

# *News Briefs*

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## **Developments**

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### **PARTICIPANTS WANTED FOR OSI, ISDN SECURITY PROGRAM**

Outside participants are invited by NIST to join in a cooperative research program relating to security and management of computer networks that use the Open Systems Interconnection (OSI) architecture or Integrated Services Digital Network (ISDN) communications services. NIST is looking for participants to provide funding, equipment, and/or staff. A major goal of the program is to expedite the development and commercial availability of OSI and ISDN security products. As part of the program, NIST will provide a facility to define, develop, and test systems for a range of telecommunications, network management, and security services in a distributed information processing environment. For further details, write to NIST, B151 Technology Bldg., Gaithersburg, MD 20899, Attn: Integrated OSI, ISDN, and Security Program.

### **VENDORS PROVIDE WORKSTATIONS FOR OSI SECURITY WORK**

The Open Systems Interconnection (OSI) standards being adopted by both government and industry make it possible to interconnect computer systems manufactured by different vendors for data communications through networks. NIST, through its National Computer Systems Laboratory, has played a major role in developing these standards. Now NIST is working to develop ways to make systems that are secure as well as open. To help NIST develop security protocols for OSI, three major U.S. computer vendors have loaned equipment to the NIST OSI Security Laboratory. NIST

will use this equipment to perform research and to develop specifications that can be used as the basis of Federal Information Processing Standards. (FIPS are developed by NIST for use by the Federal Government.)

### **STANDARD FOR INTERCHANGING DOCUMENTS PROPOSED**

Trying to interchange documents among different document or text processing systems such as desktop publishing systems can be a frustrating, sometimes impossible, experience. A new Federal Information Processing Standard (FIPS) formally known as Document Application Profile (DAP) for the Office Document Architecture (ODA) and Interchange Format Standard is being proposed by NIST and should make the process easier. (FIPS are developed by NIST for use by the federal government.) The profile was developed by participants, primarily vendors and users of computer networks, of the long-running NIST Workshop for Implementors of Open Systems Interconnection, and is based on an international voluntary industry standard. A copy of the proposed standard may be obtained from the Standards Coordinator (ADP), NIST, B64 Technology Bldg., Gaithersburg, MD 20899.

### **MERCURY ION LASER-COOLED TO LIMIT**

Scientists at NIST's Time and Frequency Division, Boulder, CO, have succeeded for the first time in laser-cooling a bound atomic ion to its fundamental limit. "We pushed the atom into the ground state of its confining well. That's the end of cooling for a bound particle," says project leader David J. Wineland. Their finding is important for spectroscopy, a study of the nature of matter through various radiations it emits. One result may be the development of a highly sensitive spectrum analyzer. A report on their work appears in the Jan. 23, 1989, issue of Physical Review Letters. They

shined laser light on a mercury ion sideband frequency generated by the Doppler effect associated with thermal motion. The result was to reduce the ion's kinetic energy, limit its movement, and sharpen its spectral features. The ion was confined in a radio frequency trap.

#### **NIST TO STUDY NEW POLYMER RESINS FOR INDUSTRY**

E. I. du Pont de Nemours & Co., Inc., has established a cooperative program at NIST to study the chemical and physical behavior of newly developed methacrylate macromonomers, and to determine how well the new materials blend with other resins. The methacrylate macromonomers can be copolymerized by conventional methods or by an electron beam process. Du Pont will supply NIST scientists with specially prepared samples of the materials for examination by several analytical methods. The primary research tools will be small-angle neutron scattering (SANS), a technique where low-energy neutrons from the NIST research reactor are used to characterize the structures of materials on a nanometer scale, and small-angle x-ray scattering (SAXS) which provides information on the phase separation of molecules and polymer chain networks. The NIST Research Associate Program provides an opportunity for scientists from industry, technical societies, universities, and other organizations to conduct cooperative research on programs of mutual interest.

