprayed properties, especially in a process as variable as cold spray.

In this study, the low-pressure gas dynamic spray process applied three different composite coatings. The samples were then evaluated via regular acoustic methods, and sound velocity was determined at four points on each sample to determine an average. Next, using a YDK01 (Sartorius) density determination kit and the Archimedean principle, the density was determined to within an accuracy of 0.1%.

By comparing porosity and sound velocity measurements, the goal is to create a database by which future coatings can be compared and porosity estimated nondestructively.

For more information: Roman Maev, University of Windsor, Windsor, ON N9B 3P4; tel: 519/253-3000 x2661; maev@uwindsor.ca; www.uwindsor.ca.