Origin of orthopyroxene-plagioclase vein in dunite xenoliths from Takashima, northern Kyushu

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Many workers have studied Takashima ultramafic xenoliths, northern Kyushu (e.g. Kuno, 1964; Ishibashi, 1970; Obata, 1972; Kobayashi and Arai, 1981), and they focused on the origin and relationship of Group1, Group2 rocks and megacrysts. Kobayashi and Arai (1981) defined Group3 rocks and described their petrographical characteristics, no works have referred to their origin. Group3 rocks are very important in considering mantle-wedge processes beneath Takashima.

Group3 rocks frequently occur as veins (10micro~2cm in thickness) , and cutting and replacing Group1. Group3 rocks are composed mostly of orthopyroxene and plagioclase rarely with clinopyroxene, Cr-spinel, Al-spinel and carbonate. In most cases, the Group3 rock occurs as orthopyroxene veinlets, and plagioclase, if any, is at the center of the vein.

Most Group1 rocks generally display a decrease of Fo content in olivine and Cr#(=Cr/(Cr+Al) atomic ratio) in spinel toward the contact with the vein. Orthopyroxene in vein has low Cr and high Al contents.

We analyzed clinopyroxene grains of Group2 and 3 rocks for trace elements by SIMS. The trace element patterns of the melts calculated to be in equilibrium with clinopyroxene of Group2 and 3. The pattern for the melt to form the Group3 is especially enriched in LREE and depleted in HREE with negative Ti and Zr anomalies, while the pattern for the Group2melt does not have negative Ti and Zr anomalies

The texture of the orthopyroxene-plagioclase vein and trace element pattern for the melt possibly suggest that the melt for Group3 the orthopyroxene-plagioclase vein was SiO2-rich and was derived from the subducted slab. The formation of Group3 rocks is one of Si-enrichment processes of mantle wedge.