オマーンオフィオライト，フィズ岩体底部で採取した軽希土類元素に富むかんらん岩の岩石学
Petrology and geochemistry of LREE-enriched fresh peridotite boulders from the basal part of the Fizh block, the northern Oman ophiolite

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Oman ophiolite, showing a great exposure (~ 500 km long), is one of the most famous ophiolites in the world. Whole ophiolite sequence is well preserved and the emplacement age has been determined as Cretaceous, based on the K/Ar dating on hornblendes from underlying metamorphic-sole amphibolite (e.g., Searle & Cox, 2002). There have been reported island-arc related volcanic rocks mainly in the northern part of Oman ophiolite, and in the meanwhile, volcanic rocks comparable to typical N-MORB are dominant in the southern part of the Oman ophiolite (e.g., Alabaster et al., 1982). It is still debated that the Oman ophiolite is of mid-ocean ridge origin or of ridge axis on supra-subduction zone origin. Recently, highly depleted harzburgites have been reported in the northern Oman ophiolite (Kanke & Takazawa, 2004); they were interpreted as products of the secondary partial melting of residual harzburgites beneath the mid-ocean ridge, induced by H_2O-induced flux during detachment and intra-oceanic thrusting.
We found quite hard and fresh (LOI < 1.0) peridotite boulders at the southern basal zone of the Fizh block (e.g., Wadi Hayl). The texture is variable (mylonitic, porphyroclastic, equigranular, and coarse protogranular) and some porphyroclastic samples contain highly deformed fine-grained zones. It is difficult to determine the modal proportion of minerals due to the presence of fine-grained zone, but we can judge that they are mostly harzburgites and subordinately lherzolites, based on petrography of coarse-grained part of the samples and their whole-rock major-element compositions (SiO_2 = 43.5-46.4 wt.%, Al_2O_3 = 0.38-1.10 wt.%, and CaO = 0.49-1.68 wt.%). Chondrite-normalized (the values showing with subscript CN hereafter) whole-rock REE concentrations show LREE-enriched U-shaped patterns, and the $(La/Sm)_{CN}$ and $(La/Yb)_{CN}$ are variable: 3.5-10.3 and 2.0-11.0, respectively. These values are quite high relative to the reported harzburgites (0.02-0.11 and 0.44-0.70; Godard et al., 2000) and fertile lherzolite (0.09-0.11 and 0.04-0.06; Takazawa et al., 2001: 0.28-1.15 and 0.09-0.53; Khedr et al., 2014) from other localities of the Oman ophiolite. The U-shaped REE pattern of ophiolitic peridotites has been interpreted as a result of secondary processes, such as serpentinization, ocean-floor alteration, or contamination of crustal materials during ophiolite obduction (Gruau et al., 1998). Low LOI value (< 1.0) of our samples denies the contribution of serpentinization and alteration to their enrichment of LREE, and indicates possible metasomatic addition of LREE to the mantle tectonite during/before ophiolite obduction (at high-temperature stage).

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