

Pumpellyite-(Al)**Ca₂Al₃(Si₂O₇)(SiO₄)(OH, O)₂·H₂O**

Crystal Data: Monoclinic. *Point Group:* 2/m. As radial aggregates of acicular prismatic crystals to 5 mm.

Physical Properties: *Cleavage:* Perfect on {100}. *Tenacity:* Brittle. *Fracture:* n.d. Hardness = 5.5 D(meas.) = n.d. D(calc.) = 3.41 Non-fluorescent.

Optical Properties: Transparent to translucent. *Color:* Emerald-green to white, sometimes with bluish tinges; colorless in thin section. *Streak:* Colorless. *Luster:* Vitreous. *Optical Class:* Biaxial (+). $\alpha = 1.678(2)$ $\beta = 1.680(2)$ $\gamma = 1.691(1)$ $2V(\text{calc.}) = 46^\circ$ *Orientation:* $Y = b$.

Cell Data: *Space Group:* A2/m. $a = 8.818(2)$ $b = 5.898(2)$ $c = 19.126(6)$ $\beta = 97.26(3)^\circ$ $Z = 4$

X-Ray Diffraction Pattern: Bertrix, Ardennes mountains, Belgium.

2.895 (100), 2.912 (95), 3.787 (80), 3.040 (70), 4.371 (65), 2.191 (45), 2.731 (40)

Chemistry:	(1)	(2)	(1)	(2)
SiO ₂	37.52	38.16	BaO	0.01
Al ₂ O ₃	25.63	32.38	Na ₂ O	0.03
MgO	1.99		K ₂ O	0.02
FeO	4.97		H ₂ O	[6.71]
MnO	0.11		Total	100.20
CaO	23.21	23.74		100.00

(1) Bertrix, Ardennes mountains, Belgium; average electron microprobe analysis, H₂O and OH⁻ calculated for charge balance; corresponding to (Ca_{1.99}Na_{0.01})_{Σ=2.00}(Al_{0.42}Fe²⁺_{0.33}Mg_{0.24}Mn_{0.01})_{Σ=1.00}Al_{2.00}(SiO₄)(Si₂O₇)(OH)_{2.42}·0.58H₂O. (2) Ca₂AlAl₂(SiO₄)(Si₂O₇)(OH)₃.

Mineral Group: Pumpellyite group.

Occurrence: In veins cutting retrograde metamorphosed sedimentary rocks.

Association: Calcite, K-feldspar, chlorite.

Distribution: From “Carrière de la Flèche” quarry, 3 km northwest of Bertrix, Ardennes mountains, Belgium.

Name: The suffix indicates a member of the *pumpellyite* group with aluminum dominant in the *M1* and *M2* sites. Honors Raphael *Pumpelly* (1837-1923), pioneer student of the paragenesis of copper-deposit minerals of the Keweenaw Peninsula, Michigan, USA.

Type Material: Laboratory of Mineralogy, University of Liège, Belgium (20327).

References: (1) Hatert, F., M. Pasero, N. Perchiazzi, and T. Theye (2007) Pumpellyite-(Al), a new mineral from Bertrix, Belgian Ardennes. *Eur. J. Mineral.*, 19, 247-253. (2) Passaglia, E. and G. Gottardi (1973) Crystal chemistry and nomenclature of pumpellyites and julgoldites. *Can. Mineral.*, 12, 219-223. (3) Nagashima, M., T. Armbruster, and E. Libowitzky (2010) The hydrogen-bond system in pumpellyite. *Eur. J. Mineral.*, 22, 333-342.