

Melting experiments on high-Mg andesite

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High pressure - high temperature melting experiments on high-Mg andesite of Otozan, Syodo-shima, were performed by using internal heated gas pressure vessel. In order to make fine powder of this andesite sample, it was pulverized by a swing mill, and then grounded by a mortar. The powdered specimen was sealed in a Pt capsule with an addition of small amount of water. This specimen was molten at 200 MPa and 1350C,

and quenched to make a glass. Glass specimens with 1, 2, 3wt% of water were made by using this procedure, and used for the starting materials for the present experiments. High pressure - high temperature experiments were carried out by using 500 MPa type internally heated gas pressure vessel, installed at Tokyo Institute of Technology. The specimens were sealed in Ag-Pd or Au-Pd capsule, and held at 350 MPa and 1000 - 1200 C for 5 - 50 hours, and quenched by dropping the sample to the colder end of the high pressure chamber. The recovered specimen was polished and its chemical composition was measured by EPMA. The oxygen fugacity was not controlled in the present experiments.

At 1200C, the specimen with 3% water was almost totally molten, while other specimens contain a small amount of CPx. In the case of the specimen with 3% water, small amounts of Olivine and OPx as found at 1150C, and the other specimens were composed of melt, Opx, and a little amount of Plagioclase at this temperature. We also found CPx under lower temperature conditions. The amount of melt in the specimen with 1% water was a few percent at 1000C.

SiO₂ content of the melt found in the present experiments were increased with decrease in temperature. It was at around 58 wt% at 1200C, and in the case of the specimen with 1% water, it amounted to about 70 wt% at 1000C. When we compare the melt compositions as a function of SiO₂ content, we cannot found any obvious difference in the specimens with the different water contents. The Al₂O₃ and Na₂O contents of the melts were similar in any SiO₂ contents, while MgO, FeO and CaO contents was obviously decreased with increase in SiO₂ content. K₂O content of the melt was increased with increase in SiO₂ content, and it exceeded 5 wt% when SiO₂ content was 70 wt%.