

## RESOURCES

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

### Electronic Structure Calculation Software:

BIOSYM Technologies' ESOCS software enables users to make electronic structure calculations on close-packed solids, thin films, layered compounds, and surfaces. The program can be applied to complex materials, with full coverage of the periodic table. ESOCS can treat magnetic, optical, and diagnostic properties such as core level shifts and NMR. The software uses the "atomic sphere approximation" for close-packed solids, and application to more open structures is facilitated by use of "empty spheres" to describe regions of space between atoms.

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**Cryogenic Data Poster:** Free 24-in. × 36-in. (0.6-m × 0.91-m) updated poster from APD Cryogenics features seven graphs and six data charts that include information on the thermal conductivity of common solids, mean linear thermal expansions, specific heat of solids, cryogenic liquid properties at the normal boiling point, and vapor pressures of cryoliquids.

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### Nitrogen Generation Systems:

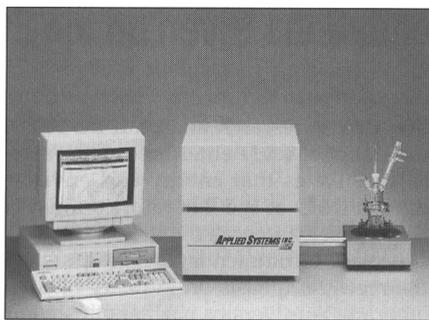
Balston's Model 75-95 nitrogen generator combines filtration and pressure swing adsorption technologies. Prefiltration pretreats the compressed air to remove all contaminants down to 0.1 μm. This model produces up to 99.99% pure compressed nitrogen at a dew point of less than -40°C from any compressed air supply and includes an oxygen monitor. Models 75-76 and 75-78 use a hollow fiber membrane technology and produce up to 99.5% pure, commercially sterile nitrogen at dew points to -50°C. A 0.01 μm membrane filter is included with these models, and an oxygen monitor is optional.

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### Patterned Wafer Inspection System:

Tencor Instruments' Surfscan® 7700 features a defect collection channel that increases sensitivity on critical process steps by reducing background noise. A multiscan capability allows an entire wafer to be consecutively scanned using various optical settings, and a circular input polarization feature increases sensitivity on post-CMP and other deposited layers. The system is suited for after-etch and high-topography applications in which pattern scatter inhibits detection of surface defects.

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### In Situ Monitoring System for Acrylate Polymerization Reactions:

The FTIR-based ReactIR® reaction Analysis system from Applied Systems provides real-time data on reaction kinetics, concentration of critical reaction species, percent conversion, and information on reaction pathways. *In situ* IR measurement enables users to control the degree of polymerization and crosslinking. Monitoring of the relative uptake of different monomers in an acrylate copolymer reaction allows specific polymer formulations to be achieved. Residual monomer concentrations also can be determined.

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### Compact Gas Analyzer:

Balzers' Prisma™ analyzes residual gases *in situ* and provides early detection of potential vacuum system problems. The triangular-shaped device incorporates the analyzer head and electronics into one unit that adapts to existing vacuum tools. Two filaments double the uptime and reduce maintenance. An ion source enhances sensitivity, and RF electronics ensure mass selection. Mass range is 1–200 amu, with an option of either Faraday or Channeltron® mass detector. Prisma can be connected to a PC, or several units can be multiplexed with high-speed LAN fiber-optic communications.

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### Five-Position Hotplate/Stirrer:

Bio-molecular's PMC Dataplate® Model 8050 allows users to stir five samples on the same heating surface. The unit has dual sensors in the plate and the probe, overtemperature alarms, settable heater plate limit, safety heater cutout relay, digital display, PID temperature control, electronic calibration, and self-diagnostic software. Three heating surfaces are available: milled flat aluminum, CERICA™ solid ceramic, or porcelain-coated stainless steel. A nine-position model is also available.

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### Advanced Mathematical Modeling Software:

MLAB (Modeling LABoratory) software, initially developed at the National Institutes of Health, is now available from Civilized Software and offers more than 400 built-in functions. MLAB can solve and fit curves to multiple algebraic functions, implicit functions, and functions defined by differential, delay, and difference equations. As a programming language, MLAB provides facilities for branching, looping, input/output, and interruption of execution. The software can create 3-D graphics and 3-D surface plots, or produce PostScript file output.

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### Compact X-Ray Detector:

Amptek's XR-100 uses a miniature detector-electronic circuit hybrid which incorporates a small thermoelectric cooler. The solid-state PIN-photodiode detector and front-end electronics are placed on top of the cooler and cooled to -30°C. The low temperature reduces the leakage current in the detector and the noise in the electronics. The hermetic package has a vacuum-tight 0.25-mm beryllium window to permit low-energy x-ray detection. Applications include fluorescence, and monitoring of material thickness and composition.

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### Metals and Materials Catalog:

Free 1994-95 Goodfellow catalog lists more than 3,600 items, along with technical specifications and comparative data. The 480-page catalog features varying forms and sizes of pure metals, alloys, polymers, ceramics, composites, and honeycombs. Custom services are available, and 48-hour delivery is standard.

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### Quadrupole Mass Spectrometer:

Hidden Analytical's EPIC system is suitable for UHV fast event gas studies and features a type 3F triple filter, high-precision quadrupole, and pulse ion counting detection system. The continuous dynamic range is 10<sup>7</sup>, and users can measure partial pressures down to 10<sup>-15</sup> mbar. Mass range options are available up to 1000 amu. Also included are a signal gating input and software for time-resolved studies in pulsed experiments, and TTL signal output for direct interfacing to multichannel scaler cards. Automatic tuning and setup provide for instance analysis, or users can customize the quadrupole operating and scan parameters.

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