Geophysical Research Abstracts
Vol. 16, EGU2014-9815-6, 2014
EGU General Assembly 2014

Mg isotope fractionation during microbe-mineral interactions

Insu Kim, Jong-sik Ryu, Kwang-sik Lee, and Dongho Lee

Korea Basic Science Institute, Division of Earth and Environmental Science, Occhang, Korea, Republic Of (kis0823@kbsi.re.kr, jsryu@kbsi.re.kr, kslee@kbsi.re.kr, dhlee17@kbsi.re.kr)

Magnesium is involved in various biogeochemical processes important to the global climate change over geological time-scale. Mg isotopes allow us to directly trace the Mg cycle in the Earth's surface but the factors controlling Mg isotopic compositions have not fully understood yet. Here, we conducted a batch experiment using two bacterial species (*Shewanella putrefaciens* and *Burkholderia fungorum*) and three major Mg-bearing minerals (biotite, dolomite and hornblende). All elemental concentrations increased by 336 h and then reached to steady-state values, of which Mg concentrations varied depending on minerals and bacterial species. This result indicates that the mineral dissolution is affect by the presence of microbes, which either provide organic acids or attach onto mineral surface. The Mg isotopic compositions of initial minerals biotite, dolomite and hornblende are -0.35‰ of biotite, -0.99‰ of dolomite, and -0.24‰ of hornblende, in δ^{26}Mg. Similarly, δ^{26}Mg values increased by 336 h and reached to steady-state values, which also varied with minerals and microbes. During dissolution of three minerals, the light isotope of Mg is preferentially incorporated into the dissolved phases and then the dissolved δ^{26}Mg values become consistent with those of minerals with the time.