

Crystal Data: Monoclinic. *Point Group:* 2/m. As rosettes of tabular crystals flattened on {100} to 0.2 mm.

Physical Properties: *Cleavage:* None. *Tenacity:* Brittle. *Fracture:* Curved. Hardness = 3.5
D(meas.) = 3.23(2) D(calc.) = 3.24 Nonfluorescent.

Optical Properties: Transparent. *Color:* Colorless, rarely pearl white to pale yellow.

Streak: White. *Luster:* Vitreous.

Optical Class: Biaxial (-). $\alpha = 1.630(2)$ $\beta = 1.640(2)$ $\gamma = 1.646(2)$ $2V(\text{meas.}) = \sim 72^\circ$
 $2V(\text{calc.}) = 75.1^\circ$ Nonpleochroic.

Cell Data: *Space Group:* C2/c. $a = 18.495(7)$ $b = 9.475(4)$ $c = 9.986(4)$ $\beta = 96.79(3)^\circ$ $Z = 4$

X-Ray Diffraction Pattern: Giftgrube Mine, St. Jacques vein, Rauenthal, Sainte-Marie-aux-Mines, Haut-Rhin Department, Grand Est, France.

3.33 (100), 3.18 (80), 2.414 (60), 4.80 (50), 4.65 (50), 3.05 (50), 2.488 (50)

Chemistry:	(1)	(2)
MgO	1.82	
CaO	20.26	19.57
MnO	11.02	16.50
FeO	2.43	
As ₂ O ₅	54.54	53.46
H ₂ O	[10.70]	10.48
Total	100.77	100.00

(1) Giftgrube Mine, St Jacques vein, Rauenthal, Sainte-Marie-aux-Mines, Haut-Rhin Department, Grand Est, France; average electron microprobe analysis supplemented by Raman spectroscopy, H₂O for charge balance; corresponding to $(\text{Ca}_{3.04}\text{Mn}_{1.30}\text{Mg}_{0.38}\text{Fe}_{0.28})_{\Sigma=5.00}(\text{AsO}_4)_{1.99}(\text{AsO}_3\text{OH})_2 \cdot 4\text{H}_2\text{O}$.
(2) $\text{CaMn}_2\text{Ca}_2(\text{AsO}_4)_2(\text{AsO}_3\text{OH})_2 \cdot 4\text{H}_2\text{O}$.

Polymorphism & Series: An ordered intermediate member between villiaellenite and sainfeldite.

Mineral Group: Hureaulite group.

Occurrence: A secondary mineral, formed by alteration of arsenical minerals after mining.

Association: Arsenolite, picropharmacolite, pharmacolite, \pm haidingerite, chongite, scorodite, Mn-bearing calcite, native arsenic, löllingite.

Distribution From the St Jacques vein, Giftgrube Mine, Rauenthal, Sainte-Marie-aux-Mines, Haut-Rhin Department, Grand Est, France.

Name: For the mine that yielded the studied material.

Type Material: Geology Museum, University of Lausanne, Switzerland (MGL 080133 and 080134).

References: (1) Meisser, N., J. Plášil, T. Brunserperger, C. Lheur, and R. Škoda (2019) Giftgrubeite, $\text{CaMn}_2\text{Ca}_2(\text{AsO}_4)_2(\text{AsO}_3\text{OH})_2 \cdot 4\text{H}_2\text{O}$, a new member of the hureaulite group from Sainte-Marie-aux-Mines, Haut-Rhin Department, Vosges, France. *Journal of Geosciences*, 64, 73-80.