#### **NEW BUILDING CRITERIA FOR PRISONS**

Overcrowded and aging, deteriorating prisons have produced a rapid increase in the United States in construction of new facilities. Over \$1.5 billion was spent to build new jails and prisons in both 1985 and 1986. But little information exists specifically for the special materials, equipment, and systems used in these facilities. As a result, many correctional agencies have experienced equipment and system performance problems leading to expensive retrofits, repairs, or other fixes. In a project for the U.S. Department of Justice, researchers in the NIST Center for Building Technology have developed preliminary performance criteria to help in the selection, application, and maintenance of building materials, equipment, and systems. A report covers criteria such as choosing a site, selecting appropriate fencing and intrusion detection systems, and developing structural systems. Preliminary Performance Criteria for Building Materials,

Equipment and Systems Used in Detention and Correctional Facilities (NISTIR 89-4027) is available from the National Technical Information Service, Springfield, VA 22161 for \$21.95 prepaid. Order by PB #89-1148514.

#### **NIST STUDYING UNINTENTIONAL EED FIRING**

Electroexplosive devices (EEDs) are electrically fired explosive initiators used in a wide variety of applications from triggering air bags in cars to separating stages in rockets. EEDs are susceptible to unintentional triggering by electromagnetic (EM) fields such as those from local radio transmitters. To help cope with this problem, NIST engineers and statisticians have studied the statistical probability of an EED firing when excited by an electromagnetic pulse of given width and amplitude. The NIST researchers have produced probability plots, called firing likelihood plots, which should assist electrical engineers when designing applications for EEDs. Methods of measuring the time and energy required to fire an EED with a single current pulse also are given. For a copy of this study, contact Fred McGehan, NIST, Division 360.2, Boulder, CO 80303.

#### **CD-ROM SPEECH DATABASE AVAILABLE**

As part of its speech recognition research to help computers become better listeners, researchers in the NIST National Computer Systems Laboratory have produced the first speech database in this country in CD-ROM (compact disc-read only memory) format. The database consists of digitized speech data for 420 talkers speaking 4,200 sentences. NIST has been working with private industry and the Defense Advanced Research Projects Agency to develop ways such as this database to measure the performance of speech recognition systems. A limited number of discs are available from David Pallett, NIST, A216 Technology Bldg., Gaithersburg, MD 20899; telephone: 301/975-2935.

#### **NIST REPORT SUMMARIZES INVENTIONS PROGRAM**

A portable pothole patcher, a new composite material made of high-strength fibers, a new process for continuous casting of steel cylinders, and a lightweight aluminum cylinder which makes it practical to use natural gas as a vehicle fuel are among the 400-plus inventions which have received support from the federal Energy-Related

Inventions Program. The program, which began in 1975, is conducted jointly by NIST and the U.S. Department of Energy and aims at helping inventors get their ideas from the workshop to the marketplace. NIST provides, at no cost to the inventor, evaluations of energy-related inventions and recommends those it considers promising to DoE. In turn, DoE can provide financial support or help in marketing an inventor's idea. A new report is available which describes the program as well as the inventions which have been recommended for DoE support. Energy Related Inventions Program: A Joint Program of the Department of Energy and the National Institute of Standards and Technology Status Report (NISTIR 88-4005) can be ordered from the National Technical Information Service, Springfield, VA 22161, for \$36.95 prepaid. Order by PB #89-141154.

#### **DIAMOND FILMS PRODUCE NEW GEMS**

Ancient alchemists did not succeed in changing base metals into gold, but scientists today are able to produce synthetic diamonds from common organic materials. With modern technology, hydrocarbon vapors mixed with hydrogen can be made to deposit a film of diamond on hot objects. Materials scientists at NIST are developing the measurement information that industry needs to produce diamond films with many of the properties of natural diamond. The physical and chemical properties of diamond make it a highly desirable material for aerospace products, electronics, and industrial equipment. At NIST, the scientists are evaluating the production of diamond films by a hot-filament, chemical vapor deposition (CVD) method. Other studies include measuring the thermal conductivity of diamond and developing a better understanding of how defects such as nitrogen impurities and crystal lattice vacancies or voids can affect the performance of diamond films. For further information on the diamond film research program, contact Dr. Albert Feldman, NIST, A329 Materials Bldg., Gaithersburg, MD 20899; telephone: 301/975-5740.

