

## RESOURCES

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

### DOE Materials Sciences Program

**Summary:** Free 173-page book highlights 472 programs funded by the U.S. Department of Energy in fiscal 1993, including programs at DOE national laboratories, research grants, and small business innovation research grants. Five indices identify programs by principal investigator(s), materials, techniques, phenomena, and environment. Also included is a bibliography of reports on materials needs and opportunities, access information for national research user facilities, and more.

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### PC-Based SEM Image Analyzer:

The AutoSEM 1 from Advanced Research Instruments allows access to software such as spreadsheets, word processing, and databases on the same IBM-compatible PC as the image analysis. The analyzer provides feature and field data (area, features per field, percent area coverage), digital imaging, image storage, and data summaries that include graphs and data discrimination. Dynamic resolution allows feature searching in resolutions as low as  $8 \times 8$  pixels and with measurement resolutions as high as  $4096 \times 4096$  pixels. The AutoSEM 1 can be interfaced to new or existing SEMs.

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### Multisensor Vacuum Gauge System:

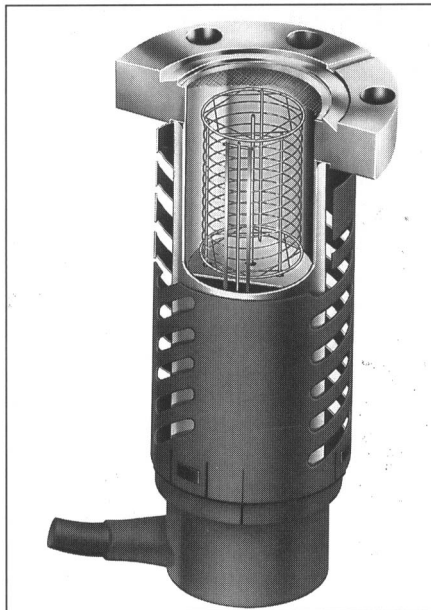
The SensaVac® Series 929 hot cathode combination gauge from HPS is a user-configured digital system that combines the technologies of hot cathode, cold cathode, Pirani, convection, thermocouple, and capacitance manometer to measure pressure from  $10^{-11}$  to  $10^4$  torr. The system operates up to five sensors and simultaneously displays all measurements; however, it can operate, display, and de-gas two hot cathode sensors at the same time. The controller includes standard leak test function, analog output, and setpoints.

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### Integrated Reflectivity and Diffraction System:

OPTI'X system from Enraf-Nonius provides information on roughness, density, and layer thickness of thin layers, surfaces, and interfaces of flat samples using a high-resolution goniometer and software. The system features a high-frequency x-ray generator with long anode fine focus x-ray tube (or optional rotating anode generator), and a horizontal goniometer with single-port tube-shield, Si monochromator, evacuated beam paths, and matching slit system.

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▲ **Vacuum Gauges:** Granville-Phillips' STABIL-ION™ gauges maintain their initial calibration within 5% or less, even after 14 months of operation. A newly designed controller provides real-time pressure indication with accuracy from  $10^{-2}$  torr to UHV without look-up tables. STABIL-1™ vacuum measurement systems are listed by Underwriters Laboratories.

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**Photonics Tools Catalog:** New Focus' 73-page catalog features tunable diode lasers, photodetectors and receivers, broadband amplifiers, modulators, high-voltage pulse generators, motorized and multi-axis positioners, 1- and 2-in. mirror mounts, pedestal risers and forks, angle plates, fiber aligners, polarizers with extinction ratios of 100,000:1, neutral-density filters, and more. Some products are available for lease prior to purchase.

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### Laboratory Refrigeration Systems:

Two Displex® models from APD Cryogenics each use second-stage regenerator materials and a thermodynamic design to achieve a 6.5–350 K temperature range and a high capacity at 10 K. Each model's pneumatic drive is composed of two parts for easy field maintenance, and a hermetic compressor component is designed for helium service. Cooldown time to 20 K for one model is 50 min at 60 Hz and 60 min at 50 Hz; for the other model, it is 35 min at 50 Hz and 40 min at 50 Hz. Applications include materials characterization, spectroscopy, matrix isolation, and more.

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### Neutron Powder Diffraction User Facility:

Brookhaven National Laboratory's new user facility combines high resolution with high density by using a 25-element "Venetian blind" monochromator design and 64  $^3\text{He}$  detectors. The FWHM of the instrumental profile is no more than  $0.15^\circ$  at  $103^\circ$  ( $2\theta$ ) with 11'-11'-5' collimators in place, corresponding to  $(\Delta d)/d$  in the  $10^{-4}$  range. With this high resolution and flux-on-specimen (i.e.,  $3 \times 10^5$  n/cm<sup>2</sup>/s with the High Flux Beam Reactor operating at half power), studies dependent on details of reflection profiles are now possible. Instrument time is available to general users on a competing proposal basis, without charge for research that is neither proprietary nor for commercial gain.

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### Ultra-High Resolution Mass Spectrometer:

The UltraSource™ FT/MS® from Extrel FTMS features numerous ion sources such as electrospray ionization and uses Fourier transform mass spectrometry (FT/MS) for mass analysis and detection. The device, which connects to the Extrel FTMS 2001 series, interfaces between the magnetic ion trap of a Fourier transform mass spectrometer and conventional ion sources which are not directly compatible with FT/MS. Macromolecules such as protein and polymers can be ionized and analyzed by FT/MS.

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### Used Semiconductor Equipment Catalog:

Bid Service's 200-page catalog highlights used high-technology and semiconductor equipment, such as electron microscopes, furnaces, leak detectors, pumps, wafer test and inspection equipment, chip handlers, and more. Most items feature a description and photo of the product. Also included are details on how to sell used equipment and spare parts to Bid Service.

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### Powder Diffraction Database and Products:

Catalog from International Centre for Diffraction Data highlights PDF-1 and PDF-2 databases of single-phase x-ray powder diffraction patterns. Also featured is the 1993 NIST crystal data identification file (with more than 182,500 entries for crystallographic and chemical data), the NIST/Sandia/ICDD electron diffraction database (with data on more than 81,500 materials), search manuals, and training materials. Formats include bound volumes, microfiche, CD-ROM disks, and magnetic tape.

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