Albania hydrogen energy storage

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The reservoir sits within a portion of Earth"s crust and mantle that once lay at the bottom of the ocean and was scraped off when the tectonic plate it rode on slid beneath another plate. The crumpled slab of crust and mantle was thrust onto land between 45 million and 15 million years ago and formed a 1,900-mile-long (3,000 kilometers) rocky belt, known as an ophiolite, that extends from present-day Turkey to Slovenia.

Ophiolites exist worldwide, and research has previously documented hydrogen gas leaking from boreholes and mines drilled into these formations. In the new study, scientists discovered the reservoir thanks to huge clouds of hydrogen gas wafting from pools of water inside the Bulqizë mine, which is located 25 miles (40 km) northeast of Tirana, Albania. Such hydrogen reservoirs could be tapped to provide carbon-free fuel, but the deep infrastructure needed to do so is lacking and the gas is inherently difficult to extract.

"We have seen plenty of hyper alkaline springs hosted in ophiolites worldwide where hydrogen is bubbling [out]," lead study author Laurent Truche, a professor of geochemistry at Grenoble Alpes University in France, told Live Science in an email. But "what we have observed deep in the mine is another dimension," Truche said, and "turns a draining pool inside a mine gallery into a breathtaking 30-square-meter [323 square feet] jacuzzi bubbling with almost pure hydrogen."

Truche and his colleagues explored the deepest levels of the Bulqizë chromium mine and recorded extreme quantities of hydrogen gas leaking from the rocks and bubbling through pools of water. Their measurements suggest that at least 220 tons (200 metric tons) of high-quality hydrogen escape from the mine every year, which is one of the largest natural hydrogen flow rates documented to date.

Hydrogen is a highly flammable gas. The high concentrations measured inside the Bulqizë mine are thought to have sparked three explosions since 2011, killing four miners and injuring many more. "Our study will help to understand the phenomenon and to improve safety," Truche said.

"What sets our discovery apart is the large flux of almost pure [hydrogen] gas we have observed," the authors wrote in the study. "In the context of energy transition, our findings could substantially affect the ongoing search for new energy resources."

Sascha is a U.K.-based trainee staff writer at Live Science. She holds a bachelor’s degree in biology from the University of Southampton in England and a master’s degree in science communication from Imperial College London. Her work has appeared in The Guardian and the health website Zoe. Besides writing, she enjoys playing tennis, bread-making and browsing second-hand shops for hidden gems.

STE GENEVIEVE, MISSOURI - DECEMBER 15, 2023: Drone images of the Dredge Potter on the Mississippi River. The state climatologist said that Missouri is currently in a one-in-20-year drought and the

Mississippi River is expected to have near-record-low levels in the next few weeks. The dredger works 24/7 to keep navigation up and down the river open for barges carrying supplies and goods.

This revelation challenges conventional wisdom, where hydrogen extraction typically relies on mixtures of natural gas, petroleum, biomass, and water. However, this newfound source promises pure hydrogen, potentially reshaping the energy landscape as we know it.

Frieder Klein, a geochemist at the Woods Hole Oceanographic Institution, highlights the significance of this discovery, noting that traditional oil and gas industries have long overlooked such deposits. The implications are profound, with Michael Webber, a researcher, suggesting that the widespread availability of hydrogen could have far-reaching geopolitical consequences, shifting energy dynamics away from fossil fuels.

The Albanian mine boasts a remarkable capacity, with the potential to yield up to 200 tons of hydrogen annually--a milestone in natural hydrogen production. While this figure pales in comparison to the current global output of around 100 million tons per year, experts remain optimistic that further exploration may uncover additional reservoirs, substantially augmenting existing supplies.

However, as researchers delve deeper into the prospect of geological hydrogen extraction, concerns regarding environmental impact loom large. While the promise of abundant hydrogen reserves holds the allure of reduced costs, questions regarding extraction methods and ecological consequences demand careful consideration.