

Mineralogical Characteristics of volcanic glass in Ulleung Island, Korea and its implications for Quaternary volcanic activity

JI HYEON IM¹ AND CHANG OH CHOO²

¹ Korea Institute of Geoscience and Mineral Resources, Daejeon, 305-350, South Korea (jhim@kigam.re.kr)

² Department of Geology, Kyungpook National University, Daegu, 702-701, Korea (mineralogy@hanmail.net)

Ulleung Island is the largest volcanic island located in the northern part of the Ulleung Basin of the East Sea, Korea. The volcanic activity of subaerial Ulleung Island took place during the period ranging from late Pliocene to Holocene [1, 2]. The black glass locally occurs at the southwestern part of Ulleung Island, belonging to the upper trachytic rock with trace agglomerate of Seonginbong Group, the upper strata of Ulleung volcano [3]. The mineralogical and morphological characteristics including chemical composition and micro-texture of glass were examined by optical microscope, XRD, XRF, FT-IR, EPMA and thermal (DSC-TG) analyses.

The fracture patterns of glass that formed by the rapid cooling of trachytic lava show subrounded and oval, bounded by cooling joints to form globule or lump. It contains some phenocrysts such as sanidine, plagioclase, diopside, biotite, chlorite and Fe-Ti oxides, etc. The glass cluster have fiamme-like texture and preferred orientation with mafic phenocrysts. The glass samples are mostly amorphous and the major element compositions of bulk samples are in the range of 61.85-62.30 wt % for SiO₂, 17.70-17.86 wt % for Al₂O₃, 0.30-0.36 wt % for MgO, 13.00-13.28 wt % for Na₂O+K₂O, and 0.11-0.12 wt % for P₂O₅, belonging to trachytic composition. SiO₂ and Al₂O₃ contents of pure glasses based on EPMA are higher than those of bulk samples, whereas Na₂O+K₂O and P₂O₅ contents are less than those of bulk samples. FT-IR and thermal analysis show relatively small hydration degree. Its mineralogical and petrological results show intermediate characteristic between obsidian and tachylite.

Analytical results of black glass materials will lead to a better understanding of cooling process of trachytic lava under subaqueous conditions (at least saturated with seawater).

[1] Kim *et al* (1999) *Geochemical Journal* **33**, 317-341. [2] Kim *et al* (2014) *Bulletin of Volcanology* **76(4)**, 1-26. [3] Hwang *et al* (2012) *KIGAM. Report*, **84p**.