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

High-Voltage Power Amplifier: Trek's Model 10/10 A is a high-voltage dc-stable power amplifier designed to provide control of output voltages from 0 to ±10 kV dc or peak ac with an output current range of 0 to ±10 mA dc or peak ac. It is configured as a non-inverting amplifier with a fixed gain of 1,000 V/V. The four-quadrant, active output stage sinks or sources current into reactive or resistive loads throughout the output voltage range to achieve accurate output response and high slew rates.
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Chemiluminescence Measurement: The CL400 ChemiLume™ from Atlas Electric Devices evaluates materials' oxidative stability by measuring chemiluminescence, or light emission caused by thermal oxidation. An organic material heated in an oxygen-rich atmosphere emits a peak light signal due to formation and decay of electronically excited carbonyl groups. During this aging period, materials emit a detectable amount of light in relationship to the rate of thermal oxidation taking place. Analysis of the chemiluminescence process provides information about the material's resistance to thermal oxidation and the efficiencies and mode of action of stabilizers.
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Mid-Sized Microscope System: The Eclipse E600 system from Nikon uses the CFI60 chromatic aberration-free infinity optical system over the full 25-mm field of view. Coating technologies allow for clear, bright, and high-contrast images from 340–600 nm or more. The system can be used with techniques such as brightfield, darkfield, differential interference contrast, and fluorescence studies. With the seven-place universal condenser, users can custom build the system to suit their needs.
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Spectroscopic Ellipsometer Accessory: The Sentech SE900 from Micro Photonics adds the power of variable angle ellipsometry to most commercial FTIR spectrometers. Operating in the MIR (500–5000 wave-numbers) and FIR (100–600 wave-numbers) ranges, the device comprises a set of variable angle infrared optics, control electronics, a PC, and Spectraray software. Optics are pre-aligned and mount into the sample compartment of the FTIR spectrometer. Ellipsometric measurements of film thickness and optical and dielectric properties can be made for multilayer thin films, interfaces, and bulk material. Spectra are obtained via the spectrometer's FTIR detector.
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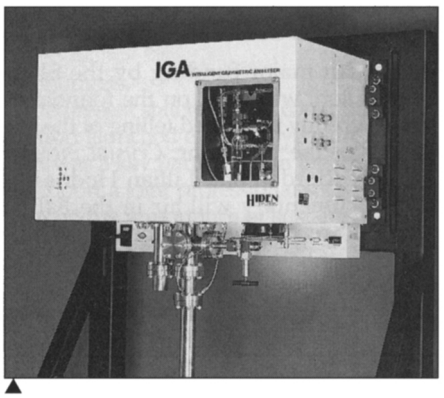

Vapor Sorption Analyzer: The IGA-002 from Hiden Analytical uses a gravimetric principle to measure the uptake of vapor adsorbates on porous materials. A vessel designed to UHV standards permits vacuum levels better than 10^{-4} torr at the sample position, and a pressure control system regulates vapor pressure accurately across eight decades of pressure measurement. Temperature stability is ±0.05°C. A rapid internal sample heating system rated to 350°C can be used to dry the sample prior to measurement. The kinetics of vapor sorption can be measured at each point on the isotherm and provide true equilibrium determination.
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Magnetic Refrigerator: A magnetic refrigerator produced by the U.S. Department of Energy's Ames Laboratory and Astronautics Corporation uses gadolinium metal to produce refrigeration that exceeds the cooling power of previous magnetic refrigerators by 100–1,000 times. The gadolinium has a large magnetocaloric effect, which is the ability of metals to heat when magnetized and cool when demagnetized. The unit, which achieves 50–60% efficiency, eliminates the use of environmentally harmful chlorofluorocarbons present in conventional refrigerators.
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Tantalum Nitride Thin Film Resistor Networks: BI Technologies' tantalum nitride resistor networks have a power rating per resistor for isolated configurations of 100 mW at 70°C and a power rating for bussed configurations of 75 mW at 70°C. The resistance values in a 16-pin QSOP for eight isolated resistors range from 10–270 ohms. Resistance values for bussed resistors are rated from 10–130 ohms. The devices are designed for voltage divider applications, pull up/pull down, series termination, and high-resistive density applications.
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Thick Film Strain Gage Sensor: DJ Force/Deflection Sensors from DJ Instruments are manufactured to specification by applying a strain gage transducer to a flat metal beam. Depending on the configuration and application, they can exhibit 5–50 kohm or less impedance and offer 4–8 mV/V output. The sensors can handle up to 100 V excitation, with a measurement range of 50 g at -60°C to 150°C, with 0.5% full scale per year long-term stability. They can be custom engineered in sizes of 0.25 in. W × 0.5 in. L (0.6 cm × 1.2 cm) and larger.
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CD-Measurement SEM: Hitachi's S-8840 uses a flashless electron source to provide 40 resolution at an operating voltage of 800 V. This eliminates charging and ensures proper imaging and measurement. The automated CD-measurement function is facilitated through wafer alignment via an optical microscope and real-time autofocus system. A loadlock system and rapid stage drive provide a 26-wafer/h through capability.
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Materials Publications: The Institute of Materials' 1997 catalog lists information on materials books, journals, and software. Topics include ceramics, coatings, composites, corrosion, heat treatment, mechanical properties, metallography, microstructure, phase diagrams, polymers, powder metallurgy, thermodynamics, and more. Title and author/editor indexes are included, and a dozen materials journals also are described.
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Microhardness Testers: Future-Tech FM-7 microhardness testers from Struers facilitate measurements by metallographers. When actuated, the automatic turret rotates from the objective lens to the indenter position, performs the loading sequence, and automatically returns the objective lens for the measuring procedure. The turret accepts up to three lenses along with the indenter. Results from 999 tests can be stored in memory.
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Rheological Testing of Polymers: Free booklets from Rheometric Scientific are intended to enhance understanding of rheological testing related to thermoplastics and thermosets. The booklets explain the science of rheology and the associated technology of rheometry. They include diverse examples of tests on a range of materials.
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