



# HYDROGEN

*Characteristics & Mechanical Properties*

## IMPACT of HYDROGEN STORAGE on the CHARACTERISTICS & MECHANICAL PROPERTIES of TRONA DEPOSITS

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### WHY THE STUDY WAS NEEDED

Underground hydrogen storage represents a promising avenue for storing excess energy for future use. To ensure the safe implementation of this technology, it is crucial to evaluate the potential alterations hydrogen might induce in the host rock.

### ABOUT THE STUDY

This research studied the impact of hydrogen ( $H_2$ ) on the mechanical properties of trona rock collected from Sweetwater County, Wyoming, USA. Twelve cylindrical specimens were prepared: three with a diameter of 25 mm and nine with a diameter of 38 mm. Specimens underwent treatment with gas compositions of 50%  $H_2$  and 100%  $H_2$  over two weeks, under 4 MPa of pressure and at room temperature.

### WHAT THE RESEARCHERS CONCLUDED

The study revealed significant findings regarding the interaction between hydrogen and the trona deposits, influencing the rock's mechanical properties and microstructure. The researchers observed a decrease in the relative content of trona, natrite, dolomite, and calcite after treatment with hydrogen. Furthermore, specimens treated with hydrogen exhibited, on average, a 33% lower strength. Conversely, an average 166% increase in elastic modulus was observed in trona after hydrogen treatment.





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