

Silica isotope fractionation during precipitation and dissolution of amorphous silica was studied in batch reactors at temperatures between 25 to 300 °C. Additionally the potential application of Si isotope fractionation in Kaolinite precipitation studies was investigated.

Kaolinite precipitation experiments were carried out in mixed flow reactors. A solution containing AlCl_3 and a solution containing silicic acid were pumped into a mixed flow reactor at pH 4 and a molar Al/Si ratio of 1. Whereas the colorimetric analysis of silica does not allow quantifying the amount of newly precipitated material, Si isotope fractionation between inlet and outlet indicates the precipitation of a Si containing phase. Additionally isotopic fractionation is valid in dissolution experiments carried out at 70 °C, whereas no fractionation is observed in any of the experiments carried out under room temperature. In the next step isotopic fractionation of Si under high temperature conditions (100 to 300 °C) will be investigated to test its potential application for the quantification of silica scaling in hydrothermal systems.

Strontium incorporation into calcite is studied in flow through experiments. Previous results from a former study suggest that alternating trace element rich and poor growth zones were discovered in experiments carried out at a constant solution composition, temperature and flow rate (Fig. 1). We suggest that the incorporation behavior depicted by bulk ratios which serve as proxies for the reconstruction of environmental conditions during precipitation of CaCO_3 is not necessarily valid on the microscale. The actual locally occurring trace element incorporation into CaCO_3 can significantly exceed or fall below the average bulk incorporation.

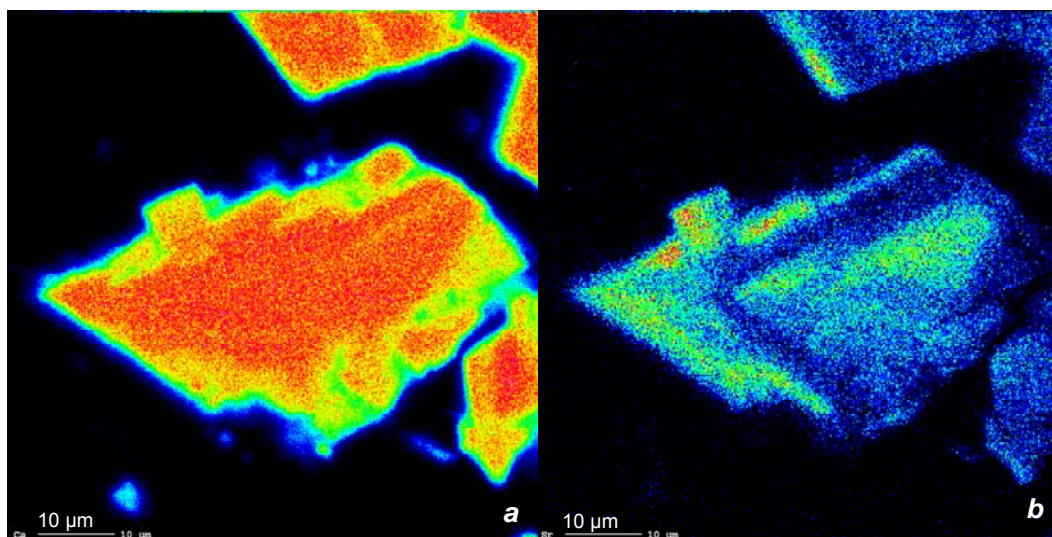


Figure 1. Elemental Map of Ca^{2+} (a) and Sr^{2+} distribution (b) of calcite precipitated in a flow through experiment.