

Petrological observation of core samples drilled from a mantle section of the Oman ophiolite: A preliminary report of the Oman Drilling Project Phase 2

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The Oman ophiolite is the world's largest ophiolite and will help us to understand the crustal formation, processes in the mantle, and evolution and modification of the oceanic lithosphere through the time. The drillings and investigations of the crust-mantle boundaries and mantle sections were operated in the Oman Drilling Project Phase 2. We report the preliminary results of the petrological observation of the drilling samples from the mantle sections in the Phase 2 Holes BA1B, BA3A, and BA4A.

The Hole BA1B is composed of upper dunite and lower harzburgite associated with mafic dikes. The Hole BA3A is dominated mainly by harzburgite and also contains a minor amount of thin dunitic layers and mafic dikes. The Hole BA4A consists of alternation of dunite and harzburgite with abundant mafic dikes. The mafic dikes observed in each hole are gabbro to olivine gabbro, and sometimes wehrlitic. Brown to pale brown hornblende is usually included in almost all lithology. Phlogopite is also present in association with hornblende. Chromian spinel in an olivine-gabbro sample from the BA4A is characterized by high $\text{Fe}^{3+}/(\text{Cr} + \text{Al} + \text{Fe}^{3+})$ ratio (>0.15) and intermediate TiO_2 content (1–2 wt.%), which are comparable with those in island arc basalts. In the contact between the mafic dikes and peridotite, orthopyroxene is formed as a reaction product between the mantle peridotite and mafic melt. The petrological characteristics of the mafic dikes indicate that they crystallized from hydrous, oxidized magmas, which imply that the intrusion event occurred in a convergent margin rather than a typical spreading axis.

Keywords: ICDP, Oman ophiolite, Mantle peridotite, Mafic dike