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## CarbFix: a CCS pilot project imitating and accelerating natural CO2 sequestration

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### Abstract

CarbFix, a combined industrial-academic pilot program, was developed in order to assess the feasibility of in situ CO2 mineral sequestration in basaltic rocks. Unique to CarbFix is its connection to the Hellisheidi geothermal power plant, allowing for capture of otherwise emitted CO2 in addition to CO2 transport and mineral sequestration.

Extensive research has been conducted in order to characterize physical properties of the pilot injection site in Hellisheidi. Tracer tests have been carried out and continuous well-logging confirmed separation of the target formation from shallower groundwater systems. Alteration mineralogy in natural analogs has been mapped out in order to predict which minerals are likely to precipitate upon CO2 injection. In addition to carbonates, these include clays, zeolites, and poorly crystalline hydroxides. Some of the secondary minerals will compete with carbonates for cations dissolved from the rock matrix.

Numerical modeling plays an important role in the CarbFix project as it provides tools to predict and optimize long-term management of the injection site as well as to quantify the amount of CO2 that can be mineralized. A reactive transport model has been developed and numerical simulations of the pilot CO2 injection are ongoing. Extensive monitoring provides the basis for testing, validating, and calibrating reactive transport models.

It is anticipated that the results of CarbFix will be used to optimize the in situ carbon mineralization process, enabling it in basalt and ultramafic rock formations throughout the world. (c) 2011 Society of Chemical Industry and John Wiley & Sons, Ltd

### Keywords

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