

# A Laboratory Study of Dissolved CO<sub>2</sub> Geochemical Interaction with Rock Matrix in Non-Traditional Reservoirs During the Carbon Storage Process

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## Summary

The geological sequestration of captured CO<sub>2</sub> in suitable reservoirs is the one of most promising way to reduce the global increasing carbon emissions to the atmosphere. Natural gas pools are ideal candidates for CO<sub>2</sub> storage as they usually have good sealing layers and additional storage space due to the adsorption mechanism. Non-traditional gas reservoirs such as carbonate gas pools and depleted shale gas pools are rarely studied. In this study, we designed and conducted CO<sub>2</sub> injection experiments on two types of these non-traditional reservoirs rock samples from Western Canadian Sedimentary Basin to learn how CO<sub>2</sub>-brine-rock geochemical interaction affect the key fluids flow properties changes and thus affecting the short-term and long-term CO<sub>2</sub> storage performance in these reservoirs.

## Theory / Method / Workflow

Core plugs were drilled from the original core intervals from selected typical formation perforated wells stored in Alberta Energy Regulator Core Research Centre. For the shale rock samples, they were manually fractured along the longitudinal direction to mimic the artificial hydraulic fractures. Core plugs were then saturated with the brine and injected with carbonated brine. Pressure, produced water samples, and other important parameters were collected. The experiments were conducted under reservoir pressure and temperature conditions. The core plugs were scanned by CT before and after the CO<sub>2</sub> injection test for comparison study.

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