

Luddenite

Pb₂Cu₂Si₅O₁₄•14H₂O

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Crystal Data: Monoclinic. *Point Group:* n.d. Rare crystals tend to a platy habit with wedge-shaped terminations; microcrystalline, with individual grains to 0.01 mm, forming rosettes and fan-shaped aggregates.

Physical Properties: *Cleavage:* Parallel and normal to the plane of flattening of the microcrystals. Hardness = 4 D(meas.) = 4.45 D(calc.) = [4.98]

Optical Properties: Semitransparent. *Color:* Nickel-green. *Streak:* Slightly paler nickel green.

Optical Class: Biaxial. *Pleochroism:* X = Y = yellow-green; Z = rich emerald-green. $\alpha = 1.852$ $\beta = \text{n.d.}$ $\gamma = 1.867$ $2V(\text{meas.}) = \sim 40^\circ$

Cell Data: *Space Group:* n.d. $a = 7.85$ $b = 20.06$ $c = 14.72$ $\beta = 90.78^\circ$ $Z = [6]$

X-ray Powder Pattern: Artillery Peaks area, Arizona, USA.
7.361 (10), 3.173 (10), 2.918 (8), 5.218 (7), 4.226 (5), 3.515 (5), 3.411 (5)

Chemistry:	(1)	(2)	(3)
SiO ₂	25.7	27.2	25.94
TiO ₂	4.7		
CuO	13.2	14.0	13.74
PbO	35.1	37.1	38.54
H ₂ O	20.5	21.7	21.78
Total	99.2	[100.0]	100.00

(1) Artillery Peaks area, Arizona, USA; microchemical analysis, H₂O by Penfield method; some H₂O may be nonessential. (2) Recalculated to 100.0% after removal of TiO₂ impurity.

(3) Pb₂Cu₂Si₅O₁₄•14H₂O.

Occurrence: In thoroughly oxidized Pb–Cu sulfide ores.

Association: Galena, chalcopyrite, fluorite, quartz, alamosite, melanotekite, cerussite, chalcocite, shattuckite, chrysocolla, wickenburgite, altered Fe–Ti oxides.

Distribution: On the dumps of a Pb–Ag–Cu prospect in the Artillery Peaks area, Mohave Co., Arizona, USA.

Name: For Raymond W. Ludden, Chief Geologist for Western Exploration, Phelps Dodge Corporation.

Type Material: The Natural History Museum, London, England, 1984,473–474.

References: (1) Williams, S.A. (1982) Luddenite, a new copper-lead silicate from Arizona. *Mineral. Mag.*, 46, 363–364. (2) (1983) *Amer. Mineral.*, 68, 643 (abs. ref. 1).