

Crystal Data: Monoclinic. *Point Group:* 2/m. As oval, elongate [001] grains to 3 mm, and as aggregates to 2 cm as inclusions in calcite.

Physical Properties: *Cleavage:* None. *Fracture:* Uneven to conchoidal. Hardness = 6.5
VHN = 732-747 (60 g load). D(meas.) = 3.13 D(calc.) = 3.14

Optical Properties: Transparent to translucent. *Color:* Pale yellow to orange-yellow or almost colorless. *Streak:* White. *Luster:* Vitreous to dull.
Optical Class: Biaxial (+). $\alpha = 1.631$ $\beta = 1.641$ $\gamma = 1.664$ $2V(\text{meas.}) = 70^\circ$ $2V(\text{calc.}) = 68^\circ$
Orientation: $Z \wedge c = 11^\circ$. *Dispersion:* Weak. *Pleochroism:* $X = \text{yellow}$, $Z = \text{colorless}$.

Cell Data: *Space Group:* $P2_1/b$. $a = 4.7488(1)$ $b = 10.2875(2)$ $c = 13.6967(3)$ $\beta = 100.63(1)^\circ$ $Z = 2$

X-ray Powder Pattern: Zelentsovskaya mine, southern Urals, Russia.
2.269 (100), 3.72 (95), 2.259 (95), 2.516 (93), 2.772 (91)

Chemistry:	(1)
SiO ₂	38.97
TiO ₂	0.67
FeO	0.70
MnO	0.12
MgO	57.56
H ₂ O ⁺	2.72
F	0.49
- O = F ₂	0.23
Total	101.00

(1) Zelentsovskaya mine, southern Urals, Russia; wet-chemical and electron microprobe analyses, water by Penfield method; corresponds to $(\text{Mg}_{8.82}\text{Fe}^{2+}_{0.06}\text{Mn}_{0.01}\text{Ti}_{0.05})_{\Sigma=8.94}[\text{Si}_{4.00}\text{O}_{15.98}][(\text{OH})_{1.86}\text{F}_{0.16}]_{\Sigma=2.02}$.

Mineral Group: Humite group.

Occurrence: In Mg-skarn (calciphyric) rims on dolomitic marble xenoliths in gabbroic rocks and associated Fe-Ti ore.

Association: Ferroan spinel, calcite.

Distribution: From the Zelentsovskaya mine, Mt. Protopop, Magnitka, near Zlatoust, southern Urals, Russia.

Name: Indicates the *hydroxyl*-dominant analogue of *clinohumite*.

Type Material: Mining Geological Museum at Ekaterinburg, Russia, and in the Mineralogy Museum of Saint Petersburg University, Russia.

References: (1) Gekimyants, V.M., E.V. Sokolova, E.M. Spiridonov, G. Ferraris, N.V. Chukanov, M. Prencipe, V.N. Avdonin, and Yu.A. Polenov (1999) Hydroxylclinohumite Mg₉(SiO₄)₄(OH,F)₂ - a new mineral of the humite group. *Zapiski Vseross. Mineralog. Obshch.*, 128(5), 64-70 (in Russian). (2) (2000) *Amer. Mineral.*, 85, 1843-1844 (abs. ref. 1). (3) Berry, A.J. and M. James (2001) Refinement of hydrogen position in synthetic hydroxyl-clinohumite by powder neutron diffraction. *Amer. Mineral.*, 86, 181-184. (4) Ferraris, G., M. Prencipe, E.V. Sokolova, V.M. Gekimyants, and E.M. Spiridonov (2000) Hydroxylclinohumite, a new member of the humite group: Twinning, crystal structure and crystal chemistry of the clinohumite subgroup. *Z. Kristallogr.*, 215, 169-173.