

PETROGENESIS OF THE YUGU SPINEL HARZBURGITE IN WESTERN GYEONGGI MASSIF, SOUTH KOREA

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The extension of a Triassic suture along the Dabie-Sulu belt towards the Korean peninsula has been recently supported by the presence of Neoproterozoic zircons and omphacitic clinopyroxenes, in the western Gyeonggi Massif (CHO et al., 2004; OH et al., 2005). We report here petrologic features of the Yugu spinel harzburgite, which may represent tectonic slivers obducted during Triassic continental convergence. The 3×1 km Yugu peridotite occurs as an orogenic massif and is one of the largest ultramafic bodies emplaced into the upper-amphibolite facies basement gneisses of the western Gyeonggi Massif. This ultramafic body consists predominantly of spinel harzburgite together with very minor dunite and clinopyroxenite. The majority of peridotites is significantly serpentinized, and highly deformed yielding mylonitic textures characterized by deformed porphyroclasts of orthopyroxene and spinel. Recrystallized olivine grains form clusters of fine grains in the matrix, and show a restricted compositional range (FO_{89-93}). Porphyroclastic orthopyroxenes are characterized by bent cleavages and lamellae, and are commonly mantled by equigranular, exsolution-free neoblasts of orthopyroxene. The Al_2O_3 and Cr_2O_3 contents of these porphyroclasts decrease toward the rim (8.2 \rightarrow 1.5 wt.% and 1.1 \rightarrow 0.1 wt.%, respectively), while MgO increases (31.9 \rightarrow 34.8 wt.%). Compositions of orthopyroxene neoblasts are similar to the porphyroclastic rims. Spinel porphyroclasts are commonly mantled by chromite-magnetite and pentlandite, and zoned in the Fe, Mg and Al contents: FeO decreases toward the rim, while MgO and Al_2O_3 slightly increase. The Mg# [= $100Mg/(Mg+Fe^{2+})$] of spinel increases from 67 to 76 towards the rim, while Cr# [= $100Cr/(Cr+Al)$] remains constant (24 – 25). However, the Mg# and Cr# of interstitial spinel (62 – 76 and 14 – 29, respectively) significantly varies depending on the mineral assemblage. Cr-free aluminous spinel (Mg# = 81 – 82) is present in olivine clinopyroxenite layers. The Mg and Cr numbers of olivine and spinel suggest that the Yugu peridotite belongs to an abyssal to passive margin peridotites. Further geochemical studies are necessary for delineating the tectonic setting and emplacement mechanism of ultramafic bodies in the western Gyeonggi Massif.

References

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