



Contribution ID: 257

Type: Oral Presentation

## Novel Pore Scale Visualization during CO<sub>2</sub> Injection into CH<sub>4</sub> Hydrate Saturated Porous Media

*Tuesday, 31 May 2022 17:00 (15 minutes)*

CO<sub>2</sub> capture in sediments through CO<sub>2</sub>-rich gas injection into methane gas hydrate reservoir is a recently proposed technology for methane recovery and simultaneously storing CO<sub>2</sub> in deposits. CO<sub>2</sub> capture and storage in CH<sub>4</sub> hydrate formations located at low-temperature, high-pressure conditions, is an attractive proposition as technical and economic costs are lower and it is safer option to store as hydrates, since it offer confined storage, presence of elevated pore pressure, very low CO<sub>2</sub> leakage rates and long-term storage potential. The current literature lacks visualization studies that could improve our understanding of fluid migration and hydrate rearrangement during CO<sub>2</sub> injection into CH<sub>4</sub> hydrate. This experimental study is the first to provide pore-scale visualization (using high-pressure micromodel) when CO<sub>2</sub> is injected into CH<sub>4</sub> hydrates. Our study shows that the CO<sub>2</sub> richness in the invading liquid phase controls the CO<sub>2</sub> injectivity and the redistribution of the hydrates. The CO<sub>2</sub> content in the liquid phase is controlled by the CO<sub>2</sub> injection scheme. The resulting CH<sub>4</sub>/CO<sub>2</sub> mixed hydrates were stepwise depressurized to visualize the hydrate reformation below the CH<sub>4</sub> hydrate phase that would improve the recovery of CH<sub>4</sub> while reforming the CO<sub>2</sub> hydrate, thus keeping the hydrate mass intact. This research would help improve our understanding of an effective CO<sub>2</sub> injection scheme for improved CH<sub>4</sub> recovery and CO<sub>2</sub> storage.

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### Country

Denmark

### References

### Time Block Preference

Time Block C (18:00-21:00 CET)

### Participation

Online

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