

DOE GRANT ADVANCES SOLID OXIDE FUEL CELL DEVELOPMENT AT UH Award of \$500,000 to Be Used to Research New High-Performance Materials

HOUSTON, Sept. 30, 2003 – Researchers at the Center for Materials Chemistry at the University of Houston (CMC-UH) have received a \$500,000 award from the Department of Energy (DOE) to investigate new materials for solid oxide fuel cells.

Such cells have the potential to substantially improve how electricity is generated, making it less expensive and more environmentally friendly.

The project is one of a series that will simultaneously advance energy efficiency and fossil energy technologies through the DOE's offices of Energy Efficiency and Renewable Energy and Fossil Energy.

The project, lead by Professor Allan J. Jacobson, who is Robert A. Welch Chair of Science and Director of the Center for Materials Chemistry at the University of Houston (CMC-UH), will be performed in collaboration with the University of Toronto, Pacific Northwest National Laboratory and McDermott Technologies, Inc. The team brings broad experience and expertise in both fundamental and applied areas that are needed to bridge exploratory and pre-commercial research on new oxide cathodes for intermediate temperature solid oxide fuel cells.

Solid oxide fuel cells (SOFCs) have the potential to improve energy efficiency and to provide a clean energy producing technology. The high temperature of operation enables the solid oxide fuel cell to function well with existing fossil fuels and to be used in combined heat and power applications or efficiently coupled with turbines to give very high efficiency conversion of fuels to electricity. SOFCs are quiet and non-polluting and their inherent high efficiency leads to lower greenhouse gas emissions.

"A solid oxide fuel cell is an electrochemical device that converts the chemical energy in a fuel, for example natural gas, into electrical energy without combustion. The absence of the combustion process in fuel cells significantly increases the efficiency of electric power generation and eliminates the formation of pollutants," Jacobson said.

While SOFC technology has been successfully established, widespread introduction of SOFCs into the marketplace requires reduction of manufacturing costs. A key approach to lowering costs is to reduce the temperature at which the SOFC operates. Intermediate temperature operation has a significant impact on cost by allowing the use of less expensive materials in interconnects and heat exchangers and by increasing reliability. Cost reduction requires both improvements in the properties of the materials, particularly the electrodes, and the development of inexpensive fabrication processes.

The objectives of the UH project are to discover new materials that will enable solid oxide fuel cells to meet performance targets at intermediate temperatures. An ancillary objective of the project is to increase fundamental understanding of the intrinsic transport properties of mixed electronic ionic conducting oxides and oxide-oxide interfaces that can be used to accelerate further progress in the development of cost effective high performance solid oxide fuel cells.

"SOFCs are complex devices and more fundamental research is needed to develop new materials with better performance," Professor Jacobson said.

Secretary of Energy Spencer Abraham, in announcing the UH grant and other energy-related research projects, said, "A strong commitment to leading-edge science is necessary in order to develop energy efficiency and clean energy technologies. Addressing crosscutting science needs within DOE maximizes the taxpayers' return on investment in key technology areas such as solid-state lighting, membranes that produce hydrogen, advanced fuels and chemicals, solid oxide fuel cells, as well as process sensors and controls."

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For additional information on Solid Oxide Fuel Cells, visit <http://www.seca.doe.gov/>.