

Origin of "black olivines"

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Rocks of SDW (spinel-rich dunite-wehrlite) suite of the Horoman peridotite complex are characterized by fresh black-colored olivines. The black color is caused by numerous minute inclusions in olivine. The inclusions are homogeneously distributed in olivine grains of the SDW. They are different from the secondary inclusions of magnetite associated with hydrous minerals aligned in olivine both in the SDW dunite and in the MHL harzburgite. The inclusions are abundant in dunites from the central part of the SDW layer, whereas they are scarcely observed in olivines near the contact with the MHL harzburgite. The MHL harzburgite do not contain olivines with such inclusions.

Raman spectroscopy revealed that the numerous minute inclusions consist of magnetite and orthopyroxene. It is very difficult to form such magnetite inclusions by secondary oxidation of olivines. They are possibly subsolidus exsolution products from OH-bearing olivines, precipitated from a hydrous magma. The "black olivine" in dunite can be an indicator for involvement of hydrous melt. Fresh olivines with black colors are frequently found in course-grained dunites.