#### **NEW WAY TO EVALUATE PROTECTIVE COATINGS ON METALS**

Researchers at the NIST Center for Building Technology have developed a fast, reliable technique for evaluating the performance of organic coatings used for controlling metallic corrosion. In addition to being a threat to the safety and reliability of structures and products, metallic corrosion

annually costs the United States an estimated \$160 billion. About one-fourth of this cost is for paints, platings, or other surface coatings used to combat corrosion. While other evaluation methods are available, they often are time consuming, sometimes taking months, or may require expensive equipment. The new NIST electrochemical technique is quick (15 minutes to several hours depending on the coating), reproducible, and causes very little perturbation to the coating. In addition, the testing procedure is simple and uses commonly available instrumentation. The method also is believed to have other applications such as screening new coatings and corrosion inhibitors and evaluating the effect of new surface preparation techniques on the performance of the coating and metal system. A report, An Electrochemical Technique for Rapidly Evaluating Protective Coatings on Metals (Technical Note 1253), is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, for \$1.50 prepaid. Order by stock no. 003-003-02910-6.

#### **ABSTRACTS OF RECENT PUBLICATIONS AVAILABLE**

Researchers in high-temperature superconductivity will be interested in a recent NIST publication that lists abstracts of 61 NIST papers in this field between March 1987 and May 1988. Topics include critical current, crystal structure, electrical contacts, Josephson effect, and magnetic measurements. High-Temperature Superconductivity: Abstracts of NIST Publications, 1987-1988 (SP 759) is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Order by stock number 003-003-02902-5 for \$2 prepaid.

#### **COLLECTED PAPERS ON ION RESEARCH**

Some of the world's most advanced research on laser cooling and storage of atomic ions is performed at NIST's Boulder, CO laboratories. A recent publication, Trapped Ions and Laser Cooling II (TN 1324), reproduces a number of papers of this Time and Frequency Division research group and is a companion to an earlier collection of papers. Subjects covered include spectroscopy and frequency standards, quantum jumps, and nonneutral plasma studies. The publication is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Order by stock number 003-003-02918-1 for \$10 prepaid.

**CHEMICAL STRUCTURE OF DNA DAMAGE UNCOVERED**

For the first time, researchers have determined the chemical structure of a major type of DNA damage caused by oxygen-derived free radicals. Such free radicals, highly reactive groups of atoms with an unpaired electron and very short lifetimes, have been linked to cancer, among other ailments. The methods used by the NIST researchers should help scientists study this type of DNA damage in living cells and gain deeper understanding of its biological effects. The NIST researchers uncovered the structure of hydroxyl radical-induced DNA-protein cross-links, which is damage caused when DNA forms a chemical bond with proteins inside the cell nucleus. This damage to DNA eventually causes chemical changes in the cell that result, for example, in altered proteins.

**NIST, NSF PLAN JOINT NEUTRON RESEARCH FACILITY**

NIST and the National Science Foundation (NSF) have announced plans to develop a Center for High Resolution Neutron Scattering (CHRNS) for research in chemistry, physics, biology, and materials science. The center will include two state-of-the-art instruments to be built at the recently dedicated NIST Cold Neutron Research Facility, with funding from NSF. The new instruments will probe the microstructure and atomic and molecular dynamics of a wide range of materials, and be competitive with the best such facilities in the world. The center will be managed as a national facility, open to qualified users from universities, industries, government agencies, and nonprofit organizations both U.S. and foreign. Proposals for research time will be evaluated on the basis of scientific merit by a program advisory committee. The first instrument is expected to be complete and operating within 2 years.

