

Penn State leads DOE consortium on hydrogen energy research

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Hydrogen energy research at Penn State expands with leadership of a newly established U.S. Department of Energy consortium funded for three years by the DOE's Nuclear Energy Research Initiative.

Penn State will lead a consortium, funded for three years for \$2.4 million, to investigate thermochemical hydrogen production. Other members of the consortium include Argonne National Laboratory, University of South Carolina and Tulane University.

One aim of the program is to develop a number of thermochemical cycles for producing hydrogen on a commercial scale through advanced nuclear energy systems. In a thermochemical cycle, water and heat are the input, hydrogen and oxygen are the only products, and all other chemicals are recycled.

The objective of the consortium research—"Advanced Electrochemical Technologies for Hydrogen Production by Alternative Thermochemical Cycles"—is to establish the most efficient technologies for hydrogen production compatible with nuclear-generated heat sources.

Researchers will investigate a number of prospective thermochemical cycles and key reactions via experimental work and process simulation to evaluate their efficiency and viability for future sustainable energy infrastructure. Serguei Lvov, professor of energy and mineral engineering, will serve as director of the consortium.

"Energy dependence and the large increase in carbon dioxide and other greenhouse gas concentrations in the atmosphere are serious concerns today," says Lvov, who serves as the director of the Electrochemical Laboratory at the Penn State Energy Institute. "Substituting hydrogen for fossil fuels and the use of electric power/heat from nuclear reactors rather than fossil fuels, would increase energy independence and reduce greenhouse gas emissions."

Research conducted by the consortium members will rely on expertise in particular areas. Joint data analysis and selection of prospective directions and systems will be made at review meetings. It is also anticipated that consortium activities will be a part of the International Nuclear Energy Research Initiative, Lvov says, and a strong collaboration with Atomic Energy Canada, Ltd. and a number of Canadian universities will be developed. Penn State leads one of the 11 university-led teams tapped to conduct state-of-the-art research on nuclear energy with a total funding amount of \$30.7 million.

Source: Penn State

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