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Mineralogical study of serpentinite from Akamatsu, Yatsushiro, Kumamoto prefecture.

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Serpentine group minerals are one of the 1:1 layer type sheet silicates and the main component of serpentinite. They are classified into three mineral species chrysotile, lizardite and antigorite. The ideal formula of chrysotile and lizardite is $Mg_3Si_2O_5(OH)_4$and that of antigorite is $Mg_{48}Si_{34}O_{85}(OH)_{62}$.

In our previous study, we researched serpentinite from a large area in Kyushu Kurosegawa belt (Tanaka et al., 2012), but there are only few reports for each area. So, the purpose of this study is to identify the composition minerals of serpentinite in Akamastutaro Pass and Tanoura, located in west of Kyushu Kurosegawa belt, and to conduct a detailed study of serpentine.

Mineral species was identified by XRD pattern and serpentinite was classified into three type: antigorite main serpentine (Type AA, 16 specimens), antigorite rich serpentine (Type A, 10 specimens) and antigorite poor serpentine (Type LC, 8 specimens). Antigorite was most abundant. Magnetite, chromite, clinochlore, brucite and hydrotalcite group minerals were identified in specimens from both areas. Only the specimen from Akamatsutaro Pass had andradite, calcite, heazlewoodite (Ni_3S_2) and millerite (NiS), while forsterite, hydromagnesite, pyroaurite and awaruite (Ni_3Fe) were seen only in Tanoura. The supply of H_2S in Akamatsutaro Pass can be estimated from the presence of heazlewoodite and millerite. Relict forsterite was observed in serpentinites from Tanoura, indicating the smaller degree of serpentization compared to Akamatsutaro Pass.

Sepentine contained in massive serpentinite had variable textures such as vein texture, reed shape texture and mesh texture with core and rim, which was formed after serpentization of olivine. In the specimens of Type LC, mesh texture was often observed, and there were cores with no rim in samples without mesh textures. Also some core texture was replaced by reed shape texture. Chemical compositions obtained by SEM-EDS show some trends for serpentines in each texture. Reed shape texture contains 0.041 (apfu) Al which replaces Mg, while core texture contain 0.07 Al and rim texture contains 0.006 Al, so reed shape texture is rich Al than mesh texture. Reed shape texture contain larger amount of SiO_2 weight percent compared with the ideal formula of chysotile and lizardite, and resemble that of antigorite.

Reference

K.Tanaka, T. Inoo and S. Uehara (2012): Microtexture and chemical composition of serpentine minerals from Kurosegawa belt, Kyushu, Japan. The 2nd Asian Clay Conference, Abstract Book.

Keywords: serpentine, antigorite, reed shape texture, mesh texture, Kyushu Kurosegawa belt, Yatsushiro