
A study of mineral phases in Hokkaido obsidian using Mössbauer Spectroscopy

Mi-Eun Jin¹, Yong-Joo Jwa^{1*}, Young Rang Uhm^{2}, Gwang-Min Sun², and Chul Sung Kim³**

¹Department of Geology, Gyeongsan National University, Jinju, Republic of Korea

²Neutron & Radioisotope Research Division, Korea Atomic Energy Research Institute(KAERI), Daejeon, Korea

³Department of Nano-electro Physics, Kookmin University, Seoul, Korea

*E-mail: *jwayj@gnu.ac.kr, **uyrang@kaeri.re.kr

Keywords: Hokkaido obsidian, Mössbauer spectroscopy, microlite, iron oxide

Hokkaido, located in the northernmost part of Japan, is the one of the major obsidian provenances in Northeast Asia. There are more than a dozen different provenances, including the Oketo and Shirataki regions. Microlites included in obsidian refer to tiny crystals usually having size of about 1 μ m, and crystallized under rapid cooling. There are a lot of geochemical studies for Hokkaido obsidians, but there is few study, if any, on composition of microlite. The composition of the microlites and distribution of iron species can be used to understand the petrogenetic characteristics of the magma. In this study, we examined the compositional, mineralogical and magnetic properties of microlites of the Hokkaido obsidians. We performed the analysis of microlite using FE-EPMA at Gyeongsang National University, and Moessbauer spectroscopy at Kookmin University. There are pyroxene, feldspar and olivine microlites in the Hokkaido obsidians. Pyroxene microlites are mostly of clinopyroxene(ferrosilite) and plagioclase microlites are of oligoclase. These characteristics are similar to those of microlites observed in Kyushu obsidians. However, there occur olivines in the Hokkaido obsidians, which is different from Baekdusan and Kyushu obsidians. The Mössbauer spectrum of Hokkaido obsidians revealed magnetite(A site-, B site-), iron oxide, pyroxene and olivine. From these results, it is certain that the Hokkaido obsidians have different mineralogical characteristics from those in the Baekdusan and Kyushu obsidians. These results are caused by the different composition of magmas, and it is possible to distinguish the Hokkaido obsidians(Shirakati region) from the obsidians of contrastings provenances.

