

Elyite**Pb₄CuO₂(SO₄)(OH)₄•H₂O**

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Crystal Data: Monoclinic. *Point Group:* 2/*m*. As tabular prismatic to fibrous crystals, elongated along [001], to 1 mm, platy on {100} with minor modifying forms; typically in radiating sprays, tufts, or matted. *Twinning:* Common by reflection across {100}.

Physical Properties: *Cleavage:* On {100}, good. *Tenacity:* Sectile. Hardness = 2
D(meas.) = ~6 D(calc.) = 6.232

Optical Properties: Transparent. *Color:* Violet. *Streak:* Pale violet to white.
Luster: Silky.

Optical Class: Biaxial (-). *Pleochroism:* Deep to pale purple. *Orientation:* $Y = b$; $X \wedge c = 45^\circ$.
Dispersion: Noticeable. *Absorption:* $Z > Y > X$. $\alpha = 1.990(1)$ $\beta = 1.993(1)$ $\gamma = 1.994(1)$
 $2V(\text{meas.}) = 66^\circ$

Cell Data: *Space Group:* $P2_1/c$. $a = 14.233(2)$ $b = 11.532(1)$ $c = 14.611(2)$
 $\beta = 100.45(1)^\circ$ $Z = 8$

X-ray Powder Pattern: Silver King mine, Nevada, USA.

7.00 (100), 7.19 (99), 2.995 (73), 2.884 (37), 3.136 (32), 3.341 (31), 3.047 (30)

Chemistry:

	(1)	(2)	(3)
SO ₃	7.10	7.70	7.24
CuO	7.98	6.71	7.19
PbO	81.65	80.36	80.69
H ₂ O	6.1	[5.23]	4.88
Total	102.83	[100.00]	100.00

(1) Silver King mine, Nevada, USA; by electron microprobe, H₂O determined by TGA; corresponds to Pb_{4.00}Cu_{1.10}O_{2.00}(SO₄)_{0.97}(OH)_{4.25}•1.57H₂O. (2) Mizuhiki mine, Japan; by electron microprobe, H₂O by difference; corresponds to Pb_{4.00}Cu_{0.94}O_{2.00}(SO₄)_{1.07}(OH)_{3.74}•1.32H₂O.
(3) Pb₄CuO₂(SO₄)(OH)₄•H₂O.

Occurrence: Rare in the oxidized zone of base metal sulfides; may be formed in dumps and common in slags.

Association: Galena, langite, serpierite, cerussite, anglesite, litharge, minium.

Distribution: From the Silver King mine, Ward, White Pine Co., Nevada, USA. In Germany, at the Clara mine, near Oberwolfach, from the Altemann rock, at the Freiamt mine, northeast of Freiburg, and from Badenweiler, Black Forest; in the Churfürst mine, Bönkhausen, Sauerland, North Rhine-Westphalia. At the Mizuhiki mine, Fukushima Prefecture, Japan. From Tsumeb, Namibia. At the Red Gill mine, Caldbeck Fells, Cumbria, England. From Leadhills, Lanarkshire, Scotland. In the Esgair Hir mine, Bwlch-y-Esgair, Ceulanymaesmawr, and at the Frongoch mine, Dyfed, Wales. A number of occurrences noted in slags have been omitted.

Name: Honors John H. Ely, nineteenth century frontiersman and promoter of an early mining company in Nevada, USA.

Type Material: The Natural History Museum, London, England, 1972,193.

References: (1) Williams, S.A. (1972) Elyite, basic lead-copper sulfate, a new mineral from Nevada. *Amer. Mineral.*, 57, 646–367. (2) Miyawaki, R., S. Matsubara, and E. Hashimoto (1997) Elyite from the Mizuhiki mine, Fukushima Prefecture, Japan. *Bull. Nat. Sci. Museum, Tokyo*, C23, 27–33. (3) (1998) *Amer. Mineral.*, 83, 403 (abs. ref. 2). (4) Kolitsch, U. and G. Giester (2000) Elyite, Pb₄Cu(SO₄)O₂(OH)₄•H₂O: crystal structure and new data. *Amer. Mineral.*, 85, 1816–1821.

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