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2021.05.20 (Fri.) 16:30 ~

Venue: Zoom
A link will be sent @grc-all within 30 minutes before the beginning of the seminar.

Limitation of Fe oxidation in chlorite

Two trioctahedral chlorites with Fe/(Fe+Mg) ratios of 0.17 and 0.53 were heated at 650ºC in air to verify the thermal modification and the susceptibility of ferric iron in structure. The heated samples together with the unheated original samples, were characterized ex-situ by high resolution transmission electron microscopy (HRTEM) along with powder X-ray diffraction (XRD) and Mössbauer spectroscopy (MS) in addition to thermal (TG-DTA) and chemical analyses. Upon heating at 650ºC, the interlayer sheet was dehydroxylated and the structural ferrous iron was completely oxidized to ferric state. The two heated samples showed the XRD profile that is diagnostic of heated chlorite with a strong 001 diffraction peak, nearly absent 002 and 003 peaks and a weak 004 and higher order reflections. In addition, the weak and broad reflection peaks corresponding to a 27-Å spacing were also observed in only heated Mg-rich chlorite. HRTEM observation of heated Mg-rich chlorite confirmed the presence of two atom planes in the interlayer region. In contrast, the above structure modification was not observed in heated Fe-rich chlorite. The lack of two-plane structure in the heating product of Fe-rich chlorite arose from the release of excess ferric iron as hematite formation. It is suggested that chlorite is susceptible to iron oxidation upon heating as long as Fe^{3+} can be in the M4 site, which holds the stable structure. Moreover, the differences in thermal behavior between the Mg-rich and Fe-rich chlorites infers that the susceptibility to ferrous iron oxidation is related to the total iron content of chlorite. Moreover, the differences in thermal behavior between the Mg-rich and Fe-rich chlorites infers the susceptibility to ferrous iron oxidation is related to the total iron content of chlorite. The Fe^{3+} content in chlorite is controlled by the redox condition and temperature during the formation under the structural contstraint.