Magma fracturing, oxidation and nanolite crystallization processes during silicic magma eruption: Implication from textural and chemical analyses on oxidized obsidian

*Kyohei Sano[1], Eiichi Sato[2]

1. Graduate School of Regional Resource Management, University of Hyogo, 2. Faculty of Liberal Arts and Sciences, Osaka Prefecture University

Silicic volcanism ranges from explosive to effusive. Understanding what controls in such activity is an important issue to explain the explosive-effusive transition. Especially, a recent study revealed that oxygen fugacity affects the melt viscosity (Genova et al., 2017). Thus, it is important to characterize the microlite and/or nanolite as the indicator of magma fracturing, crystallization and oxidation processes on silicic magma eruption. At the Akaishiyama obsidian lava on Shirataki, northern Hokkaido, Japan, we can observe the red-colored oxidized obsidian mingled with black-colored obsidian on the surface of lava. The mingled obsidian shows various contrasts and distributions on the hand specimen, and we can consider that such various oxidation and fracturing textures reflect the different mechanisms of fracturing, outgassing, and oxidation during the eruption. In this study, we performed textural and chemical analyses on oxidized obsidian by using Field Emission Electron Probe Micro Analyzer (FE-EPMA) at Osaka Prefecture University to describe the textural variation relating to the magma fracturing and oxidation. Our analyses using FE-EPMA revealed that microlite and nanolite crystalized on oxidized and fractured texture. On this texture, we could also observe the chemical heterogeneity of FeO and CaO on glass chemical compositions. In this presentation, we describe the relation between nanolite crystallization and magma fracturing, oxidation texture and finally discuss the formation process of heterogeneous magma fracturing, crystallization and oxidation textures during the eruption.

Keywords: obsidian, oxidation, nanolite, magma fracturing

