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## SRNL Awarded \$3M to Advance Clean Energy Technologies

AIKEN, S.C. (Sept. 1, 2022) – Savannah River National Laboratory (SRNL) received a \$3 million Department of Energy (DOE) Office of Science Basic Energy Science Program award to further fundamental research capable of enabling new pathways for hydrogen storage and production technologies.

The award is part of [DOE's recent announcement](#) of awarding \$540 million for university- and national laboratory-led research into clean energy technologies and low-carbon manufacturing to transform energy production and cut emissions.

The research will provide greater insight into the variety of surface characteristics that promote dissociation and recombination of hydrogen on a material surface and the behavior of subsurface hydrogen species. The objective is to provide an in-depth analysis of the interactions between MXenes, a two-dimensional ceramic material, and hydrogen, as well as the influence of external stimuli to fine-tune this interaction. This collaborative research effort is led by SRNL researcher Patrick Ward, Ph.D., Yury Gogotsi, Ph.D., from Drexel University, Kah Chun Lau, Ph.D., from California State University Northridge, and Paul Weiss, Ph.D., from University of California, Los Angeles.

“Utilizing a theory-guided experimental approach, we can systematically evaluate the nature and mechanistic behavior behind the interactions of hydrogen with these materials,” said Ward. “By combining our knowledge of the basic influential surface and subsurface features, which dominate the hydrogen interaction behavior with induced behaviors from external stimuli, a cohesive and complete perspective can be obtained. It is through expansion of our fundamental understanding of the physical world that led to great advances in technology. We have assembled an extraordinary team, which is determined to accomplish this,” he said.

This SRNL-led fundamental research supports underpinning aspects of the three [DOE Energy Earthshots](#), initiatives to set goals for improvements in clean-energy technologies. This research is particularly suited for addressing the Hydrogen Shot initiative, which seeks to reduce the cost of clean hydrogen by 80 percent to \$1 per 1 kilogram in 1 decade ("1 1 1") and unlock new markets for hydrogen.

Savannah River National Laboratory is a United States Department of Energy multi-program research and development center that's managed and operated by Battelle Savannah River Alliance, LLC ([BSRA](#)). SRNL puts science to work to protect the nation by providing practical, cost-effective solutions to the nation's environmental, nuclear security, nuclear materials management, and energy manufacturing challenges (<https://srnl.doe.gov/>).

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