

Mn-rich orthopyroxene from the Priol'khonje, Lake Baikal Area

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The unusual Mn-rich pyroxene occurs as small grains (30-40 μm) and skeletal crystals (0.3x0.5 mm) of white colour in metamorphic rocks of the gondite type from the Priol'khonje, western shore of Lake Baikal, Russia. The mineral has white streak, vitreous lustre and a perfect {110} cleavage. Associated minerals are quartz, spessartite, piroxmangite, Mn-diopside, ilmenite-pyrophanite, apatite, zircon, rutile and unnamed mineral with the formula $(\text{Mn},\text{Fe})\text{Ti}_2\text{O}_5$. The calculated density is 3.718 g/cm^3 . Mohs hardness is 5-6. The mineral is biaxial positive; $N_g = 1.760(5)$, $N_p = 1.743(5)$, $2V(\text{meas.}) = 74(2)^\circ$.

X-ray studies show that the pyroxene is orthorhombic with space group Pbca and $a: 18.47(1)$, $b: 8.97(2)$, $c: 5.243(2)\text{\AA}$. It has a cell volume of $868.8(2.7)\text{\AA}^3$ with $Z = 8$. The strongest eight lines of the X-ray powder diffraction pattern are [d in \AA (hkl)]: 3.19 (10) (221); 2.99 (8) (321); 2.90 (7) (610); 2.57 (7) (131); 2.50 (10) (231,521); 2.12 (9) (322,531); 1.624 (8) (10.2.1); 1.499 (10) (832). Averaged electron microprobe analyses give the empirical formula (on the basis of 6 atoms O):

$(\text{Mn}_{0.671}\text{Mg}_{0.268}\text{Ca}_{0.059})(\text{Fe}_{0.659}\text{Mg}_{0.341})\text{Si}_{1.998}\text{O}_6$

Simplified formula: $(\text{Mn}_{0.7}\text{Mg}_{0.3})(\text{Fe}_{0.7}\text{Mg}_{0.3})\text{Si}_2\text{O}_6$. Judging from the data obtained, the mineral is the ferrous analog of another Mn-orthopyroxene – donpeacorite, $(\text{Mn},\text{Mg})\text{MgSi}_2\text{O}_6$.

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