**MEASURING HIGH-TEMPERATURE SUPERCONDUCTORS**

NIST researchers have developed a novel apparatus for variable-temperature measurements of high-temperature superconductors. Termed a cryogenic bathysphere, it can rapidly (in 10 minutes) test superconductors over a range of temperatures from 300–4 K, or it can be used to stabilize the temperature at a given value. The tiny (3-centimeter-width) device has no moving parts and can be used in compact spaces such as shipping Dewars and small-bore high-field magnets. The apparatus has

been tested successfully in liquid helium and liquid nitrogen by measuring the resistance-versus-temperature curves of several superconductors. A paper describing a prototype device is available from Fred McGehan, Division 360.2, NIST, Boulder, CO 80303.

**STEEL IN FRACTURE TEST SETS U.S. RECORD**

Just how tough is a 6-inch thick piece of steel? NIST researchers performed a series of tests on thick steel plates to learn more about how cracks might travel and stop in large pieces of metal. The NIST research team learned that it took 5.94 million pounds of force in tension pulling force to fracture a 6-inch thick, 40-inch wide new steel plate: a U.S. record for fracture tests. All information so far from the tests indicates that the fracture toughness of these steels at the point of crack arrest significantly exceeds minimum values used in applicable design codes and standards. This new information may be used to revise industry codes and standards and will be useful in the design of all types of steel structures including bridges, ships, and buildings, as well as for equipment in industrial plants and utilities.

**NIST INVITES VENDORS FOR GOSIP EVALUATION PROJECT**

The National Computer Systems Laboratory at NIST is developing guidelines to help users evaluate different implementations of GOSIP (Government Open Systems Interconnection Profile) applications. To help expedite the project, vendors are invited to lend to NIST software and hardware which implements Message Handling Systems (MHS) and File Transfer, Access, and Management (FTAM) applications. Currently, GOSIP supports both applications. GOSIP was approved last fall as a Federal Information Processing Standard. (FIPS are developed by NIST for use by the Federal Government.) The standard defines a common set of data communication protocols which enables computer systems developed by different vendors to communicate and enables the users of different applications on these systems to exchange information. For further information on the evaluation project, contact Steve Trus, NIST, B225 Technology Bldg., Gaithersburg, MD 20899; telephone: 301/975-3617.

### **NATIONAL EARTHQUAKE AWARENESS WEEK**

The catastrophic earthquake which struck Armenia last December is a reminder of the threat to lives, property, economic activity, and national security posed by earthquakes. To promote awareness of earthquakes, Congress designated the first week in April 1989 as National Earthquake Awareness Week. But, while earthquakes are an inevitable hazard, they are not an inevitable disaster. Structures can be made earthquake resistant. As part of the National Earthquake Hazards Reduction Program, NIST is working to improve the performance of buildings and other structures subjected to earthquakes. NIST provides research and technical support for the development of improved seismic design and construction practices. The NIST program includes both laboratory research and experiments and post-disaster investigations. A fact sheet on the program is available from the NIST Public Information Division, Jan Kosko, A909 Administration Bldg., Gaithersburg, MD 20899; telephone 301/975-2762.

### **FIBER-MATRIX INTERFACE PROPERTIES VIA AN INSTRUMENTED INDENTER TECHNIQUE**

A commercial microhardness tester has been instrumented to provide measurement of the fiber-matrix interface properties of a ceramic matrix composite. The technique uses a strain gage load cell and a pair of capacitance probes to directly determine the force on and displacement of a fiber in the matrix. The system can be used to determine both fiber-matrix debond strengths and interfacial frictional stresses. These properties are important for determining the occurrence of matrix micro-cracking and, hence strain limits in the composite as it is loaded in service.

Loads up to 1 kg can be used and displacements up to 25 micrometers can be obtained with this system. Sample sizes are typically  $5 \times 6 \times 0.5$ -3 mm and require at least one well-polished surface. The system can be used to perform either indentation push-in or indentation push-out tests on a variety of composites. The push-in test requires only that the fiber be pushed into the matrix while the push-out test pushes the fiber out through the other side of the composite. Examples of typical materials characterized to date include CVI SiC/SiC fiber, borosilicate glass/SiC monofilament, and lithium aluminosilicate glass-ceramic/SiC fiber.

