Mineralogy of the hydrothermal chimneys and the mounds in the northern part of Kagoshima bay

Kotaro Maeto[1]; Hitoshi Chiba[2]; Junichiro Ishibashi[3]; Youko Miyoshi[4]; Yoshihiro Kuwahara[5]; Toshiro Yamanaka[6]

[1] Dept Earth Sci. Graduate school of Okayama Univ.; [2] Dept. of Earth Sci., Okayama Univ.; [3] Earth & Planet. Sci., Kyushu Univ.; [4] Earth and Planetary Sci., Graduate School of Sci., kyushu Univ; [5] Dept. Envronmental Changes, Fac. Soc. Cult. Stud., Kyushu Univ.; [6] Fac. Sci., Okayama Univ.

The active submarine volcano, Wakamiko, is located in the northern part of Kagishima bay. The submarine hydrothermal and fumarolic activities have been known on the crater floor (200m depth). The hydrothermal fluid venting at ca. 200 degC from the chimney-like structure was first discovered on the crater floor at the northwest part of the crater during the dive survey of ROV/Hyper-Dolphin of JAMSTEC (R/V Natsushima, NT07-09 Cruise) in 2007. We have discovered three active chimneys so far in the northwest part of the crater, White cone, Hairy cone, and Daihuku-yama. During the dive survey in 2008, Hairy cone was found to be broken, however simmering of hydrothermal fluid was continued.

We sampled hydrothermal chimney and mound deposit from White cone, and mound deposit from Hairy cone in 2008.

Chimney is mainly composed of talc with stacking disorder and/or interlayer water and carbonates (dolomite and magnesite). Small amount of sulfate minerals (anhydrite) also exists. Talc was major mineral in the chimney, and it tends to be more abundant closer to the flow channels. Especially talc with colloform structure was found at the inner wall of the vent. Carbonates mainly exist in the outer part of the chimney. Stibnite (Sb_2S_3) was also found on the surface of carbonates, most outer part of the chimney. Stibnite seems to have been precipitated from the hydrothermal fluid seeping through the crack of chimney.

Since the endmember of hydrothermal fluid has no Mg2+, talc must be formed upon the mixing of Si-rich hydrothermal fluid and Mg-rich ambient seawater. Carbonates must be formed upon the mixing of high-alkalinity hydrothermal fluid and seawater too, and occur at the outer part of the chimney. Therefore carbonates must be formed at lower-temperature condition than talc.

The mounds of White cone and Hairy cone were fragile and black in color. They are mostly composed of stibnite with small amount of fine pyrite. Stibnite occurs mostly as needle-like euhedral shape both in the chimney and mounds. The mound of White cone contain only small amount of talk. The grain size of stibnite is larger in the mounds than in the chimney. Stibnite is frequently reported in the hydrothermally altered sediments at the crater floor, but not in the massive form.