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

**Modular Thermal Imaging:** Each system in Mikron Instrument's TH3100 Series is both a portable system and a unit suitable for printed circuit performance and R&D. The series includes three detector units for various levels of temperature and resolution application. Each of the three models uses a 12 bit A/D conversion of user-suppressible temperature spans, 12 VDC operation, and elimination of a dedicated image processing computer. Each system consists of a small detector unit with a close focus, telephoto, or wide angle lens, and a control unit with a 3.5-in. (8.89-cm) display. A plug-in DIF board permits use with a PC for fixed applications.
**Circle No. 61 on Reader Service Card.**

**Low-Leakage Switch:** Hewlett-Packard offers a low-leakage switch that facilitates the HP parameter analyzer to automate direct-current (DC) measurements. The switch enables users of the HP 4155A and 4156A DC parameter analyzers to expand the analyzer functionality from a single box to an automated measurement system. Users can choose one of two low-noise plug-in modules. One module configures the switch as a cross-point matrix for general parametric measurements, and the other configures the switch as a multiplexer for long-term reliability parallel measurements.
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**Thin Film Deposition Rate Monitor:** The ATOMICAS from Intelligent Sensor Technology uses the principle of atomic absorption spectroscopy for *in situ* monitoring and real-time control of the atomic vapor flux in PVD processes. The optical design corrects long-term baseline drift problem normally caused by window coating and other factors. ATOMICAS can monitor and control depositions in reactive evaporation or sputtering processes where conventional deposition rate monitors become ineffective either from lack of material specificity or because the sensor cannot function at high gas pressure. Deposition rates of 0.01 nm/s can be detected and controlled.
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**Precision Metals:** Free 12-page brochure highlights the capabilities of Hamilton Precision Metals, a specialty reroller of most alloys. Strip and foil are produced in thicknesses ranging from 0.050 in. to 0.000060 in. (1.27 mm to 1.524 μm) and in widths up to 15 in. (38.1 cm). Applications include medical and surgical instrumentation, computers, and electronics. The brochure describes the company's capabilities for rolling, slitting, and annealing, and also provides a list of the metals and alloys that the company regularly produces.
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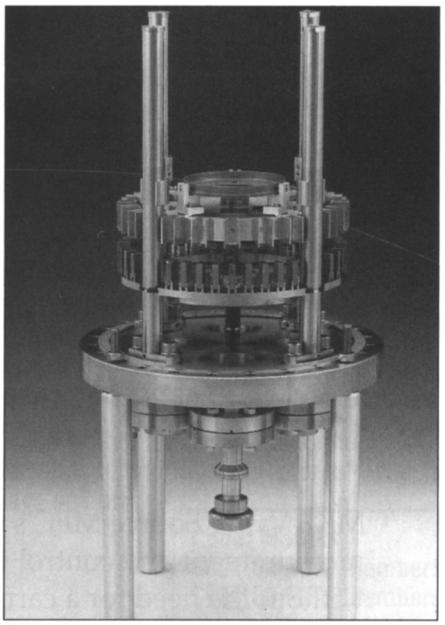

**Scanning Tunneling Microscopes:** OMICRON's UHV scanning tunneling microscopes accept wafer samples from 1 in. to 4 in. (2.54 to 10.16 cm) in diameter. The STM head facilitates customized adaptation to MBE systems and wafer production lines. The STM stage, a 3-D $10 \times 10 \times 10$ $mm^3$ precision tip coarse positioning system, uses piezo stepper drives and covers a range from atomic resolution imaging to scans up to $15 \times 15$ $\mu m^2$. Tip exchange is accomplished via remote-controlled piezo motors and internal vibration isolation, with spring suspension and eddy current damping system that eliminates the need for external vibration isolation.
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**Silicon, Germanium, and Tin Compounds:** Gelest's 432-page catalog offers information about silicon, germanium, and tin compounds, as well as metal alkoxides, metals, diketonates, and silicones. Included are materials for optical and conductive coatings, photolithography, synthetic organic chemistry, ceramics, catalysis, monomers, polymers and polymer synthesis, coupling agents, and superconductors.
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**Cutting Tool Stress Relief System:** The FluxaTron® U-105 from Magnetic Processing Systems uses a pulsed magnetic treatment process to induce magnetostriction and to relieve residual stresses in tools that are developed during the resharpening, coating, or manufacturing process. The device strengthens the cutting edge by reducing the amount of chipping, cracking, or fracturing of the edge. Applications include tool steels such as HSS, cobalt, and carbide.
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**Diode Array Spectrometers:** Labsphere's DAS multichannel analyzers designed for real-time spectral analysis are available in four models for applications covering the wavelength region from 390 to 760 nm and 350 to 1,050 nm. Users may choose either an uncooled or TE-cooled detector. "Virtual instrument" files facilitate spectral data acquisition, pixel-to-pixel wavelength conversion, radiometric calibration, and CIE color calculations. Data acquisition and signal processing are achieved when interfaced with National Instrument's LabVIEW® software.
**Circle No. 67 on Reader Service Card.**

