Contribution ID: **175** Type: **Oral Presentation**

3D Visualization of hydrogen storage in sandstones at reservoir conditions

Wednesday, 1 June 2022 10:45 (15 minutes)

Hydrogen energy is poised to play a pivotal role in the global efforts to achieve net-zero targets and the planned transition from traditional fossil fuels to clean energy sources. While there has been increasing interest in the use of green hydrogen, the massive amount needed for future demand would require new storage facilities. Underground storage of hydrogen, e.g., in saline aquifers and depleted gas reservoirs, can provide a viable solution for short-term to long-term storage to meet the fluctuations in energy demand; however, it poses unique challenges due to hydrogen's distinctive physical and chemical properties. It is imperative to understand the different interactions and displacement mechanisms that would occur at the pore-scale when hydrogen is injected, stored, and then produced from rocks at reservoir conditions. In this study, we use X-ray micro-tomography to investigate the fundamentals of pore-scale fluid displacement processes during cyclic injection of hydrogen in an initially brine saturated Bentheimer sandstone sample at high pressure and temperature conditions. These imaging experiments allow us to visualize the flow patterns and rock-fluid interactions at the pore-scale, providing an initial indication about the trapping mechanisms and storage efficiency. We will extend this research further by performing time-resolved synchrotron X-ray imaging experiments, which will provide additional insights into the dynamics of pore-scale processes during underground hydrogen storage.

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Time Block Preference

Time Block B (14:00-17:00 CET)

Participation

Online

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