

## RESOURCES

A summary of new products and services  
for materials research...

**Plastics Design Software:** Rapra Technology's SENSAN simulates the role of an impartial design consultant at initial stages of product development. It highlights potentially critical issues that may determine product integrity and durability. The left half of the screen guides designers through a question-and-answer routine for a project, covering topics such as temperature, chemical, environmental, legislative and social issues, bulk and surface properties, jointing, and dimensional stability. The right half of the screen displays technical information to help the designer solve problems.

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**Portable Degassing System:** MV Products' portable degassing system can be customized for applications such as degassing epoxies and adhesives, potting, and impregnation. The self-contained cart features a 15-gal. chamber with custom porting; a 1.5-in.-thick clear Lucite® top; vacuum pumps with capacities from 15 to 50 CFM and pressure ranges from 15 in. to 29.9 in. Hg (<1 Torr); inlet and exhaust traps; electrical or rotary motion feed-throughs; gauges and controls; and plumbing. Built to customer specifications, the system is suitable for labs and small batch processing applications.

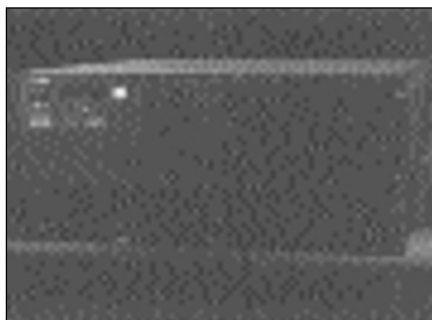
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**Image Analysis System for TEM:** The Fujifilm FDL 5000 delivers 25  $\mu\text{m}$ -pixel size digital images by reading TEM images from an erasable Imaging Plate (IP). The IP detection area is more sensitive than conventional film but is just as large. Users can quantify the electron dose for diffraction patterns and HREM images more accurately than with film. Digital image data can be processed and analyzed on various computer platforms. A wide dynamic range is offered, with linearity across more than five orders of magnitude.

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**CCD Camera with Gated-Detection Technology:** Roper Scientific's PI-MAX uses a Programmable Timing Generator™ that allows users to set gate pulse widths and delays under GUI-software control. For temporal resolution, gate widths are less than 2 ns. The MCP Bracket Pulsing™ achieves on/off ratios greater than 10<sup>7</sup>:1, even in UV, and QED exceeds 35%. Applications include VUV and NIR spectroscopy and gated imaging experiments such as combustion analysis.

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**Variable Frequency Generator:** The HFV-L from Advanced Energy Industries is a 3000 W variable frequency generator designed for use with 200- and 300-mm wafer processing equipment. Output frequency range is 1.765–2.165 MHz, and users can customize frequency tuning parameters that reside in firmware. The water-cooled generator is suitable for PVD, PECVD, etch, and other inductively coupled plasma applications.

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**Low-Temperature Joining Process for Dissimilar Materials:** Materials Resources International's S-Bond™ has been demonstrated in joining carbon:carbon composites to aluminum with application in thermal management components used in space-based radiators and heat transfer packaging in satellite electronics. Commercialization of S-Bond is now centering on other light metal (Al, Mg, and Be), C:C, and MMC joining for aerospace applications and for use in electronic processing machinery. The one-step low-temperature process eliminates the need for multiple-step pre-metallizing techniques and results in joint shear strengths of 4,000–6,000 psi.

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**Ultrasonic Hardness Tester:** Micro Photonics' Kawatetsu Sonohard Model SH75 measures the hardness of surfaces and bulk materials by means of a small diamond indenter, which is pressed into the surface under examination. The probe is stimulated with a longitudinal ultrasonic vibration. When the probe comes into contact with the sample material, the damping effect on the probe is related to the hardness of the sample. This is reflected in a change of resonant frequency of the probe, which is measured by the instrument and converted into a hardness reading. Calibrations are entered using test blocks of known hardness.

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**Quadrupole Mass Spectrometer:** Hiden Analytical's 3F/1000 series of quadrupole mass spectrometers offers mass resolution for mass range applications to 2500 amu. The triple-stage mass filter is available with pole diameters of 9 and 12 mm. Coupled with the 200-W RF power source operating at frequencies of 5 MHz, performance is optimized from low to high mass for measurements as diverse as deuterium/tritium and cluster analyses. Accessories include gas and molecular beam ion sources and axial and sector field energy analyzers.

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**Range-Adjustable Mass Flow Controller and Meter:** MKS Instruments' M100B mass flow controller combines a thermal sensor with a changeable bypass. Both the M100B and the M10B mass flow meter can be range-adjusted through a change of a bypass element accessible through the sensor inlet. The M100B is offered in full-scale ranges from 10 sccm to 30 slm. Accuracy is  $\pm 1.0\%$  of full scale over a control range from 2% to 100% of full scale. Repeatability and resolution are  $\pm 0.2\%$  and 0.1% of full scale, respectively.

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**3D Measuring Instrument:** Nikon's Veritas 3D uses three probe technologies—video, laser, and touch—to capture data on shapes such as cones, spheres, cylinders, and indentations. The system runs in conjunction with Metronics' Quadra-Chek 5300NLS software for 3D geometries, and includes pattern recognition, a report generator, integrated SPC, conditional branching, and edge filtering. A retractable probe module can be programmed to swing downward and lock into place for touch measurements and then retract for laser or video monitoring.

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**In Situ Multiple-Gas Analyzers:** The INDUCT™ from On-Line Technologies provides quantitative, simultaneous *in situ* determinations for more than 20 gas concentrations within the feed or exhaust line of a processing tool. The automated system features a large dynamic range (low ppb to percent), under 1 s response, temperature and pressure compensation, and lifetime calibration. The instrument employs the Model 2102 FTIR spectrometer designed for process and environmental monitoring in hostile environments.

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