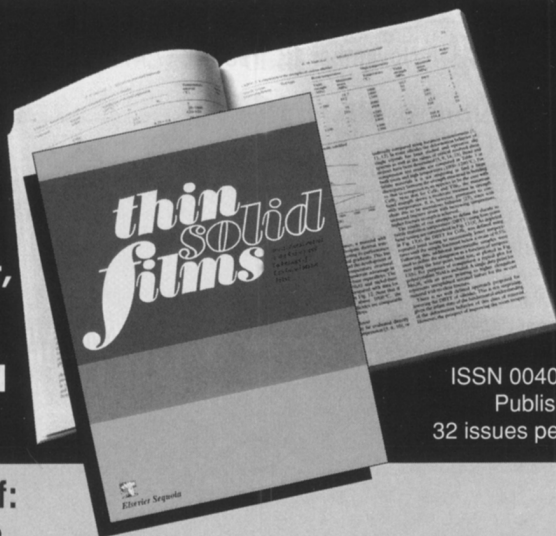


thin Solid Films

International Journal on the Science and
Technology of Condensed Matter Films

For:
**Scientists
and
Engineers
active in
research,
development,
and
applications
of condensed
matter films**



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The journal *Thin Solid Films* is in a unique position to both reflect developments in the evolving field of thin films and to provide guidance and coherence. The field of thin films, which can be defined as the confluence of materials science, surface science, and applied physics, has become an identifiable unified discipline of scientific endeavor. The scope of *Thin Solid Films* is indicated by, but not limited to, the following topical subheadings:

- A. Synthesis and Characterization
- B. Surfaces, Interfaces and Colloidal Behaviour
- C. Metallurgical, Protective and Hard Layers
- D. Mechanics and Nanomechanics of Thin Layers
- E. Electronics, Optics and Opto-electronics
- F. Magnetics and Magneto-optics
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- I. Thin Film Devices, Sensors and Actuators
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FROM WASHINGTON

DOE Notes Department Appointments, Nominations Announced

Deputy Secretary of Energy. The U.S. Senate confirmed the nomination of William H. White of Houston, Texas, as deputy secretary of energy and chief operating officer for the Department of Energy. White, a partner in the Susman Godfrey law firm in Houston, has extensive experience in commercial litigation, including fraud, antitrust, and oil and gas cases. He had also been a legislative assistant to Rep. Bob Krueger of Texas and was instrumental in drafting major energy legislation.

Assistant Secretary for Congressional Affairs. The Senate also confirmed the nomination of William J. Taylor III of Houston, Texas, as assistant secretary for congressional and intergovernmental affairs in the Department of Energy. Taylor had been an attorney in the law firm of Hutcheson & Grundy in Houston since 1989. He was also administrative assistant to the late Rep. Mickey Leland of Texas.

Office of Science Education and Technical Information. Terry Cornwell Rumsey has been named director of DOE's Office of Science Education and Technical Information. As director, Cornwell Rumsey will develop policies and administer programs that fully utilize the department's research and development programs, facilities, laboratories, and other resources to support national objectives for science, mathematics, and engineering education. She will be responsible for the management and dissemination of the department's scientific and technical information and will serve as a member of DOE's Leadership Council.

Office of Energy Research. President Clinton will nominate Martha Krebs as director of the Office of Energy Research at the Department of Energy. As director, Krebs will manage one of the largest sponsors of basic research in the federal government. The office's annual budget of about \$3 billion funds programs in biological and environmental research, basic energy sciences, fusion energy, high-energy and nuclear physics, the Superconducting Super Collider, and scientific computing. Krebs will also advise Secretary of Energy Hazel R. O'Leary on science and technology issues.

Program Awards, Scholarships Announced

Advanced Battery R&D. Twenty-one projects at universities, businesses, and

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MRS BULLETIN/OCTOBER 1993

DOE laboratories have been selected for funding under DOE's new Advanced Battery Technology Research and Development Program within the Office of Energy Research's Basic Energy Sciences Office. The program's objective is to support research to develop new generic battery technology focused on the non-automotive consumer market with emphasis on improvements in battery size, weight, life, and recharge cycles. For information on the next solicitation, contact: Robert S. Marianelli, ER-14, U.S. Department of Energy, Washington, DC 20585; phone (301) 903-5804.

