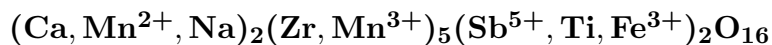


**Hiärneite**

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**Crystal Data:** Orthorhombic (probable). *Point Group:*  $2/m2/m2/m$ . As grains, to 700  $\mu\text{m}$ , filling veinlets.

**Physical Properties:** *Cleavage:* One direction, good, perhaps a parting. Hardness = n.d. D(meas.) = n.d. D(calc.) = 3.04 Soluble in  $\text{H}_2\text{O}$ .

**Optical Properties:** Semitransparent. *Color:* Colorless to pale green when fresh, orange when oxidized, in transmitted light; greenish internal reflections, red when oxidized, in reflected light. *Optical Class:* Biaxial; low birefringence. *Pleochroism:* Slight. *Orientation:* Extinction  $\sim$ parallel; length-fast.  $n = 1.6\text{--}1.7$   $2V(\text{meas.}) = \text{n.d.}$

**Cell Data:** *Space Group:*  $Pnam$ (probable).  $a = 6.31(6)$   $b = 9.20(4)$   $c = 7.10(7)$   $Z = 4$

**X-ray Powder Pattern:** Strathcona mine, Canada.

2.33 (10), 2.86 (6), 2.12 (5), 1.652 (5), 5.62 (4), 5.16 (2), 1.87 (2)

**Chemistry:**

	(1)	(2)	(3)
Si	0.10		
Fe	49.02	53.9	56.36
Mn	1.49		
Mg	2.62		
Cl	17.39	18.2	17.89
OH	[29.92]	[27.9]	25.75
Total	[100.54]	[100.0]	100.00

(1) Hibbing, Minnesota, USA; by electron microprobe, average of eight analyses from two samples, original total given as 100.56%;  $\text{Fe}^{2+}$  and  $(\text{OH})^{1-}$  indicated by several methods, OH by difference; corresponds to  $(\text{Fe}_{1.72}\text{Mg}_{0.21}\text{Mn}_{0.06}\text{Si}_{0.01})_{\Sigma=2.00}[\text{Cl}_{0.87}(\text{OH})_{0.12}]_{\Sigma=0.99}(\text{OH})_{3.00}$ .

(2) Strathcona mine, Canada; by electron microprobe, OH by difference; corresponds to  $\text{Fe}_{2.00}\text{Cl}_{1.06}(\text{OH})_{3.40}$ .

(3)  $\text{Fe}_2\text{Cl}(\text{OH})_3$ .

**Occurrence:** In serpentinized troctolite and peridotite (Hibbing, Minnesota, USA); in fractures in chlorine-rich portions of a Cu–Ni orebody (Strathcona mine, Canada); in terrestrially weathered iron meteorites.

**Association:** Akaganéite, magnetite, maghemite, goethite, serpentine, olivine, plagioclase, biotite (Hibbing, Minnesota, USA); chalcopyrite, pentlandite (Sudbury, Canada).

**Distribution:** From drill cores in the Duluth Gabbro complex, near Hibbing, St. Louis Co., Minnesota, USA. In the Strathcona mine, Sudbury, Ontario, Canada. From the Noril'sk region, western Siberia, Russia.

**Name:** For Hibbing, Minnesota, USA, from near where the mineral was first characterized.

**Type Material:** Department of Natural Resources, Hibbing, Minnesota, USA.

**References:** (1) Saini-Eidukat, B., H. Kucha, and H. Keppler (1994) Hibbingite,  $\gamma\text{-Fe}_2(\text{OH})_3\text{Cl}$ , a new mineral from the Duluth Complex, Minnesota, with implications for the oxidation of Fe-bearing compounds and the transport of metals. *Amer. Mineral.*, 79, 555–561.

(2) Springer, G. (1989) Chlorine-bearing and other uncommon minerals in the Strathcona deep copper zone, Sudbury district, Ontario. *Can. Mineral.*, 27, 311–313.