### **NIST COLLABORATION WITH OAK RIDGE NATIONAL LABORATORY ON NEUTRON STANDARDS**

The combined resources and measurement capabilities of NIST and the Oak Ridge National Laboratory are being utilized to obtain a high-precision measurement of the neutron interaction with the boron isotope with an atomic mass of 10. This interaction is one of the most widely used standards in the determination of neutron flux. Because neutrons are uncharged, they cannot be measured directly. The neutron interaction with the boron isotope is easy to utilize because a gamma ray is released as a result of the interaction. The easily detected gamma ray can then be used to indicate the intensity of the neutron flux. Large uncertainties are now associated with the measurement for neutrons having energies above 500,000 electron-volts. NIST will take its carefully calibrated neutron flux detector to Oak Ridge where it will be used to calibrate the neutron flux generated by the Oak Ridge Electron Linear Accelerator. The calibrated neutron flux can then be used to make a precise measurement of the boron interaction.

### **MAJOR NIST COLLABORATION TO STUDY NOVEL MAGNETIC SYSTEMS**

NIST Scientists have been participating in a multi-institutional effort at the National Synchrotron Light Source (NSLS) to study novel magnetic systems created in situ by molecular beam epitaxy (MBE). To date, the work has concentrated on establishing a spin-polarized, angle- and energy-resolved, photoemission apparatus on the U-5 beamline of the uv storage ring.

This project is unique in a number of ways: (1) The research team consists of 10 principal investigators from eight institutions nationwide. These are national labs (NIST, Argonne, NRL, and NSLS), universities (Rice, U. Texas at Austin, and Northwestern), and an industrial lab (AT&T Bell). (2) The beamline is the only spin polarized photoemission facility in the United States and the only one in the world with a movable spin analyzer to permit angular studies. (3) It is one of very few beamlines in the United States to have an MBE capability. (4) The experiment is being carried out on the highest flux uv beamline at NSLS. It is based on an undulator currently installed in a straight section of the ring. During the next 2 years this same group, acting as an Insertion Device Team, will install a new state-of-the-art undulator now under construction.

The beamline has recently been used to take spin polarized photoemission data. The object of future experiments will be to observe the magnetic properties, e.g., anisotropy, Curie temperature, remanence magnetization, etc., as a function of layer thickness and growth methodology, and to correlate them with the spin-dependent electronic structure we measure. We expect this facility to greatly extend our ability to study new and interesting magnetic systems.

#### **ATOMIC POSITIONS FROM X-RAY STANDING WAVES**

Recent experiments carried out at the Cornell High Energy Synchrotron Source (CHESS) by NIST and CHESS scientists have demonstrated a new method of determining adsorbate positions on crystals with improved accuracy. x-ray standing waves that occur in the process of diffraction from the crystal substrate excite the adsorbed atoms, which fluoresce. Slight changes in crystal alignment translate the standing waves and give the atomic registration.

The novel element in these experiments is the application of the technique to the geometry of glancing incidence. This gives accurate position information parallel to the surface and allows for the possibility that the measurement can be made not only at a surface but at an interface between two different crystalline materials.

#### **PATENT APPLICATION ON NEW X-RAY DIFFRACTION DEVICE**

Scientists from the Surface Science Division and the Semiconductor Electronics Division have recently applied for a patent on a new method of detecting the Bragg diffraction condition of x rays incident on a crystal. The determination of diffraction, an extremely common phenomenon in physics experiments, has always been made by monitoring the existence and intensity of the diffracted beam. The novel approach takes advantage of large changes in intensity and penetration depth of the x-ray fields inside the diffracting crystal itself. A semiconductor detector is actually implanted inside the diffracting crystal and responds to small amounts of energy that are always absorbed in the diffraction process. The invention has potential applications in such areas as medical angiography.