**Variable Frequency Microwave Systems:** Lambda Technologies' Series 6000 VFM rack-mounted units are suitable for process research for polymer and composite processing, adhesive curing for surface mount technology, controlled drying, bonding applications, surface treatments, and ceramic sintering. Offered from 200 W to 1.5 kW in frequencies of 0.9–18 GHz, the systems provide coupling efficiency by tuning the central frequency to match the sample load. The systems also can be programmed to sweep around an adjustable bandwidth to produce uniform energy distribution.
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**Magnetron Sources:** TORUS® magnetron sources from Kurt J. Lesker Company offer target sizes ranging from 1 in. to 6-5/8 in. (2.54 to 16.83 cm), with UHV and magnetic target models also available. The targets are suitable for sputtering from small-scale R&D to high-volume production applications. The broadened plasma volume produced by the source can increase the target erosion zone by more than 40%. The sources, compatible with DC power for conducting targets and RF power for insulating targets, are capable of normal sputtering with an inert gas or reactive sputtering with an active gas. A 1,000-page product catalog also is available.
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**Switching Handbook:** Keithley Instruments' third edition of the *Switching Handbook* is an application guide to signal switching in automated test systems. More than 200 pages of information on the theory and practice of automated switching in low-level measurements are provided. The book covers stimulus/response functions, switching components, system topologies and specifications, hardware selection, scanning versus multiplexing, voltage and current switching methods, and settling time considerations.
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# MKS Materials Delivery

## Systems • Components • Solutions

**Gases**

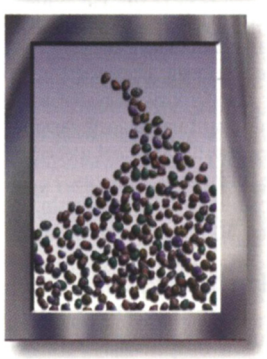
MKS offers a wide variety of thermal gas phase mass flow controllers for flow rates from 0.1 sccm to 200 slm. These include elastomer-sealed general purpose MFC's, high line pressure MFC's (up to 1500 psig), high accuracy Transfer Standards and a complete line of all-metal MFC's for ultrapure applications.

**Vapors**

MKS Vapor Source MFC's employ a pressure-based measurement and control technique to deliver source vapor without the need for a carrier gas system. 1150 and 550 Series MFC's feature a wide operating temperature range (30°C to 150°C) and can therefore deliver a variety of vaporized liquid source materials into low pressure systems.

**Liquids**

Direct Liquid Injection (DLI) sub-systems utilize a micropump, vaporizer and electronics control unit to deliver 0.001 to 10 cc/min liquid in a smooth pulse-free manner. Liquid Precursor Delivery Systems (LPDS) are integrated/configurable systems that provide a custom delivery solution using a positive displacement metering pump and vaporizer.



**Solids**

Both the MKS Liquid Precursor Delivery System and the Type 1150 MFC can effectively deliver dissolved or heated solid sources. In Copper CVD processing, the LPDS is used to deliver ß-diketonate $Cu^{II}$ by dissolving the solid material in a solvent such as isopropanol. Sublimed solid sources can be delivered directly without the use of a carrier gas with the MKS Types 1150 and 550 MFC's.

### Worldwide Customer Support

MKS materials delivery products are supported by a worldwide network of dedicated field sales and service engineers and applications specialists.

MKS INSTRUMENTS, INC.

ISO CERTIFIED 9001

Six Shattuck Road, Andover, MA 01810 • (800) 227-8766 • Tel: (508)975-2350 • Fax: (508)975-0093



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