

RESOURCES

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

High-Pressure High-Temperature Furnace:

The HPS-5015 from Morris Research allows users to react, anneal, or hot-isostatic-press advanced materials at pressures up to 1000 bar (100 MPa, 14,500 psi) at 950°C in gases such as oxygen, nitrogen, hydrogen, and argon. Higher temperatures are available at reduced pressures of 450 bar at 1000°C and 130 bar at 1100°C. The benchtop unit plugs into a standard outlet and requires no external safety barrier or cooling water. Research applications include high-temperature superconductors, solid-state chemistry, ionic conductors, super-strength oxide and nitride ceramics, and composites.

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Four-Circle Automatic X-ray Diffractometer:

The KUMA KM-4 from Advanced Diffraction Systems features a tangentially mounted detector that permits reciprocal space sampling and conserves open space around the instrument for accessory installation. Automatic peak hunting and cell reduction algorithms allow users to identify and refine crystal lattice parameters. Positioning accuracy is 0.00125° for omega and 2-theta, and 0.0025° for kappa and phi. Users also can remove and insert collimators and slits. The system includes a 3K5 x-ray generator and NRCVAX crystallographic software that operates in a 32-bit mode.

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Sample Preparation Guide: Free 115-page Metalog Guide™ from Struers systematizes sample preparation into 10 step-by-step procedures. The color-coded Metalogram™, a matrix of hardness vs. ductility, directs users to optimized procedures for specific materials. The book also explains preparation theory and practice, with a section utilizing Struers systems for solutions to the most common preparation problems.

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Vacuum Pump Inlet and Exhaust Filters:

Balston's inlet filters remove solids and liquids from the inlet stream at 90% for 0.1-μm particles, permitting recovery of valuable or hazardous materials while preventing pump damage and downtime. Exhaust filters remove concentrations of oil droplets from the vacuum pump exhaust. Exhaust gas may be recycled to the process or into a clean work area, and lubricating oils are captured and filtered for reuse. Filter cartridges continuously drain the collected liquid, allowing recovery of inert lubricating fluid. Inlet filters are available for service from 2 to 10⁻⁶ torr, and exhaust filters are available for pumps with flow ratings of 3 to 850 cfm.

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Automated Perfusion System: Automate Scientific's ValveBank™ 4 automates solution switching for physiology experiments. The microprocessor-based controller may be programmed to open and close four valves independently with 0.01-second accuracy. The system includes solenoid valves, reservoirs, four-into-one manifold with flow regulator, ringstand, and tubing for connection to existing perfusion chambers. Four digital inputs and outputs facilitate feedback and control of external recording devices. Users can create and edit programs using the keypad and backlit display, or download programs using EasyCode™ graphic software and serial cable.

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Laboratory Mixing Extruder: The CS-194 CSI-Max tabletop elastic melt extruder from Custom Scientific Instruments features a screwless design that enables the device to mix, compound, and extrude small quantities of materials that vary in both physical form and polymeric characteristics. Users can determine variables such as temperature, amount of shear, de-

gree of mixing, and rate of extrusion. Research applications include plastics, resins, rubbers, pharmaceutical additives, flame retardants, pigment covering powder, and reinforcing fillers.

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Robotic Arm for Cluster Tools:

The SMIF-Arm™ 2200X from Asyst Technologies interfaces with cluster tools and other loadlocked semiconductor processing systems, and extends particle control and automation to production equipment previously incompatible with Asyst-SMIF systems. The arm offers 200-mm wafer processing and enables wafer cassette transfer from an SMIF-Pod™ to production tools with recessed process chambers, such as cluster, CVD, PVD, etch, and implanter tools. The 2200X uses dc motor control and digital signal processing for placement accuracy and control of vertical and horizontal acceleration. A customized path can be created for each tool in a variety of applications and end-user conditions.

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Metallographic Atlas: The Materials Education Council's *Metallographic Atlas* offers an introduction to the microstructures of metallic materials, how they appear, and how they can be modified. Used for many years in the metallurgy program of Sweden's Royal Institute of Technology in Stockholm, the *Atlas* has been translated into English by its author, Mats Hillert. A series of micrographs demonstrates phenomena occurring in metallic materials due to solidification or solid-state transformation. The price is \$28.00, plus \$2.00 for shipping.

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Metal Etch System: The TCP 9600 from Lam Research uses transformer-coupled plasma technology and offers dimension control in the production of 16-megabit and subhalf micron devices. The TCP 9600 operates at pressures of 1–20 m torr and uses a high-density planar plasma to achieve etch rates of 7,000–10,000 Å/min. The system minimizes profile microloading through low-pressure operation and photoresist selectivity greater than 3:1. Corrosion is reduced through post-etch, strip, and rinse modules, and particle densities of <0.05 particles/cm² of ≥0.3 μm in size can be achieved.

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