

Jahnsite-(CaMnZn)

Crystal Data: Monoclinic. *Point Group:* 2/m. As blocky lath-like crystals elongated along [100] and flattened on {001} to 100 μm . As thin crusts and epitactic growths on altered phosphophyllite. Intergrown with jahnsite-(CaMnMn) on a scale of $\sim 50 \mu\text{m}$.

Physical Properties: *Cleavage:* Good on {001}. $D(\text{calc.}) = 2.87$

Optical Properties: *Color:* Yellow, brown.

Optical Class: Biaxial (-). $\alpha = 1.675(2)$ $\beta = 1.686(2)$ $\gamma = 1.691(2)$ $2V(\text{calc.}) = 68^\circ$

Orientation: $Z = b$. *Pleochroism:* Imperceptible. *Dispersion:* None observed.

Cell Data: *Space Group:* $P2_1/a$. $a = 15.059(1)$ $b = 7.1885(6)$ $c = 10.031(2)$ $\beta = 111.239(8)^\circ$ $Z = 2$

X-ray Powder Pattern: Hagendorf-Süd pegmatite mine, Oberpfalz, Bavaria, Germany.

2.853 (100), 5.018 (43), 9.356 (40), 4.677 (32), 3.509 (30), 3.473 (24), 1.961 (22)

Chemistry:	(1)	(2)
CaO	3.72	6.21
MnO	13.7	14.6
MgO	0.82	0.82
ZnO	6.76	3.89
FeO	[1.04]	[1.00]
Fe ₂ O ₃	[22.1]	21.2
P ₂ O ₅	31.7	31.7
H ₂ O	[18.2]	[18.3]
Total	98.04	97.72

(1) Hagendorf-Süd pegmatite mine, Oberpfalz, Bavaria, Germany; average electron microprobe analysis supplemented by IR and Mössbauer spectroscopy; corresponds to $(\text{Ca}_{0.59}\text{Mn}_{0.24})_{\Sigma=0.83}\text{Mn}(\text{Zn}_{0.74}\text{Mn}^{2+}_{0.48}\text{Mg}_{0.18}\text{Fe}^{2+}_{0.13}\text{Fe}^{3+}_{0.47})_{\Sigma=2.00}\text{Fe}^{3+}_2(\text{P}_{1.00}\text{O}_4)_4(\text{OH})_{2.03}(\text{H}_2\text{O})_{7.97}$. (2) Do.; average electron microprobe analysis supplemented by IR and Mössbauer spectroscopy; corresponds to $(\text{Ca}_{0.98})\text{Mn}_{0.90}(\text{Zn}_{0.42}\text{Mn}^{2+}_{0.92}\text{Mg}_{0.18}\text{Fe}^{2+}_{0.12}\text{Fe}^{3+}_{0.36})_{\Sigma=2.00}\text{Fe}^{3+}_2(\text{P}_{0.99}\text{O}_4)_4(\text{OH})_{1.97}(\text{H}_2\text{O})_{8.03}$.

Mineral Group: Jahnsite group, jahnsite subgroup; $\text{Fe}^{3+} > \text{Al}$ in the M(3) structural site.

Occurrence: In an oxidized nodule of former triphylite, now replaced by phosphophyllite. A low temperature, secondary mineral formed by alteration of primary phosphates in zoned granitic pegmatite.

Association: Chalcophanite, hopeite, jahnsite-(CaMnMn), Zn-bearing laueite, scholzite/parascholzite, parahopeite, schmidite, stewartite, vivianite, whitmoreite/earlshannonite, zincostrunzite, apatite.

Distribution: At the 67 m level, Hagendorf-Süd pegmatite mine, Oberpfalz, Bavaria, Germany.

Name: Root name, *Jahnsite*, indicates a member of the group with $\text{M}(3) = \text{Fe}^{3+}$; the suffix indicates sequentially the dominant atom in the X, M(1), and M(2) structural positions.

Type Material: Museum Victoria, Melbourne, Victoria, Australia (M55028) and the Natural History Museum of Los Angeles County, Los Angeles, California, USA (73927).

References: (1) Grey, I.E., E. Keck, A.R. Kampf, C.M. MacRae, J.D. Cashion, and A.M. Glenn (2020) Jahnsite-(CaMnZn) from the Hagendorf-Süd pegmatite, Oberpfalz, Bavaria, and structural flexibility of jahnsite-group minerals. *Mineral. Mag.*, 84(4), 547-553. (2) (2021) *Amer. Mineral.*, 106, 1363 (abs. ref. 1).