Project BiMiAb_H2: New experimental Research on Underground Hydrogen Storage at the Federal Institute for Geosciences and Natural Resources (BGR)

Weniger, P., Krüger, M., Ostertag-Henning, C., Beckmann, K.
Bundesanstalt für Geowissenschaften und Rohstoffe (BGR)

Abstract

Hydrogen is an important energy carrier and ‘green’ hydrogen, produced from renewable sources, represents one of the keystones of the energy transition and climate action programmes. During implementation of Germany’s National Hydrogen Strategy, the demand for transport and storage of domestically produced and imported hydrogen is expected to increase. In the future hydrogen economy, large-scale underground hydrogen storage (UHS) will be an integral part of the European hydrogen infrastructure.

Currently geological UHS activities mainly focus on storage in salt caverns, whereas storage in porous rocks such as deep aquifers or depleted petroleum fields will become important for future large-scale seasonal storage and in regions where cavern storage is not feasible.

A recently published expert’s opinion of the Energy Research Network Hydrogen emphasized R&D demands associated with medium to large-scale UHS. These include investigation of the influence of hydrogen on microbiological processes in geological storage formations and the impact on hydrogen quality, reservoir and well integrity as well as reservoir performance.

This paper introduces BGR’s new project (BiMiAb-H2), aimed to addresses future R&D demands for geological hydrogen storage by integrating geochemical, microbiological and petrophysical research. The aim of this project is to improve understanding of the origin and fate of hydrogen in the geosphere, to close knowledge-gaps associated with microbial processes in UHS and to contribute to risk assessment and identification of feasible geological storage formations in porous reservoirs in Germany. New analytical and experimental capabilities are developed, including in-situ-Raman spectroscopy in high-pressure, high-temperature experiments, high-pressure hydrogen sorption and core flooding under ‘in-situ’ storage conditions. These new experimental methods enable a quantitative investigation of microbial processes in UHS, evaluation of the potential for ‘microbial engineering’, quantification of hydrogen consumption through abiotic reactions at fluid-mineral interfaces and investigation of the influence of microbial and abiotic processes on petrophysical properties (porosity, permeability) under simulated storage conditions.

Korrespondierender Autor:

Titel:	
Vorname:	Philipp
Name:	Weniger
Firma/ Universität:	Bundesanstalt für Geowissenschaften und Rohstoffe
Straße:	Stilleweg 2
PLZ Ort:	30655 Hannover
Telefon:	0511-6432343
E-Mail:	Philipp.weniger@bgr.de

Vortrag [ ] Posterbeitrag [x]