The Experimental Research for CO2 Storage in Basaltic-Rock Aquifer.

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Carbon dioxide capture and storage (CCS) technologies are the promising methods to stabilize atmospheric CO_2 concentration. In particular, CO_2 aquifer storage is a notable method because of its huge CO_2 storage potential (IPCC, 2005). However, there is a major concern with the large scale implementation of CO_2 aquifer storage whether injected CO_2 will be stored safely over a long period of time. The geochemical trapping of CO_2 is receiving attention as an important mechanism for providing long-term security of CO_2 aquifer storage (Goldberg et al., 2008). The geochemical trapping is a course of transformation where injected CO_2 changes to more stable phase (ions, minerals) throughout the chemical reactions between the aquifer water and the host rocks.

Basaltic-rock aquifers are suitable candidates for CO_2 geochemical trapping because they contain much cations such as Mg and Ca that govern acid neutralization potential of rock and formation of stable carbonate minerals (McGrail et al., 2006, Matter et al., 2007). Despite the increasing interest in basalt aquifer disposal of CO_2, there are few researches on quantitative evaluation of basaltic rocks as an aquifer storage option. In this study, therefore, we defined the cation release rates from basaltic rocks based on CO_2-water-rock interaction experiments. We also evaluated the influence of alteration of reacting basalts on the cation release rates by conducting same experiments on basaltic rocks altered in different environments.