#### **MAGNETIC THIN FILMS WITH LARGE PERPENDICULAR MOMENTS**

A class of ultrathin magnetic films has been discovered that is ferromagnetic at room temperature and has both a large magnetic moment (high-spin state) and a large perpendicular magnetic anisotropy holding the moment normal to the thin film plane. Such perpendicular anisotropies are a much sought-after property because of their potential for ultrahigh-density information storage in advanced magnetic-recording media.

A key ingredient in achieving these unusually favorable properties has been the ability to optimize the epitaxial growth conditions using the NIST-developed technique of XPS forward-scattering crystallography. Optimum conditions consist of deposition of Fe on Cu at cryogenic temperatures, annealing at 350 K, and deposition of Cu on the Fe at room temperature. This process can be repeated cyclically to produce Cu-Fe superlattices, which have been found to retain the favorable magnetic properties.

This work is a result of collaborative research between scientists at NIST, the Simon Fraser University in Canada, and Cambridge University in England. The work highlights the important potential of such artificially structured materials both for improved understanding of the basic physics of magnetism and as useful novel materials for important technologies.

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### **Calibration Services**

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#### **INDUSTRY HELP REQUESTED ON COAXIAL CONNECTORS**

NIST is interested in learning from the microwave industry of new metrology-grade precision coaxial connectors developed by particular companies. Companies desiring NIST to provide calibration services for components with new connectors are encouraged to furnish NIST with appropriate check standards, air line impedance standards, and test port adapters to use with NIST six-port measurement systems. NIST can then provide measurements traceable to these standards with an uncertainty determined by NIST. The institute provides calibration services for passive devices over the frequency range from 50 MHz to 26.5 GHz with plans to expand to 50 GHz. The standards used by NIST to support coaxial impedance

measurements in this frequency range are lengths of precision air-dielectric transmission lines. In developing these standards, NIST tries to avoid using components or designs available from only one manufacturer; NIST does not wish to favor or become dependent on any one manufacturer. For more information, contact Ramon L. Jesch, NIST, Division 723.01, Boulder, CO 80303; telephone: 303/497-3496.

#### **NEW CALIBRATION SERVICES USERS GUIDE AVAILABLE**

The new NIST Calibration Services Users Guide 1989-1990 Special Publication 250 (SP 250) lists the calibration services, special test services, and measurement assurance programs (MAPs) available from NIST. The physical measurement services are designed to help the makers and users of precision measurements achieve the highest possible levels of quality and productivity. The hundreds of services described in the guide are the most accurate calibrations of their type available in the United States. They directly link a customer's precision equipment or transfer standards to national measurement standards. The calibrations and special tests include NIST services that check, adjust, or characterize instruments, devices, and sets of standards. The MAPs are quality control programs for calibrating a customer's entire measurement system. The guide also lists NIST technical experts who may be contacted for information on services and measurement problems. For information on the NIST measurement services program, or to obtain a copy of SP 250, contact the Office of Physical Measurement Services, NIST, B362 Physics Bldg., Gaithersburg, MD 20899; telephone: 301/975-2005.

#### **NCSL AD HOC COMMITTEE 91.3 ON THE CHANGE OF THE TEMPERATURE SCALE**

The National Conference of Standards Laboratories (NCSL) ad hoc Committee on the Change of the Temperature Scale met in open session on January 26, 1989, in Anaheim, CA, during the Measurement Science Conference. The committee was formed last year to facilitate the change from the International Practical Temperature Scale of 1968 (IPTS-68) to the new scale that will be implemented on January 1, 1990, and that will be known as the International Temperature Scale of 1990 (ITS-90). The meeting was well attended, both by committee members and by guests. Standards laboratories and instrument manufacturers were well

represented. The latest draft of the ITS-90 and the implications of this new scale were discussed in considerable detail. Although the scale is not yet in its final form, it will be complete by September, at which time the CCT will meet and recommend it to the International Committee of Weights and Measures (CIPM). The CIPM will then adopt it in October. Those involved in temperature measurements are being kept informed of changes in the scale, and will be told what steps they should take to either implement the scale or ensure that their measurements are on the ITS-90, beginning in 1990.

