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**Title of Ph.D. thesis:** CO<sub>2</sub>-water-rock interaction: numerical modeling and experiments on the effects of CO<sub>2</sub> on basalt alteration

**Description:**

- Laboratory reaction path and reactive transport experiments on CO<sub>2</sub>-water mixtures in contact with basaltic glass at variable temperatures.
- Characterization of mass fluxes of solutes between primary-secondary mineralization and solution (CO<sub>2</sub>-water mixture).
- Modeling calculations using PHREEQC geochemical software in comparison with laboratory experiments.

Use of experimental work to improve existing geochemical models of volcanic rock dissolution-precipitation reactions during transport in porous media in order to reproduce more closely geochemical reactions observed in natural environments. - Use the experimental results to setup real scale injection of CO<sub>2</sub>-charged waters produced by geothermal power plants into basalt, part of the Hellisheidi project in Iceland.

**Supervisors:** Dr. Andri Stefánsson Institute of Earth Sciences, University of Iceland and Dr. Sigurður Reynir Gíslason Institute of Earth Sciences, University of Iceland.

**Education:** MSc ETH (2007), ETH Zurich, Switzerland

**Papers and abstracts:**

A. P. Gysi and A. Stefánsson, (2008). Numerical modeling of CO<sub>2</sub>-water-basalt interaction. Abstract, GES 8, London.

A. Stefánsson and A. P. Gysi, (2008). CO<sub>2</sub>-basalt interaction – numerical simulation and experimental study. Abstract, Goldschmidt 2008, Vancouver.

Gysi, A.P. et al., (2008). Petrogenesis of pyroxenites and melt infiltrations in the ultramafic complex of Beni Bousera, northern Morocco. (manuscript in preparation for J. Petrol.).

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