

Characteristics of pumice from the 1977 Plinian eruption of Usu-Volcano

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Pyroclast produced by explosive volcanic eruption such as pumice and volcanic ash records the phenomena in its texture and morphology, which are the whole processes magma ascends through the conduit from magma chamber and sediments on the ground as pyroclast. Therefore, analyses of the texture and morphology of pyroclast are very effective means in order to understand the vesiculation, degassing, and fragmentation processes of magma, i.e. mechanisms of explosive volcanic eruption, which are impossible to observe directly. Although many researchers have investigated the vesiculation and degassing processes of magma to analyze the textures of pumice from Plinian eruption (Polacci et al., 2001; Martel et al., 2000; Hammer et al., 1999), there is not enough description to explain their processes. In this study, we consider the vesiculation and degassing processes of magma to analyze textures of pumice from the 1977 Plinian eruption of Usu-Volcano.

The 1977 eruption of Usu-Volcano was characterized by the 4 Sub-Plinian eruption, and we call them Big I, II, III, and IV, respectively (Katsui et al., 1978). Pumice produced by this eruption varies from white to gray gradually. The bulk chemical compositions of them are almost identical to each other, and particular trends are not found. Microscopically, the porosity of white pumice is higher than that of gray pumice, while the crystallinity of microlite is lower, and these change systematically to that color. This suggests that the difference of color is not caused by the difference of bulk chemistry, but the porosity and crystallinity of microlite.

It is suggested that microlite seen in like this pumice is crystallized by the degassing of magma. In this study, we measure the bubble-size-distribution and crystal-size-distribution of microlite of each types of pumice in order to quantify the difference of the textures, and consider the vesiculation and degassing processes of magma of the 1977 Plinian eruption of Usu-Volcano.