

Materials Research Missions as yet Unaffected by Counterterrorism Priorities

Some six months after the September 11 terrorist attacks on the United States, "homeland security" has become the overriding topic among the federal scientific research agencies. Although this theme has not yet translated into specific initiatives for materials research, there are some indications that it will produce new efforts in the near future.

Tom Weber, director of the National Science Foundation's (NSF's) Division of Materials Research, said that in preparation of the agency's FY2003 budget, they were highlighting examples of research they fund that could contribute to homeland security. "However," he said "this has not currently been singled out as a separate priority area. Priority areas are nanoscale science and engineering, information technology, biocomplexity in the environment, and mathematics and science education. Clearly, some of the research funded in these areas will contribute to homeland security."

Regarding NSF's request for materials research funding for next year, Weber cautioned that Congress, as always, will make the final decision. "The research we fund is long-term. In our budget request, we're demonstrating how our efforts contribute to counterterrorism."

Another indication of the general continuity in federally funded materials research can be found at the Department of Energy (DOE). Last fall, Energy Secretary Spencer Abraham directed the DOE Office of Science and the directors of the department's eight national laboratories to review all ongoing research and development (R&D) programs to ensure that they supported homeland security goals. Officials at both DOE headquarters and the national laboratories believe that the secretary's directive will result in small but subtle shifts in research efforts over the next few years, which could affect some aspects of materials research. Ongoing research in support of the Department's missions, much of which is relevant to homeland security, will continue at least at current levels, officials said. They cited recent innovations using high-temperature superconducting quantum interface devices (SQUIDs), solid-state neutron detectors, and new organic sensors that show great promise and could lead to new technologies important for counterterrorism.

According to Bill Oosterhuis of DOE's Office of Materials Sciences and Engineering, the Office of Basic Energy Sciences is in the process of developing a research program to support homeland security.

"It behooves us [at DOE] to continue to find new opportunities in materials and invest in them," he said. "It's still a really exciting time to be in the field." Oosterhuis explained further that DOE is attempting to develop its counterterrorism efforts by building on the department's ongoing R&D projects. "These, indeed, may provide new opportunities for materials science," he said.

At the time Secretary Abraham issued his directive, Mary Anne Yates, leader of the 9/11 Response Team at Los Alamos National Laboratory, said, "The strategic mission review may cause us to temporarily curtail certain long-range research efforts and focus more on technologies that can be operationalized for counterterrorism. Of course, our main mission [at Los Alamos] continues to be maintaining an effective and safe nuclear weapons stockpile."

Given the DOE secretary's directive, Catherine Foster of Argonne National Laboratory said that basic research at the Advanced Photon Source, as well as other light sources, should continue unabated because "the facility was an investment made long before the events [of September 11]." The strategic mission reviews were to be completed by the end of January. At that time, Foster predicted that a higher emphasis would be placed on research involving improved and hardened infrastructure, which would encompass materials.

As for Sandia National Laboratory, spokesperson Larry G. Perrine said that Sandia would work closely with its DOE and National Nuclear Security Administration sponsors and contacts to determine whether to redirect funds or solicit additional funding to initiate new projects. The results of these studies were not known at press time.

Leslie Smith, Director of Materials Science and Engineering at the National Institute of Standards and Technology (NIST), said that his agency has also placed its highest priority on responding to the needs of homeland security. For materials science, that primarily means increased attention to the standards and measurement methods needed to ensure the structural integrity of structures subject to fire or explosion. Such research on structural materials has declined steadily over the last decade and needs to be reinvigorated, according to Smith.

However, he added, the heightened concern over homeland security in general will change the way scientists do research in the federal government. Cooperative research with non-U.S. colleagues has always been an important part of science, and those interactions will have to be care-

fully considered. Collaborations will demand more advanced planning to accommodate the time needed for security clearances, and perhaps more will be done through direct contact and less over computer networks and the Internet.

Smith also pointed to increasing attention to "cyber-security" and the kinds of information available on agency Web sites. For example, he said, the Web sites now contain fewer names of staff and less contact information, which poses a possible impediment to identifying potential scientific collaborators.

Officials responsible for materials research in the Department of Defense have not yet been reached.

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Transportation Research Opportunities to Increase at NTRC

Scientists studying vehicle safety, fuel efficiency, and other transportation issues will have improved access to state-of-the-art laboratories at the National Transportation Research Center. Located in West Knoxville, Tenn., NTRC has been designated a national user facility by the Department of Energy (DOE). The center—a joint effort involving DOE, the Development Corporation of Knox County, Oak Ridge National Laboratory (ORNL), and the University of Tennessee—also provides access to research and development (R&D) facilities not readily available to industry and other organizations.

Transportation research totaling \$100 million is already being conducted by ORNL and the university, and approximately one-third of that work is performed at NTRC. Nearly half of the research is funded by DOE's Office of Transportation Technology. User facilities enable researchers from corporations, universities, and other institutions to conduct proprietary and nonproprietary research. They encourage collaborative efforts among ORNL, private industry, and other institutions.

Researchers in the NTRC Composites Laboratory are awaiting the April arrival of a new test device that will enable them to measure the properties of materials at the equivalent of 2–10 mph. Director of the NTRC User Facility Richard Ziegler said, "This [device] is very significant in vehicle crash test research. In a crash that occurs at a speed of 30 miles per hour, for example, many of the changes to the vehicle materials actually occur at lower speeds. If we can understand how the materials change, we may be able to take advantage of those changes to help absorb more of the crash energy, thus making vehicles safer." □