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Chemical catalysts in the lab that could help produce hydrogen gas from iron-rich rocks. Credit: Toti Larson.

# Scientists Explore Catalyst for Emissions-Free Hydrogen

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In a project that could be a game-changer for the energy transition, researchers at the Jackson School of Geosciences are exploring a suite of natural catalysts to produce hydrogen gas from iron-rich rocks without emitting carbon dioxide.

The research is one of 16 projects funded by a \$20 million U.S. Department of Energy initiative that's exploring the potential of geologic hydrogen — that is, hydrogen produced from rocks. The initiative is also funding projects in The University of

Texas at Austin Hildebrand Department of Petroleum and Geosystems Engineering.

The catalyst project is led by Toti Larson and Esti Ukar, who are both research associate professors at the Jackson School's Bureau of Economic Geology.

The natural catalysts that the researchers are studying contain nickel and platinum group elements. They work by simulating a natural geologic process called "serpentinization," which involves iron-rich rocks releasing hydrogen as a byproduct of chemical reactions. Although serpentinization usually occurs at high temperatures, the catalysts would enable the reaction to occur at lower temperatures and at depths easily accessible to today's technology.

Researchers have already conducted successful tests at the laboratory scale. The grant will be used to scale up the experiments and test the process on a broad range of iron-rich rock types found across North America. Locations include basalts from the Midcontinent Rift in Iowa, banded iron formations in Wyoming and ultramafic rocks in the Midwest.

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