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

Physical Property Measurement System: Quantum Design's PPMS variable temperature-field system can execute magnetic, electrotransport, and thermoelectric measurements. Sample environment controls include fields up to +14 Tesla and temperature range of 1.9–350 K. The system also offers continuous operation below 4.2 K. Measurement options include ac and dc resistivity, ac/dc magnetism, Hall effect, heat capacity, *I-V* measurements, critical currents, and user experiments.
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Nanoscale Electronics: Ernest Orlando Lawrence Berkeley National Laboratory has constructed carbon nanotubes containing metal/semiconductor or semiconductor/semiconductor junctions that may be used to form electronic devices 1–2 nm in each dimension. A topological solution was discovered that matches tubes with different electronic structures, making the carbon nanotube devices possible. Carbon nanotubes are synthesized to contain pentagon-heptagon pair defects in their normal hexagonal structure. The defects change the helicity of the nanotube and alter its electronic structure. The tubes also can be doped with boron or nitrogen to add charge carriers to the semiconducting region.
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Industrial Excimer Workstation: The Series IX-1000 from JPSA is an integrated uv microprocessing system with a built-in excimer laser. The systems feature coordinated opposing motion control, step and scan, dual-sided exposure, and high-resolution imaging and workpiece viewing. Optional modules include beam attenuators, beam homogenizers, dielectric laser masks, and high-accuracy motion control. Up to two different types of lasers (excimer, CO_2, Q-switched, and pulsed YAG) can be integrated into the workstations. The system can drill to below 5 μm and up to 0.5 mm.
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32-Bit Alpha- and Gamma-Spectroscopy Software: EG&G ORTEC's Connections-32 operates under Windows 95 or Windows NT 4.0 and provides smooth pre-emptive multitasking of 32-bit operations. The software offers crash-resistance and Class C2 security, as well as multi-user password-protected data access and acquisition control with live spectral display, local, and remote. As many as 250 detectors can be supported on one system, and 8 MCBs can be directly connected to an individual workstation.
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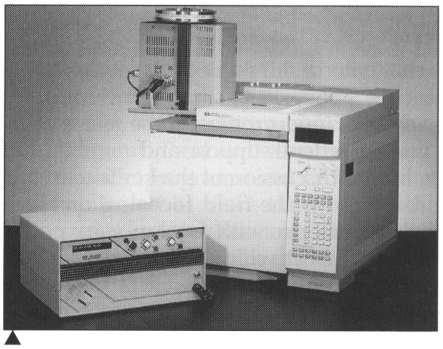

Automated Polymer Analysis: CDS Analytical's Automated Polymer Analyzer eliminates the need to perform extraction or derivatization of samples prior to analysis. Based on pyrolysis mass spectrometry, the system can perform automated analysis of as many as 45 samples of materials such as solids, powders, viscous liquids, inorganic materials, and paper materials coated with polymers. Thermal and pyrolytic analyses of the same sample are possible. Detection of the analytes is achieved using a gas chromatograph equipped with a mass detector.
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High-Power Pulse Systems: Diversified Technologies' PowerMod™ systems feature solid-state switching at less than 0.5 μs at high voltage and high power, with pulse frequencies up to 100 kHz and durations from 1 μs to cw. The systems offer switch selectable positive or negative pulses and incorporate full arc protection. They are available with voltages from 1 to 100 kV, 1 to 2000 amps current, pulse widths from 1 μs to continuous, less than 1 μs rise and fall times, and 5 kW to 40 MW average power.
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Noble Metals Sputter-Coating Process: Englehard-CLAL offers a sputter-coating process for wire, ribbon, and discrete parts using noble precious and nonprecious metal coatings. The technology enables codeposition of alloys or compounds that are not alloyed by other techniques. The process is conducted at low temperatures and low pressure in an inert gas environment. Substitution of a reactive gas makes it possible to engineer coatings of metallic compounds. Typical deposition coating thicknesses range from 0.5 to 6 μm.
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Thermal Sensors: SnakeEye™ sensors from Exergen may be used as photocells and proximity sensors in thermal process applications in packaging. The sensors enable users to inspect the production quality, presence, and position of the thermal process in relation to the product, at speeds up to 300 m/min. The sensor operates with the sensitivity of an infrared sensor and can thermally diagnose products in real time. Applications include hot melt adhesives and induction sealing.
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Contaminant Removal for Semiconductor Processing: Memtec's CoLD MELT™ RO Series of melt blown depth filter cartridges integrates co-located large-diameter fibers within the fine filtration fiber matrix to provide a rigid support network. The cartridges offer structural strength, resistance to contaminant unloading, high void volumes, and long on-stream life cycles. Cartridges are available in nominal removal efficiencies in lengths up to 40 in. (1 m). Various end configurations and elastomer O-ring and gasket options are available.
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Cyclic Corrosion Exposure Systems: The CCX Series chambers from Atlas Electric Devices can be used to test materials used in paints and coatings, including specifications such as new ASTM test methods G85-9 and D5894-96. The systems are automated for unattended testing, and users can program custom, multistep cycles. Instruments control cycling between salt fog, condensing humidity, dry cycles, dwell cycles, and ambient conditions in any combinations for various lengths of time. Immersion, solution spray, and controlled humidity options are available.
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Microindentation System: The Fischerscope® H100 from Fischer Technology is an ultra-low load dynamic microindentation system that provides material property data including hardness, elasticity, plasticity, and modulus of elasticity. Measurements are made with the coating in place, and results are unaffected by the substrate material. The system measures ultralow load hardness under test load, with test uncertainties below 1% in the 0.4–1000 mN load range.
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Mini Time-of-Flight Mass Spectrometer: Comstock's miniTOF™/40 uses a 40-cm linear flight tube with ion source-matching optics. Configured for positive ions, the unit combines high sensitivity with mass resolution, $M/\Delta M$, of 1000 at mass 131. An ETP electron multiplier detector ensures detection dynamic range of eight orders of magnitude, and an entire mass spectrum is acquired in less than 20 μs. Applications include process control, environmental sensing, and chromatography.
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