

DOE - Fossil Energy Techline - Issued on: August 15, 2013

Historically Black Colleges and Universities Receive Funds for Fossil Energy Research

August 15, 2013 - 1:18pm

Washington, D.C. — Five fossil energy-related projects that will help maintain the nation's energy portfolio while also providing educational and research training opportunities for tomorrow's scientists and engineers have been selected for funding by the U.S. Department of Energy (DOE).

The funding opportunity to enhance scientific and technical understanding of conversion and utilization of fossil fuels is through the Office of Fossil Energy's National Energy Technology Laboratory (NETL). The DOE program involved is the Support of Advanced Fossil Resource Utilization Research by Historically Black Colleges and Universities and Other Minority Institutions (HBCU). The ultimate aim is to help develop new technologies that use fossil fuels in an environmentally friendly, low-cost and reliable manner.

By involving these professors and students in fossil energy development projects, the Energy Department hopes to maintain and upgrade education, training, and research capabilities at our minority colleges and universities in science, engineering, and technical management. The crosscutting university training and research program also generates fresh research ideas and ensures a future supply of fossil energy scientists and engineers.

The following projects have been selected for this funding opportunity.

Howard University (Washington, D.C.) — *Novel Low-Cost, Environmentally Friendly Synthetic Approaches Toward Core-Shell Structured Micro-particles for Fossil Energy Applications.* In a collaborative project between Howard University and the Ohio State University, graduate students will develop two inexpensive synthetic methods to prepare core-shell structured particles for chemical looping combustion or gasification and post-combustion CO₂ capture in power plants. The proposed methods of preparation — metal organic chemical vapor deposition and ionic diffusion—are both low cost and environmentally friendly, compared to other fabrication methods. Completion of the proposed work will benefit not only the chemical looping combustion/gasification and post-combustion CO₂ capture, but also many other related fossil energy conversion processes. (Award amount: \$199,892; Duration: 36 months)

Southern University and A&M College (Baton Rouge, La.) — *An Integrated Study on a Novel High-Temperature, High-Entropy Alloy.* The team at Southern University and A&M College proposes integrating computational materials simulation and experimental validation in material sciences to improve and design high-entropy alloys for high-temperature, high-pressure gas turbine application that will address the oxidation resistance and low-temperature ductility problems in coal energy conversion. They intend to determine the most optimal high-entropy

alloys and integrate the materials design and high-performance computing simulation into their course work. (Award amount: \$200,000; Duration: 24 months)

Tennessee State University (Nashville, Tenn.) — *Searching for Low-Cost Ferritic Steels for Advanced Ultra-supercritical Boilers Using First Principles Methods*. The team at Tennessee State University will develop automated simulation software tools to enable fast, large-scale screening of candidate designs to find a material better suited for the advanced ultra-supercritical environment. The result of this investigation should speed the development of new ferritic steel with reduced creep rupture and corrosion for energy applications. (Award amount: \$200,000; Duration: 36 months)

University of Texas at El Paso (El Paso, Tex.) — *Investigation on Pyroelectric Ceramic Temperature Sensors for Energy System Applications*. A low-cost, self-powered, wireless temperature sensor for energy system applications will be developed by the team at the University of Texas at El Paso. This work includes fabricating and characterizing pyroceramic temperature sensor materials, constructing a wireless sensing system, and demonstrating the wireless temperature sensing capability, data transmission, and durability at high temperatures and environmental conditions similar to a coal-based system. (Award amount: \$200,000; Duration: 36 months)

University of Texas at San Antonio (San Antonio, Tex.) — *Use of an Accurate DNS Method to Derive, Validate, and Supply Constitutive Equations for the MFX Code*. By providing equations that model the heat and mass transfer coefficients of non-spherical and irregularly shaped particles and clusters of particles, the team from the University of Texas at San Antonio intends to improve the accuracy of the MFX code's predictive capabilities. Additionally, the undergraduate and graduate students involved in this project will receive valuable training in computational fluid mechanics and heat transfer, using physically sound and validated software and first-class computing facilities. (Award amount: \$189,825; Duration: 36 months)