A list of the projects to receive FY 1993 funding is available from: Steve Barnhart, ER-14, U.S. Department of Energy, Washington, DC 20585; phone (301) 903-5820.

EPSCoR. Kentucky, Louisiana, Maine, and Montana were competitively selected to receive \$5 million under DOE's Experimental Program to Stimulate Competitive Research (EPSCoR) for fiscal year 1993.

The purpose of the DOE/EPSCoR program is to enhance the capabilities of eligible states to conduct nationally competitive energy-related research. The program assists states that do not compete well for federal research dollars and is limited to Alabama, Arkansas, Idaho, Kansas, Kentucky, Louisiana, Maine, Mississippi, Montana, Nebraska, Nevada, North Dakota, Oklahoma, South Carolina, South Dakota, Vermont, West Virginia, Wyoming, and the Commonwealth of Puerto Rico.

This year's awards are as follows:

Kentucky—\$1,246,274 for research in characterization of trace elements in coal and related materials; the transport, accumulation, and utilization of organic carbon in large reservoir systems; and high-energy nuclear physics.

Louisiana—\$1,039,590 for research in inorganic synthesis and laser-induced photochemistry; mammalian and non-mammalian toxicological studies; and the use of high-energy ion beams and synchrotron radiation.

Montana—\$890,407 for research in

petroleum reservoir characterization and wind energy development.

Maine—\$1,249,444 for a human genome effort in hierarchical chromosome studies.

Additional information about this program is available from Donna Prokop, Department of Energy, 1000 Independence Avenue SW, Washington, DC 20585; phone (202) 586-8916.

Industrial Competitiveness Program. Eight projects will share \$2.4 million in grants as part of the National Industrial Competitiveness through Energy, Environment, and Economics program (NICE³). NICE³ was launched as a seven-state pilot program in 1991 by DOE, the Department of Commerce, and the Environmental Protection Agency. The program is designed to demonstrate new technologies that prevent pollution and improve energy efficiency, and to find ways to overcome barriers to industrial pollution prevention. This year's awards go to:

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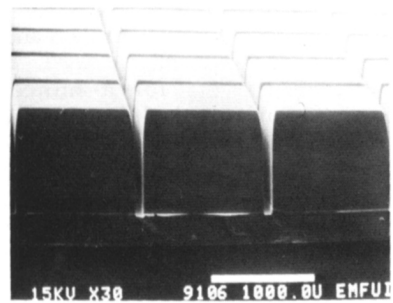


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small- and medium-sized steel manufacturers and manufacturers of corrosion protection.

Alpine Technology, to build and demonstrate new technology to recycle raw glass by removing contaminants.

Lubrizol Petroleum Chemicals Co., to find a solvent recycling process for the residual materials that are currently landfilled or thrown away.

Michigan Biotechnology Institute, to use a low-value molasses byproduct as an inexpensive fertilizer substitute.

Columbia Aluminum, to set up a pilot spent-potliner recycling facility.

Shaw Industries, to develop a commercial-scale automated dyebath reuse system in a carpet mill.

Thompson Consumer Electronics, to reduce the energy used for, and hazardous waste products produced by, the manufacture of television picture tubes.

Coors Brewing Company, to expand industry-wide Coors' ultraviolet-light coating process for aluminum cans.

SBIR Program. One-hundred seventy-one grant applications from small, high-technology firms in 29 states will receive funding under the DOE's Small Business Innovation Research (SBIR) program. The objective of the SBIR program, now in its 11th year, is to increase the commercialization of federally funded research and development by small innovative firms.

The applications were chosen on the basis of scientific and technical merit from among 1,999 submitted in 37 technical topics ranging from educational technologies to advanced window and glazing technologies. Of the awards, 14 were for design and applications of novel materials, 8 for chemical sciences research, and 5 for materials sciences instrumentation.

A complete list of the 171 applications chosen for Phase I awards, as well as information about the next solicitation, is available from Kay Etzler, Office of Energy Research, ER-16, U.S. Department of Energy, Washington, DC 20585; phone (301) 903-5867.

See related article, "National Conferences Explain SBIR Program to Businesses" in *Research/Researchers*.

University Research Instrumentation. Twenty-four universities and colleges will receive \$5.2 million to purchase state-of-the-art scientific instruments for energy-related research under the DOE's University Research Instrumentation (URI) Program. The awards are aimed at strengthening the ability of universities and colleges to conduct long-range, energy-related research and to help alleviate

a shortage of research equipment in these institutions.

