

Low CaO olivine phenocrysts in picritic rocks formed in back-arc area, Japan.

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Low-CaO core (<0.17 wt.%) of olivine phenocrysts are found from Miocene picritic rocks distributed in back-arc area, Japan Sea. Picritic dolerite of Ogi Basalt, Sado island, Japan, has MgO content ranging from 12 to 34 (wt.%), which is controlled by olivine accumulation. Based on c.a. 50 line profiles, the large phenocrysts show reverse zoning, and Fo content of the core varies grain by grain, in the range Fo 90 to 82, rimmed with normal-zoned rim (Fo90 to 87). Composition of high-Fo core has low-CaO contents (0.1-0.15 wt.%) and continue to that of low-Fo core with high-CaO contents (≥ 0.15 wt.%), illustrating a sequential trend of composition. The compositional trend is similar to that of olivine phenocrysts crystallized from high-CaO boninitic magma. NiO contents of all the olivine phenocrysts are no more than 0.28 (wt.%). Xenocrystic origin of olivine core of the phenocrysts is suggested as captured from dunitic cumulate rather than from mantle lherzolite. High-CaO boninitic magma could be parental to form this dunitic cumulate body. Similar core of olivine phenocrysts can be found in picritic basalt of Miocene Mishima Volcanic Rocks, Mishima Island. Though any boninitic rocks has not been known in the back-arc area, boninitic magmatism could not be denied from these facts. Although high Mg andesite is not popular in back area, there are some adakitic dacite and high Mg andesite reported from the Japan Sea side in Neogene to Miocene age. Associated with back-arc spreading, boninitic magma could have been originated by decompressional melting of upwelled hot mantle, or by melting of depleted mantle source reacted with slab melts.

Keywords: picrite, back-arc basin, low-CaO olivine, Ogi Basalt, Mishima Volcanic Rocks, high Mg andesite