

NRC Releases Materials-Related Reports

The National Research Council has published reports on materials-related studies on intermetallic alloy development, high-purity chromium metal, and aging of U.S. air force aircraft.

Intermetallic Alloy Development: A Program Evaluation (1997) reports on the development of Ni₃Al alloys and process at Oak Ridge National Laboratory (ORNL) as part of the Department of Energy Office of Industrial Technology (OIT) program. The evaluation finds that the program has met the technical goals "to develop high strength, ductile intermetallic alloys that can be processed and utilized for high-temperature structural applications"; has developed manufacturing processes; and has performed well in production-scale trials. The study cannot predict, yet, what the success level of commercial application will be. For future program focus, the report recommends a shift to "modeling solidification (casting and welding) process and to establishing production processing standards and methods for machining and welding nickel and iron aluminides."

The report entitled *High-Purity Chromium Metal: Supply Issues for Gas-Turbine Superalloys* (1995) focuses on the availability of the material for aircraft gas-turbine engines. The committee responsible for the report finds that the national and international supply of chromium-metal is stable and sufficient to meet the needs of the U.S. aerospace industry. The report recommends that the

- U.S. government not take any special steps to develop additional domestic suppliers of high-purity chromium metal;
- the National Defense Stockpile maintain and continually upgrade to industry standards a sufficient quantity of high-purity chromium metal to meet the aerospace industry's needs in the event of an emergency; and
- chromium-metal specifications be disconnected from production methodology so that any material that meets the required end-product specifications is permissible.

The *Aging of U.S. Air Force Aircraft: Interim Report* (1997) focuses on airframe materials and structures, predominantly aluminum alloy constructions, found in older aircraft. The Air Force has many 20-35+ year old aircraft expected to remain in use for another 25+ years. This interim report reviews the aging aircraft research program in two categories relevant to the aging of airframe structures: "structural integrity (including subcate-

gories in widespread fatigue damage, corrosion and fatigue, repairs, dynamics, and health monitoring) and nondestructive evaluation. This report along with the others can be obtained from the National Materials Advisory Board, 2101 Constitution Avenue, N.W., HA-262, Washington, DC 20418; 202-334-3505; nmab@nas.edu.

White House Publishes Report on Science and Technology

In April, the Clinton Administration issued a report to Congress on *Science and Technology: Shaping the Twenty-First Century*. Prepared by the Office of Science and Technology Policy (OSTP), the report summarizes the Administration's research portfolio, giving examples of government initiatives and scientific advances and examples of future research. Materials science is listed as an example under key areas of opportunity. The report includes chapters on science, technology, national security, and human resources with emphasis on scientific education and training.

The chapter on science devotes a section to federal investments in materials research that has led to advances, for

example, in communications and turbine engines. Another section specifies numerous federally funded facilities that support materials research: the National Science Foundation's National High Magnetic Field Laboratory (1993), National Nanofabrication Users Network (1994), and Cornell Electron Storage Ring (to be completed in 1999); and the Department of Energy's Advanced Light Source (1994), Thomas Jefferson National Accelerator Facility (1995), Advanced Photon Source (1996), and Relativistic Heavy Ion Collider (to be completed in 1999).

The chapter on science emphasizes the Administration's commitment to basic research through university-industry-government partnerships. Among the scientific advances in basic research listed are features in Mars meteorite that may provide evidence of fossil microorganisms, Bose-Einstein condensation observed and atom laser demonstrated, 10 mW of power achieved by fusion of deuterium and tritium, smart gels that shrink or swell thousand-fold when conditions change slightly, femtosecond spectroscopies that reveal chemical reaction dynamics in detail, and scanning thermal

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Among the achievements in technology listed are the Advanced Technology Program (ATP), Partnership for a New Generation of Vehicles (PNGV), Energy and Renewable Energy Research, Intelligent Transportation Systems, Goals for a National Partnership in Aeronautics Research and Technology, Manufacturing Extension Partnership, Public-Private Technology Partnerships, and Cooperative Research and Development Agreements. The chapter on technology emphasizes the Administration's position that advancement in technology is necessary for economic growth in global competition.

Accomplishments listed under ATP include the creation of prosthetic tissue and an ion-implant machine for semiconductor manufacture that successfully implanted a 300-mm wafer marked as the next generation semiconductor wafer size. Under PNGV, progress has been made in developing fuel cells (see also Washington News in July 1996 and July 1997 *MRS*

Bulletin). Other technological innovations highlighted in the report include the development of giant magnetoresistance materials and supercomputing resources to improve computer simulations.

The chapter on national security includes lengthy sections on maintaining the safety and reliability of nuclear weapons and the nuclear materials cycle. Other accomplishments listed include laser techniques for igniting energetic materials; "canary-on-a-chip" detector for chemical or toxin warfare agents; and materials protection, control, and accountability activities.

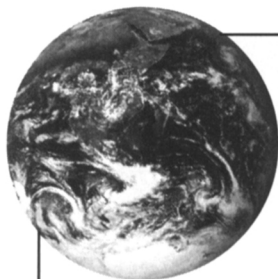
The report also covers science and technology in the areas of environment, health, and education. To obtain a copy of the report, contact the Office of Science and Technology Policy, Old Executive Building, Room 431, Washington, DC 20502.

Trew Appointed as Director of Research, DoD

Robert J. Trew has been appointed Director for Research, Office of the Direc-

tor, Defense Research and Engineering in the Department of Defense, effective August 17, 1997. He is responsible for providing scientific leadership, management oversight, policy guidance and coordination of the \$1.2 billion yearly basic research programs of the Military Services and Defense Agencies. In this capacity, Trew has cognizance over the complete spectrum of efforts in research including materials, physics, chemistry, biology, electrical engineering and electronics, computer engineering and science, mathematics, environmental sciences, and aerospace.

Trew has extensive experience in industry, academia, and government, including General Motors and Watkins-Johnson Company, North Carolina State University, and the U.S Army Research Office. He is a Fellow of the Institute of Electrical and Electronic Engineers and has served as guest editor for *MRS Bulletin* and for the *International Journal of Micro-wave and Millimeter-Wave Computer-Aided Engineering*. □



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