Each instrument awarded under the program costs more than \$100,000. Fiscal year 1993 funds will be used to help meet the needs of institutions carrying out DOE-sponsored research in biological and environmental, chemical sciences, engineering, geosciences, materials sciences, and mechanistic plant and microbial.

The awards in materials science went to Arizona State University for planar composite interface synthesis, Washington State University for a transmission electron microscope, North Carolina State University for an integrated growth/analysis system for synchrotron radiation studies, and to Clark Atlanta University for a 400 MHz NMR Spectrometer.

For information about this program, contact: Michael Wolfe, U.S. Department of Energy, Washington, DC 20585; phone (202) 586-8949.

Minority Scholarships. DOE will sponsor four-year undergraduate scholarships for 10 minority students who are pursuing degrees in the sciences or environmental studies. The department's commitment will total \$500,000 annually.

As part of the program, students will intern at one of DOE's national laboratories after their junior and senior years. Scholarship recipients agree to work at DOE for two years after graduation.

Local chapters of the NAACP will forward nominations for scholarships to DOE. Final selection will be made by representatives of DOE and NAACP national leadership. For information about this program, contact: Rich Stevens, Director of University and Science Education, U.S. Department of Energy, Washington, DC 20585; phone (202) 586-8949.

NRC Awards 100 Minority Fellowships.

Fellowships have been awarded to 100 minority scholars in two Ford Foundation programs. Fifty-five predoctoral students and 21 doctoral dissertation candidates received awards in the eighth year of the Ford Foundation Predoctoral and Dissertation Fellowships Program. Fellowships also were awarded to 24 doctoral degree recipients in the 14th year of the Ford Foundation Postdoctoral Fellowships for Minorities Program. Both programs are administered by the National Research Council (NRC).

Plans for the 1994 fellowship competitions are now under way. Information and application materials are available

from: Fellowship Office, National Research Council, 2101 Constitution Avenue NW, Washington, DC 20418; phone (202) 334-2860.

Changes Planned for Materials Initiative

During a July meeting of the Council on Competitiveness Materials Advisory Committee, it was learned that several important changes are being planned for the Advanced Materials and Processing Program (AMPP). The AMPP is the Bush administration's FY93 materials initiative, which coordinated and prioritized materials science research in 10 federal agencies. The initiative drew heavily on the National Research Council's 1989 report, *Materials Science and Engineering for the 1990s*. (For more information about the AMPP, see the March 1992 *MRS Bulletin*, pp. 18-20.) Current plans are to combine the AMPP and materials-related

thrusts under the Manufacturing Initiative in the FY95 budget. A manufacturing initiative is consistent with the Clinton administration's efforts to focus on certain areas of strong public interest and will be used to support such thrusts as surface transportation, information highways (communication), infrastructure, and environment. The AMPP will continue to go forward as a Clinton initiative in FY94.

DOE Announces Plan to Improve Collaboration with Industry

DOE Secretary Hazel R. O'Leary recently announced a package of initiatives designed to change the way the department shares its scientific and technical expertise with U.S. companies and small businesses.

The Strategic Plan for Technology Partnerships was released in a document

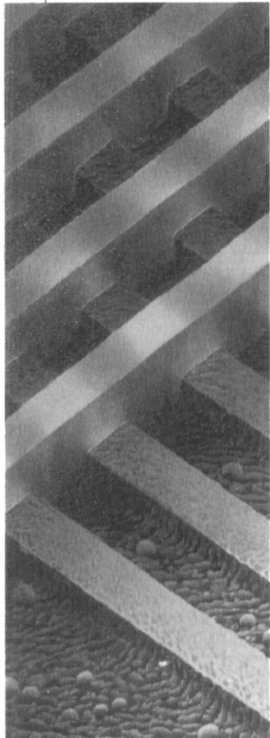
entitled *Partnerships for Global Competitiveness* during testimony in late July before the House Committee on Science, Space and Technology. The plan provides a blueprint for making DOE's \$6.5 billion, 50,000-employee laboratory system "user-friendly, market-driven and consumer-oriented."

The plan includes the following points: make access to DOE resources easier, increase the pace by reducing CRADA (cooperative research and development agreement) processing time, delegate authority and accountability to directors of DOE's national laboratories for some CRADAs, provide block funding for CRADAs for selected laboratories, integrate planning among federal agencies and the Office of Science and Technology Policy, and reach small business by issuing a dramatically simplified CRADA.

