Petrological Characteristics of Volcanic Rocks from the Boninitic Seamoun in Ogasawara Forearc, Japan

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Boninite is a kind of special andesite characterized by very high MgO content and relatively high SiO2 content. The Chichijima Island in the Ogasawara ridge is mainly composed of Tertiary submarine volcanic rocks of boninite series rocks. During the Hakuho Maru KH84-1 Cruise in 1984, boninites, pyroxene andesites, hornblende-quartz dacites were dredged from the Boninitic Seamount (BSM) that is between the Ogasawara ridge and the Ogasawara trench (Ishii, 1984).

The volcanic rocks dredged from the Boninitic Seamount are mainly divided into two groups: boninite group and pyroxene andesite-hornblende dacite group. The boninites dredged from the Boninitic Seamount are similar to those of the Chichijima Island; the pyroxene andesites-hornblende dacites are similar to the calc-alkali andesites and dacites in the Chichijima Island Mikazukiyama formation. In the Boninitic Seamount, boninites contain the most abundant bronzite (Mg# = 0.87); on the other hand, bronzite crystals with the same chemical compositions (Mg# =0.87) always present in pyroxene andesites pyroxene desites and hornblende dacites. The quantity of bronzite is decreasing from hypersthene-augite andesites through pyroxene dacites to hornblende dacites.

The above-mentioned evidences can be assumed that boninite magma injected into pyroxene andesite-hornblende dacite magma chamber in the Boninitic Seamount. The following is a possible model, that is, the hypersthene-augite andesite magma locating in the lower part of the chamber was injected by a great number of boninite magma. According to increasing of height in chamber, the quantity of injected boninite magma was decreasing.