

Penobsquisite



©2001-2005 Mineral Data Publishing, version 1

Crystal Data: Monoclinic. *Point Group:* 2. Euhedral crystals, triangular in outline, tabular on {100}, elongated along [010], to 1.5 mm, showing {100}, {101}, {10 $\bar{1}$ }, {111}, {110}, {1 $\bar{1}$ 0}, {2 $\bar{1}$ 2}, { $\bar{1}$ 12}.

Physical Properties: *Fracture:* Conchoidal. *Tenacity:* Brittle. *Hardness* = ~3
D(meas.) = 2.26(3) D(calc.) = 2.27

Optical Properties: Transparent to translucent. *Color:* Pale yellow. *Streak:* White.
Luster: Vitreous.

Optical Class: Biaxial (+). *Orientation:* $Y = b$; $Z \wedge c = 16.6^\circ$. $\alpha = 1.550(2)$ $\beta = 1.554(2)$
 $\gamma = 1.592(2)$ $2V(\text{meas.}) = 33(2)^\circ$ $2V(\text{calc.}) = 36.6^\circ$

Cell Data: *Space Group:* $P2_1$. $a = 11.620(3)$ $b = 9.407(2)$ $c = 8.726(1)$ $\beta = 98.58(2)^\circ$
 $Z = 2$

X-ray Powder Pattern: Penobsquis mine, Canada.
7.29 (10), 8.65 (3), 2.113 (3), 5.32 (2), 4.50 (2), 2.958 (2), 2.744 (2)

Chemistry:	(1)
B ₂ O ₃	[48.50]
FeO	7.48
MnO	0.23
MgO	1.82
CaO	17.27
Cl	5.77
H ₂ O	[19.52]
-O = Cl ₂	1.30
Total	[99.29]

(1) Penobsquis mine, Canada; by electron microprobe, average of three analyses, total Fe as Fe²⁺, total Mn as Mn²⁺, H₂O confirmed by IR, B₂O₃ and H₂O calculated from stoichiometry; corresponding to Ca_{1.99}(Fe_{0.67}Mg_{0.29}Mn_{0.02}) $_{\Sigma=0.98}$ B₉O_{12.95}Cl_{1.05}(OH)_{5.99} • 4.01H₂O.

Occurrence: A very rare residual mineral, obtained by dissolution of halite in a drillcore through a marine evaporite series.

Association: Halite, sellaite, fluorite, boracite, hilgardite, pringleite, trembathite, brianroulstonite, hematite, malachite.

Distribution: From the Penobsquis evaporite deposit, near Sussex, New Brunswick, Canada.

Name: For the Penobsquis mine, Canada, first source of the mineral.

Type Material: Canadian Museum of Nature, Ottawa, Canada, 81524.

References: (1) Grice, J.D., R.A. Gault, and J. Van Velthuisen (1996) Penobsquisite: a new borate mineral with a complex framework structure. *Can. Mineral.*, 34, 657–665. (2) (1997) *Amer. Mineral.*, 82, 208 (abs. ref. 1).