Contribution ID: **855** Type: **Oral Presentation**

Caprock sealing capacity for underground hydrogen storage; Kimmeridge Clay

Tuesday, 23 May 2023 10:00 (15 minutes)

Hydrogen for clean energy is in the national and international spotlight. Offshore wind presents an extensive renewable energy source in the UK, and a large green hydrogen resource, positioning the UK to be a major player in the emerging global hydrogen market. In the UK and around the globe there's a handful of likely subsurface hydrogen storage sites and it is widely recognised that hydrogen storage in porous media (rocks) will be necessary to support the scale of production, storage and use anticipated for a global hydrogen economy.

A key component of subsurface risk management is the suite of geological controls needed to ensure that storage is efficient and secure (i.e. that injected fluids do not leak from the storage formation). Storage security is closely related to caprocks and their capacity to hold the stored hydrogen at the place for the needed period of time. The work characterizes and describes the Kimmeridge Clay. A caprock widely spread across the Central and Norther North Sea and which has acted as an effective seal for numerous hydrocarbon fields. Two key phenomena defining caprock ability to seal are capillary pressure (CP) threshold and displacement pressure (DP). Capillary pressure of the caprock needs to be sufficient to resist the upward buoyant forces of the hydrogen that is built up beneath the caprock and displacement pressure rules the flow of leaking hydrogen. Both capillary and displacement pressure are effected by pores/throats size distribution and wettability. The work focuses on porosity & wettability determination and an effect of these parameters on capillary pressure. The aims is to better understand caprock compatibility to hydrogen stored underground and to examine the processes conditional to caprock integrity and its sealing capacity.

Understanding of geological controls is critical to inform the selection of appropriate reservoir sites as well as designing safe and effective storage and recovery schemes. The work outcomes will inform (a) security, monitoring and assessment approaches for hydrogen geological storage, and (b) potential for engineered barriers for enhanced containment or leak remediation.

Participation

In-Person

References

Underground hydrogen storage

MDPI Energies Student Poster Award

No, do not submit my presenation for the student posters award.

Country

United Kingdom

Acceptance of the Terms & Conditions

Click here to agree

Energy Transition Focused Abstracts

This abstract is related to Energy Transition

Primary author: SLABON, Lubica (University of Edinburgh)

Co-authors: Dr MOLNAR, Ian (University of Edinburgh); EDLMANN, Katriona (The University of Edinburgh); Dr HASSANPOURYOUZBAND, Aliakbar (University of Edinburgh); Dr ROBERTS, Jennifer (University of Strathclyde)

Presenter: SLABON, Lubica (University of Edinburgh)

Session Classification: MS01

Track Classification: (MS01) Porous Media for a Green World: Energy & Climate