DOE Notes

Grants Awarded for Math, Science Enrichment for Women and Minorities

Twenty-five colleges and universities have been awarded grants to encourage young women and minority students (in grades 7-10) to stay in the math and science pipeline and consider entering engineering careers. The grants, issued under the Pre-Freshman Engineering Program (PREP), enable the institutions to provide summer and academic-year enrichment activities centered on mathematics, problem solving, engineering design, and various science disciplines.

PREP began in 1973 and reaches approximately 1,500 students per year. Yearly survey results show that, on average, more than half of PREP participants enroll in engineering coursework at the university level.

Firms Selected for Full-Scale Development of Molten Carbonate Fuel Cell Modules

The DOE will negotiate three-year contracts with Energy Research Corp. (ERC) of Danbury, CT and M-C Power Corp. of Burr Ridge, IL to develop full-size molten carbonate fuel cell stacks along with the fuel processing and other components needed for a complete fuel cell power system. A third company, International Fuel Cells Corp. (IFC) of South Windsor, CT, will receive a three-year contract to continue research that could improve the fuel cell stack.

The electrochemical process employed by the molten carbonate fuel cell produces none of the pollutants associated with acid rain; and the high operating efficiencies, nearly twice those of a modern-day conventional coal power plant, produce as much as 40% less carbon dioxide.

Development has progressed to the point where 10- to 30-cell combinations have operated for several thousand hours. The new effort will integrate several hundred cells into a module capable of generating 100 to 300 kilowatts. The first commercial power plants are expected to link 10 to 20 stacks to produce one to two megawatts of electric power.

The three contractors propose different configurations for their fuel cell power systems. The IFC concept extracts hydrogen (the fuel feedstock for the system) from the coal gas or natural gas in a separate "reformer" outside the fuel cell assembly. Energy Research Corp. relies on an internal reforming design, while M-C Power arranges the fuel cells in a unique geometric pattern that allows heat to flow more efficiently and minimizes the tendency of the cells to shrink over time.

NSF Notes

35 Receive Undergraduate Faculty Enhancement Awards

As part of a program to help revitalize the teaching of undergraduate science, mathematics, and engineering, the National Science Foundation has awarded 35 Undergraduate Faculty Enhancement awards.

The Undergraduate Faculty Enhancement Program provides opportunities for faculty to participate in national or regional workshops and seminars on recent developments in the disciplines they teach. The program stipulates a sustained interaction among participants, who are themselves active scientists and teachers, and with authorities in their fields, both during the project and after.

Approximately 3,000 undergraduate faculty will take part in the current series of conferences and workshops, which will address theoretical and experimental topics. Most are residential and utilize the facilities of the host academic institution. Awards cover the cost of instruction, facilities, and, in many cases, room and board, and offer a modest stipend.

The recently announced awards cover the physical, biological, and social sciences, computer science, mathematics, and engineering. Several are interdisciplinary. Among the latest projects is a course in "Enhanced Macromolecular Chemistry and Engineering Undergraduate Education in the 1990s and Beyond." Organized as a joint venture between the American Chemical Society and Virginia Polytechnic Institute and State University, the two-week course is being held for 30 undergraduate faculty. It will provide undergraduate educators with in-depth exposure to modern theories and experimental techniques of polymer science and engineering in order to more widely incorporate this area into undergraduate chemistry and engineering curricula in major universities, small colleges, and among predominantly minority institutions.

For information about the Undergraduate Faculty Enhancement Program or specific projects, contact the National Science Foundation, 1800 G Street NW, Washington, DC 20550; telephone (202) 357-9859.

DARPA Selects 13 Proposals for High T_c Funding

The Defense Advanced Research Projects Agency (DARPA) has selected 13 proposals related to a Broad Area Announcement in high temperature superconductivity issued earlier this year. Contracts will be awarded when negotiations are completed.

Several of the contractors said their proposals amounted in funding of several hundred thousand dollars. Funding for Lehigh University, one of those selected, is expected to run about $400,000 for a three-year period. The contract involves optimization of grain-boundary alignment and microstructure using the yttrium-barium-copper-oxygen compound.

Another of those selected, Boston University, will also work with DARPA for a three-year period, dealing with the proximity of applied high T_c devices. Researchers there are interested in fabricating SNS junctions and connections between wafers and crossovers on wafers.

Rockwell's International Science Center received approval for a proposal to make high T_c compounds from molten salt electro-deposition. Such a process could lead to greater electrical control and much lower processing temperatures.

It is possible that other proposals could be announced later, depending on the amount of funding DARPA receives for the program.

Following is a list of proposals selected, together with locale and principal investigator: Rockwell International Science Center, Thousand Oaks, CA, D. Tench; Lehigh University, Bethlehem, PA, H. Chan; Pennsylvania State University, State College, PA, E. Cross; University of Wisconsin, Madison campus, E. Hellstrom; Boston University, W. Skocpol; State University of New York at Stony Brook, M. Gurvitch; Trans-Science Corp., La Jolla, CA, R. Asaro; Quad Design Technology, Inc., Camarilla, CA, R. Eden; Microelectronics and Computer Technology Corp., Austin, TX, H. Kroger; CVC Products, Inc., Rochester, NY, P. Ballentine; American Superconductor Corp., Watertown, MA, C. Russo; Honeywell, Inc., Bloomington, MN, J. Shomion; and Emcore Corp., Somerset, NJ, P. Norris. □

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