

Zircon melt inclusions from Izu-Bonin arc plutonic rocks: Breakthrough to the missing link between the plutonic and volcanic rocks

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Obtaining/estimating melt compositions from holocrystalline plutonic rocks have been the key issue to understand the genesis of granitic rocks. In addition, the lack of effective method to recover melt composition from the plutonic rocks has also prevented us from directly linking the studies of plutonic rocks to the magma chamber processes discussed in the studies of volcanic rocks.

In this study, we are successful in recovering the melt compositions from the Izu-Bonin arc tonalite and granodiorite samples using the zircon melt inclusions. Compared to the melt inclusions in other minerals, zircon melt inclusions have advantages in minimum effect of overgrowth, highly refractory characteristic of the host zircon crystal, and age determination using the zircon U-Th-Pb geochronology.

Initially, all of the melt inclusions in this study are partially to completely crystallized, probably due to the slow cooling late of the host plutonic rocks. The diameter of the inclusions range from 3 to 30 micron meter. Using the 500 MPa-type internally heated gas pressure vessel installed in the Tokyo Institute of Technology, the zircons containing crystallized melt inclusions were heated under pressure (900 - 1000 C at 170 MPa) and then quenched to obtain homogeneous glass. The each zircon crystal is then polished separately to expose the melt inclusion for further geochemical analyses.

We will present our latest results of the recovered melt compositions, mainly rhyolitic in composition, and their comparison to the compositions of the rhyolitic magma erupted in the Izu-Bonin arc.