

## **Experimental studies on CO<sub>2</sub> (SO<sub>2</sub>)-saline-minerals interaction with related to CO<sub>2</sub> geological storage**

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Geologic CO<sub>2</sub> sequestration (GCS) in deep saline aquifers is the most effective way to reduce CO<sub>2</sub> emissions. Since the injected CO<sub>2</sub> is not pure and always contains several reducing gases such as SO<sub>2</sub>. Considering dissolved SO<sub>2</sub> in water might seriously change the pH value of the solution and accelerate the water-rock reaction, we conducted experiments for the investigation on the impure CO<sub>2</sub>-brine-minerals interactions.

In our present study, pure CO<sub>2</sub> and impure CO<sub>2</sub> (Vol. % SO<sub>2</sub>= 0.5%) were reacted for two weeks with calcite at 50°C and 10MPa, and feldspar at 200°C and 15MPa, respectively. Cleaved surfaces of minerals were characterized by SEM-EDS and the solutions were measured by ICP-OES. The results showed the dissolution of the calcite surface could be observed in both pure and impure CO<sub>2</sub>, while the corrosion pits were deeper in the later system. A few of corrosion pits and secondary minerals were found on the feldspar surface in these two systems. The platy secondary minerals generated near the corrosion pits piled up into rose-like shape on early formed flakes in pure CO<sub>2</sub>. While in the CO<sub>2</sub> mixed with SO<sub>2</sub> system, the secondary minerals grew preferentially on feldspar surface and developed into a thin layer. The secondary minerals were confirmed to be kaolinite and phyllosilicate. It indicated SO<sub>2</sub> only enhanced the dissolution of calcite and changed the development area of secondary minerals on feldspar surface. The results indicate that impure CO<sub>2</sub> injection would be carefully considered for the related CO<sub>2</sub> geological storage.

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