Goldschmidt 2025 Abstract
https://doi.org/10.7185/gold2025.28766

Hydrogen solubility in underground water

MEIXI ZHANG

Institute of Energy, Peking University

Numerous instances of natural hydrogen dissolved in groundwater have been documented, emphasizing hydrogen solubility as a key component in the study of natural hydrogen. Further research into the mechanisms of hydrogen dissolution and the factors influencing it is crucial for establishing a solid theoretical foundation for understanding hydrogen-rock-fluid interactions and is essential for advancing natural hydrogen accumulation studies.

Temperature, pressure, and salinity are the main factors influencing hydrogen solubility. Although the solubility of hydrogen has been widely investigated across multiple disciplines separately, there is a need to organize and integrate these findings. Besides, the phenomenon of super solubility in pore water is attracting increasing attention, which refers to gases exhibiting higher solubility in liquids confined within nanoscale pores compared to bulk phase. In conjunction with studies on water structure, hydrogen solubility is closely linked to the rearrangement of water molecules within the porous framework.

This study will systematically conclude the factors influencing hydrogen solubility and the mechanisms governing its dissolution in porous media, followed by discussions and future prospects based on these findings.