The plan, which was issued in draft form, will be finalized after comments from the private sector. A copy is avail-

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able from: Chris Kielich, U.S. Department of Energy, Washington, DC 20585; phone (202) 586-5806.

COSEPUP Report Proposes Goals for Federal Science Policy

Outgoing National Academy of Sciences President Frank Press and Phillip Griffiths, chairman of the Committee on Science, Engineering, and Public Policy (COSEPUP) presented their recommendations for federal science policy at a June hearing by the Senate Subcommittee on Science, Technology and Space. Speaking on the last day of his 12-year tenure as president of NAS, Press said the report, *Science, Technology and the Federal Government: National Goals for a New Era*, "may be one of the most important things we've done over the years."

Because of the many worldwide changes in economies and governments, the report recommends that the United States look closely at its scientific and technological performance relative to that of other nations when reviewing needs for funding. "The United States should be among the world leaders in all major areas of science," but the report recommends that the nation strive for clear leadership only in areas likely to contribute substantially to national objectives for economy, public health, the environment, defense, and cultural life. The decision to select an area of research for leadership would be based on criteria external to that area.

The comparative position of the United States in a particular area and

whether that area is meeting its goal would be determined by an expert panel made up of U.S. and foreign researchers in that area, individuals in closely related fields, and users of the research. Measurement criteria would be both quantitative (citation counts, capabilities of facilities and equipment) and qualitative. The COSEPUP committee envisions that this comparative ranking would show which areas need additional funds and which can survive some funding reductions. Funds could be reallocated from a highly successful area to one less successful. Within a field, projects deserving funding would still be determined by peer review.

The report provides a framework for determining the total level of federal spending for science and also for applying these funds to specific fields. The committee felt that U.S. goals for science could be met under the current \$70 billion federal R&D budget.

This approach to science would affect "big science" programs, says the report. If scientists propose a megaproject in a field in which the United States does not need to lead, the government would provide funding only through an international consortium. If, however, the nation wants to maintain a lead in this field, the government could choose to pursue a project without international partners.

Regarding technology development, the report states that "technological leadership in the commercial marketplace is the responsibility of the private sector," but that current conditions on the global economy warrant a re-examination of the government's role. The federal role would be determined by the goal of

maintaining a leadership position "in those technologies that promise to have a major and continuing impact on broad areas of industrial and economic performance." In commercially promising areas where R&D would be too costly or risky for an individual company, "a role for the federal government can make good sense," says the report.

The report also calls on industry and government to form partnerships to pursue new technologies. These partnerships would be responsive to market signals because the private sector would initiate proposals and share costs. The committee said these partnerships should provide stable, long-term support; they should recognize the growing role of the states; and they should go beyond the development stage to help companies adopt the new technologies.

The report offers guidelines for identifying important technologies and suggests some actions the government can take to foster them, such as easing antitrust restrictions to allow cooperation on precompetitive research. The report also cites some existing models for federal technology policy, including NIST's Advanced Technology Program, the Advanced Research Projects Agency, NSF's Science and Technology Centers and Engineering Research Centers, and SEMATECH.

The 54-page report, *Science, Technology, and the Federal Government: National Goals for a New Era*, is available from: COSEPUP, 2101 Constitution Avenue NW, Washington, DC 20418; phone (202) 334-2424. □

Research Opportunities in Japan

The **National Science Foundation** offers opportunities for U.S. scientists and engineers to conduct research at Japanese universities, national research institutes, and corporate research laboratories. To provide these opportunities, NSF cooperates with many organizations in Japan, including the Center for Global Partnership, the Science and Technology Agency, the Agency for Industrial Science and Technology, and the Japan Society for the Promotion of Science.

Graduate students, postdoctoral researchers, and senior investigators are eligible to apply for research stays in Japan ranging from 3 to 24 months. The next deadline is **November 1, 1993**.

Details and application materials are in the program announcement, NSF-93-51, *International Opportunities for Scientists and Engineers*, which is available from: Publications Office, National Science Foundation, Washington, DC 20550. Phone: (202) 357-3619; E-mail: pubs@nsf.gov

For other information, contact: Japan Program, Division of International Programs, National Science Foundation, Washington, DC 20550. Phone (202) 653-5862; E-mail: NSFJinfo@nsf.gov.

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