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# Lithium in deep geothermal systems: Fluid-mineral experiments under in situ conditions with sandstone and granite samples.

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As a consequence of the increased demand in Li, Li extraction as a byproduct of geothermal energy use is explored as an alternative for Li production in the recent years. Understanding water-rock interactions in regards to Li is crucial for the estimation of Li deep geothermal brine reservoirs but the geochemical behavior and occurrence of Li in such systems is still poorly understood. In context of the project $Li^+$ Fluids, we are systematically investigating Buntsandstein, Rotliegend and granite drill core material from geothermal research sites of the Upper Rhine Valley and North German Basin with petrographic and geochemicial analysis. Furthermore, Au capsules and flexible Dickson-type Au-Ti reactor cells were utilized for batch experiments conducted under in situ conditions in order to study the near-equilibrium Li concentration and to identify mineral dissolution as well as secondary mineral precipitation. Results of fs-LA-ICP-MS measurements of mineral phases reveal that Li is present in multiple phases, but concentrated in chlorite and biotite. The release of Li in batch experiments occurs rapidly and a near-equilibrium concentration is attained after 3 to 6 days of experimental run time. Ongoing work includes the exploration of Li release stimulation by variation of experimental parameters such as fluid chemistry and the setup of flow-through experiments.