Clay minerals from Akeshi mine, Minamikyushu City, Kagoshima Prefecture, Japan

*Takuya Yoshimura¹, Seiichiro Uehara², Kyohei Kurokawa³, Atsushi Gomi³

1. Department of Earth and Planetary Sciences, Faculty of Science, Kyushu University, 2. Department of Earth and Planetary Sciences, Faculty of Science, Kyushu University, 3. MITSUI KUSHIKINO KOZAN Co.,Ltd

Gold deposits in Akeshi mine belong to Nansatsu-type gold deposits in Southern Kyushu, Japan. This mine is operated by Mitsuikushikino Mining Co., Ltd. The mine was described by mineralogical studies (Nakamura et al., 1994), economic geological studies (Tokunaga, 1954), and minerals such as autogenous, discretionary and limonite have been described. However, no mineralogical study has been carried out on clay minerals found in the alteration zone surrounding the deposits. In this study, we mainly analyzed the clay rich part of the alteration body, which is reflects the alteration condition of the mine.

The analyzed boring cores were obtained near the mining areas, and 30 samples from the 70-90 m depth from the H27-2-2 core, and 19 samples from 90-110 m depth from the H29-1-1 core. Collected samples were investigated using the polarization microscopy, X-Ray Diffraction (XRD) analysis, SEM-EDS analysis and TEM-EDS analysis in order to define the composing minerals and clay minerals.

Drilling core samples were classified into 4 groups according to the amount of quartz and constituent minerals. Group 1 and 2 was rich in quartz and contains minor kaolinite. Group 3 in composed of kaolinite and smectite. Group 4 includes chlorite, kaolinite, and interstratified clay mineral of chlorite and smecite, and H29-1-1 core was richer in kaolinite. In the results of chemical analysis by TEM-EDS, the clay minerals in altered andesite from group 4 was Fe-rich chlorite (chamosite), however, in SEM-EDS, the obtained composition was intermediate of clinochlore and chamosite. In TEM-EDS, illite-smectite interstratified clay minerals, \( (K_{0.47}(Mg_{0.37} Fe_{0.37} Al_{1.62})_{2.36}(Si_{3.23} Al_{0.77})_{10}O_{10}(OH)_2) \) was observed.

Keywords: Akeshi Mine, Gold deposit, Clay Minerals, Interstratified Clay Minerals
Fig. 1. BSE image of kaolinite (Ka) and illite (Ill) in altered andesite from Akesi mine.