Water and crystal structure of Ichinomegata olivine

Hironori Nomori[1], Toshiharu Tanaka[1], Takahiro Kuribayashi[2], Yasuhiro Kudoh[3]

[1] Inst Min, Pet, Econ Geology, Tohoku Univ, [2] Inst. of Min.,Pet. and Econ. Geol., Tohoku Univ., [3] Tohoku Univ

Olivine single crystals from two mantle nodules (Ichinomegata, Akita, Japan and San Carlos, Arizona, U.S.A.) were studied by means of single crystal X-ray method, EPMA and FT-TR techniques in order to determine the mode of hydrogen occurrence in olivine. Ichinomegata olivine (Fo90.1) contains some hydroxide (OH), whereas San Carlos olivine (Fo89.5) has little amount of OH. Unit cell parameters of specimens from Ichinomegata and San Carlos are determined as follows, respectively: a = 4.7624(10), b = 10.2262(16), c = 5.9910(11) A, V = 291.77(9) A^3 and a = 4.7623(6), b = 10.2350(20), c = 5.9966(8) A, V = 292.29(8) A^3. The result of the crystal structurual refinement, the M1-O1 bond length from Ichinomegata olivine is larger than that from San Carlos olivine by 0.0030 A. It is considered from this result that OH is associated with M1 site vacancy and H may be bonding to O1.