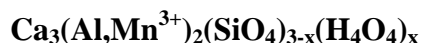


Holtstamite

Crystal Data: Tetragonal. *Point Group:* 4/m 2/m 2/m. As rounded composite grains to 3 mm; individual crystals, to 0.2 mm, are pseudo-octahedral by twinning. *Twinning:* Around [111].

Physical Properties: *Cleavage:* None. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 6 D(meas.) = n.d. D(calc.) = 3.25

Optical Properties: Transparent. *Color:* Pale brownish yellow. *Streak:* White. *Luster:* Vitreous. *Optical Class:* Uniaxial (+). $\omega = 1.718(2)$ $\varepsilon = 1.746(2)$ *Pleochroism:* Weak; *O* = pale orange; *E* = lemon yellow. *Absorption:* $E > O$.

Cell Data: *Space Group:* $I4_1/acd$. $a = 12.337(3)$ $c = 11.930(5)$ $Z = 8$

X-ray Powder Pattern: Wessels mine, Kalahari manganese field, South Africa. 2.743 (100), 1.614 (56), 2.757 (55), 2.685 (54), 2.501 (47), 2.978 (45), 3.082 (44)

Chemistry:	(1)
SiO ₂	26.26
Al ₂ O ₃	10.77
Mn ₂ O ₃	11.64
Fe ₂ O ₃	6.30
CaO	36.76
[H ₂ O]	7.87
Total	99.61

(1) Wessels mine, Kalahari manganese field, South Africa; average of 15 electron microprobe analyses, H₂O calculated, OH⁻ confirmed by IR spectroscopy, Mn³⁺ confirmed by optical absorption spectroscopy; corresponding to Ca₃(Al_{0.96}Mn³⁺_{0.68}Fe³⁺_{0.37})_{Σ=2.01}(SiO₄)_{2.00}(H₄O₄)_{0.99}.

Polymorphism and Series: Polymorphous with hibschite; is the Al-analogue of henritermierite. Forms a solid solution series with henritermierite; crystals commonly compositionally zoned with cores of henritermierite and rims of holtstamite.

Occurrence: In a manganese-rich calc-silicate contact metamorphic rock.

Association: Mn³⁺-bearing vesuvianite, calcite, henritermierite

Distribution: Wessels mine, Kalahari manganese field, South Africa.

Name: Honors Dr. Dan Holtstam (b. 1963) for his contributions to Swedish mineralogy and specifically Mn deposits of the Långban type.

Type Material: Swedish Museum of Natural History, Stockholm, Sweden (960380).

References: (1) Hålenius, U., U. Häussermann, and H. Harryson. (2005) Holtstamite, Ca₃(Al,Mn³⁺)₂(SiO₄)_{3-x}(H₄O₄)_x, a new tetragonal hydrogarnet from Wessels Mine, South Africa. *Eur. J. Mineral.*, 17, 375-382. (2) (2005) *Amer. Mineral.*, 90, 1946 (abs. ref. 1).