

## RESOURCES

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

**Nanocrystal Materials:** Ultram offers metal and ceramic nanocrystals in quantities suitable for commercial and industrial use. The nanocrystal materials, with particles ranging from 10 to 100 nm in diameter, are spherical, with a narrow particle-size distribution; approximately 90% of the particles are within 10% of nominal size. Impurities of 0.1 at.% are possible, with further reductions achievable by starting with higher-purity feed materials. The nanocrystal materials may be combined with other substances to create new classes of bulk materials or tailor-made materials, products, or processes.

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**10-and 20-Hz Nd:YAG Laser Systems:** Two models of pulsed, Q-switched Nd:YAG laser systems from New Wave Research are designed for laser-induced breakdown, UV fluorescence, mass spectroscopy, and similar applications. Users may add optional second, third, and fourth harmonic crystals to both models to extend the laser wavelength capabilities. At 1064 nm, laser energy is greater than 20 millijoules, spatial mode is better than 90% Gaussian, and peak-to-peak energy stability is less than 6%. Closed-loop internal cooling simplifies operation and maintenance.

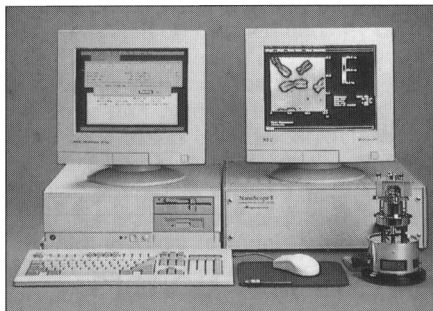
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**MOCVD Reactors:** EMCORE's TurboDisc™ Discovery reactor features scaleable throughput with  $\pm 1\%$  thickness uniformity and  $\pm 1^\circ\text{C}$  temperature uniformity. Wafer capacities range from one 2-in. to 3×3-in. wafer, or one 6-in. wafer. *In situ* process control options include scanning pyrometry on the wafer surface, photo luminescence, and ellipsometry. The device may be configured for MOCVD, ALE, and PECVD, and materials capabilities include ZnSe, GaAs, diamond, metals, and oxides. Also available is the TurboDisc™ Explorer MOCVD reactor for university and basic research use.

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**Carbon Glass Resistors:** Marketch's calibrated TVO carbon glass resistor thermometers offer sensitivity of  $0.01^\circ\text{K}$ . Standard calibrations function from 2 to 300°K in vacuum or in gas or liquid systems with pressures up to 5 MPa. Calibrated resistors provide low-temperature sensitivity in dilution cryogenic systems and can operate from 0.01 to 10°K. Response times are within 0.001 second, and the resistors generate zero inductance and offer insulation resistance up to 1000 ohms.

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**Scanning Probe Microscopy Systems:** Digital Instruments' NanoScope E systems cost less than half the price of fully configured NanoScope III-based systems and may be configured for contact atomic force microscopy, lateral force microscopy, and scanning tunneling microscopy. Applications include electrochemistry, metallurgy, materials science, surface frictional studies, and more. The systems are upgradable for scanning techniques such as magnetic and electric force, and force modulation technologies.

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**Bottom Probe Card Changer:** Electroglas' bottom probe card changer for its Horizon 4060X® and 4080X® wafer probers facilitates front loading and unloading of probe cards without undocking the test head, while protecting the probe tips from damage. The device accommodates probe cards up to 260 mm in diameter, features automatic latching, and may be retrofitted to existing 4060X and 4080X systems.

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**Noncontact Laser-Based Interferometer:** Gradient Lens' LARS™/200 comprises a system laser, interferometer, and receiver in one package that is one-fifth the size of conventional interferometers. The LARS is prealigned for a resolution of 0.01  $\mu\text{m}$  and slew rates of up to 12 in./sec. The device may be connected to existing controllers or interfaced to a PC, and is suitable for process control, calibration, and micropositioning.

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**Vacuum Components Catalog:** Free 224-page 1994-95 catalog from Huntington Laboratories contains approximately 4,000 items for high-vacuum and ultra-high-vacuum systems. The catalog provides details about vacuum fittings, feedthroughs, manipulator lines, chambers, ISO flanges, low-profile angle valves, butterfly valves having vacuum integrity up to  $10^{-9}$  torr, and more.

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**Desktop DC Measurement and Analysis Software:** Hewlett-Packard and Alliance Technologies' Interactive Characterization software, an enhanced version of Alliance's Metrics software, is available for HP parametric analyzers. The Windows™-based software provides standard measurement routines for semiconductor devices optimized for HP parametric analyzers, including I-V sweeps and time domains. Users may develop customized routines in various languages. Real-time results are displayed graphically, graphs may be overlaid, and results may be transferred to other applications.

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**Filtered Cathodic Arc Source:** Commonwealth Scientific's CAF-38 combines a cathodic arc discharge source with a macroparticle filter to produce a plasma beam virtually free of macroparticles. A magnetic guide in the filter bends the plasma beam through a series of baffles where particulates are trapped. The resulting filtered plasma beam coats the substrate platform cleanly and evenly. Applications include carbon film deposition and hard coatings of metals, ceramics, nitrides, and carbides. The device can provide a continuous 1-3 amperes of ion current over the life of the cathode and may be integrated into existing coaters.

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**Liquid-Nitrogen-Free Detector:** The cryoX from EDAX matches the analytical performance of liquid-nitrogen detectors while operating at the same temperatures. The unit features a universal spectrometer and a closed-cycle cryostat to achieve optimum cryogenic temperature in energy resolution, peak/background, throughput, and stability. The device is suitable for use with semiconductors, where liquid-nitrogen-free systems are required, and may be upgraded from one microscope to another.

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**Automatic Sample Notchers:** Custom Scientific Instruments' CS-93 automatically notches up to 16 1/8-in. Izod sample bars, and offers polymer labs a means of specimen preparation for universal impact testing to ISO, ASTM, and other specifications. The CS-93M features variable cutter and table speeds, and notch verification. The CS-93E provides a single-tooth carbide cutter and a single-speed, motor-driven sample table.

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