

Effect of Mg²⁺ to precipitation and transformation kinetics for monohydrocalcite in aqueous solution.

Takashi Munemoto[1]; Keisuke Fukushi[2]

[1] Earth sciences, Kanazawa Univ.; [2] KINET

The calcium carbonate is one of the abundant minerals that exist in nature. The formation of the calcium carbonate and preservation in the sediments are the most important geochemical processes that effect on the behavior of CO₂ in the earth surface environment. Monohydrocalcite (CaCO₃H₂O: MHC) is one of the calcium carbonate minerals. The formation of MHC requires the high concentration of Mg²⁺ ion, high pH and the high CO₂ supersaturation level in mother solution (Dejehet 1999). MHC is a metastable which have changed into an anhydrous phase in a short time when existing in the water (Taylor 1975). Therefore, MHC is thought to be labile phase which doesn't have any significances in the earth surface processes. On the other hand, MHC was recently found in the sediment which formed almost 200,000 years ago in the Lake Hovsgol located in Mongolia (Fukumoto 2008 MS). This discovery suggests the possibility that MHC is more stable than it have been thought up to now , and plays an important role for the behavior of CO₂ in the earth surface environment.

The aim of the study is to evaluate the formation condition and stability of MHC from the laboratory experiment. We studied effect of Mg⁺⁺ ion on the formation of MHC, which has little been studied as well as the transformation processes and kinetics of MHC in low temperature which is indispensable for understanding of the metastability of MHC.

Reference

Dejehat F., Idrissi S., and Debuyst R. (1999) *J. Chim. Phys.*, vol. 96, pp. 741-753.

Taylor G.F. (1975) *American Mineralogist*, vol. 60, pp. 690-697.

Clarkson J.R., Price J., and Adams C.J. (1992) *J. Chem. Soc. Faraday Trans.*, vol. 88, pp243-249