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### **Standard Reference Materials**

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#### **IMPROVING LEAD-IN-FUEL ANALYSES IS AIM OF MATERIALS**

Elevated lead levels in the environment could be caused by a number of sources, but one of the chief culprits may still be the alkyl lead used as an additive in gasoline, according to some reports. Because the Environmental Protection Agency regulates lead content in fuel emissions as part of air quality standards, the petroleum industry needs accurate measurement techniques to ensure compliance with federal emission limits. To aid industry in calibrating the instruments that analyze fuel samples and to help confirm the accuracy of measurement techniques, NIST has developed four different standard reference materials (SRMs). Individually, the SRMs consist of gasoline-like fuel in vials, with each SRM representing a different certified lead level (.0297, .0506, .0733, and 2.045 grams per gallon of lead, respectively). By analyzing the SRM fuel the same way as a fuel sample, a chemist can gauge how well analytical instruments and techniques are working at four different lead levels. The new SRMs, numbered 2712 through 2715, are available for \$110 each from the Office of Standard Reference Materials, NIST, B311 Chemistry Building, Gaithersburg, MD 20899; telephone: 301/975-6776.

#### **NEW MATERIALS CAN HELP GAUGE COAL SULFUR CONTENT**

Because sulfur emissions from coal-fired industrial plants are regulated by environmental agencies, it is important for coal and utility companies to know

how much sulfur is contained in a given coal batch. Likewise, coal companies and their customers need accurate determinations of sulfur and ash content along with calorific value to set fair tonnage prices of coal shipments. A new NIST Standard Reference Material (SRM) can help boost the accuracy of all these measurements by allowing evaluation of laboratory methods and calibration of instruments used in coal analysis. The SRM, which consists of a 50-gram bottle of bituminous coal, is certified for its sulfur and ash content as well as its calorific value. Also included are non-certified values of 23 other elements. The new material (SRM 2692) costs \$102 and is available from the Office of Standard Reference Materials, NIST, B311 Chemistry Building, Gaithersburg, MD 20899; telephone: 301/975-6776.

#### **NEW AUSTRALIAN BAUXITE ORE STANDARD ISSUED**

A new bauxite ore Standard Reference Material (SRM) is available from NIST for aluminum producers to use in analyzing raw materials. SRM 600, Bauxite from the Darling Range, Australia is the fifth in a series of bauxite standards to be issued by NIST under a cooperative program with industry through ASTM. The other SRMs are Arkansas, Surinam, Dominican, and Jamaican. SRM 600 is in the form of a fine powder for use in validating experimental data and analytical methods. It provides certified concentrations and estimated uncertainties for 15 inorganic constituents. SRM 600 may be purchased for \$94 per 60-gram unit from the Office of Standard Reference Materials, NIST, B311 Chemistry Building, Gaithersburg, MD 20899; telephone: 301/975-6776.

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## **Standard Reference Data**

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### **DIPPR DATABASE EXPANDED TO 1,023 PURE COMPOUNDS**

More than 250 pure chemical compounds have been added to a computerized database on the thermodynamic and physical properties of chemicals. The database, DIPPR (Design Institute for Physical Property Data), Data Compilation of Pure Compound Properties, 1989, now contains information on 39 properties for 1,023 pure chemical compounds of high industrial priority. The database provides chemical engineers, manufacturers, and scientists in industry, government, and universities with quick access to important information on the behavior of substances and their reactions at various temperatures. The chemicals in the database were selected by the industry members of the American Institute of Chemical Engineers' (AIChE) DIPPR group, and are considered to be the most important ones to industry. For information on fees and license agreements for NIST Standard Reference Database 11, DIPPR, Data Compilation of Pure Compounds, 1989, contact the Office of Standard Reference Data, NIST, A323 Physics Building, Gaithersburg, MD 20899; telephone: 301/975-2208.