

Carbonate mineral scaling is commonly associated with geothermal fluid utilization, both in the reservoir as well as in production and re-injection wells and surface pipelines. Problematic aspect is to visually investigate on-going geochemical processes. The Lack of information on porosity changes, total reactive surface area, fluid-rock kinetics makes difficult to predict such interaction and leads to malfunction during geothermal utilization. Understanding the CO₂-water-rock interaction at geothermal conditions is therefore of significant importance.

For this reason batch-type experiments (CO₂-H₂O-olivine) were conducted as a function of time and acid supply under hydrothermal conditions. Such series of experiments tell us more about typical dissolution, nucleation, crystal growth macroscopic patterns of secondary phases or how evolves reactive surface area with time.

...Currently finished Transition state theory full-kinetic model of CO₂-H₂O- olivine interaction has a good fit with experimental data and therefore provides realistic insight into mass transfer in fluid-rock interface on macroscopic scale. The effect of initial acid supply is here presented by mass and type of secondary minerals precipitated as u function of time (reaction progress).

System with A) initially less acid supply (C_{tot}) consumed acid faster and is demonstrated by constant mass of carbonates precipitated after 20 days of interaction. At this point serpentinization started to dominate by chrysotile and brucite mineralization, whereas system with high acid supply at the beginning B) is dissolving olivine faster over longer time period. Carbonates, as a withdrawal of C_{tot} from solution, were forming still after 100 days in form of siderite and Fe-rich solid solution carbonate. At this time chrysotile and brucite starts to dominate among precipitated phases.

