

Osarizawaite**PbCuAl₂(SO₄)₂(OH)₆**

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Crystal Data: Hexagonal, pseudocubic. *Point Group:* $\bar{3}2/m$. Hexagonal crystals, flattened on {0001}, with {10 $\bar{1}$ 1}, to 20 μ m, which may be hollow rings due to dissolution of a central zoned phase; typically earthy, powdery.

Physical Properties: *Tenacity:* Friable. Hardness = n.d. D(meas.) = 3.89–4.037
D(calc.) = 4.167–4.20

Optical Properties: Semitransparent. *Color:* Greenish yellow; greenish yellow to yellowish green in thin section.

Optical Class: Uniaxial (+), may be biaxial. *Pleochroism:* O = dark yellow; E = pale yellowish. $\omega = 1.712(3)$ $\epsilon = 1.732(2)$ $2V(\text{meas.}) = 0^\circ\text{--}15^\circ$

Cell Data: *Space Group:* $R\bar{3}m$. $a = 7.05\text{--}7.075$ $c = 17.23\text{--}17.25$ $Z = 3$

X-ray Powder Pattern: Osarizawa mine, Japan.

3.00 (100), 5.79 (70), 3.52 (60), 2.87 (60), 2.28 (60), 2.23 (30), 1.918 (30)

Chemistry:	(1)	(2)	(3)		(1)	(2)	(3)
SO ₃	24.80	26.02	25.87	PbO	35.41	33.15	36.07
Al ₂ O ₃	13.36	17.51	16.48	H ₂ O ⁺	9.20	10.42	8.73
Fe ₂ O ₃	4.79	0.77		H ₂ O ⁻		0.09	
CuO	12.20	11.83	12.85	insol.		0.19	
ZnO	0.24			Total	[100.00]	99.98	100.00

(1) Osarizawa mine, Japan; H₂O by TGA; recalculated to 100% from an original total of 99.09% after deduction of SiO₂ 2.18% as quartz, CO₂ 0.45%, and H₂O⁻ 4.05%; then corresponds to Pb_{1.02}(Cu_{0.99}Zn_{0.02}) $\Sigma=1.01$ (Al_{1.70}Fe_{0.38}) $\Sigma=2.08$ (SO₄)₂(OH)_{6.30}. (2) Mt. Edgar Station, Australia; corresponds to Pb_{0.91}Cu_{0.92}(Al_{2.11}Fe_{0.06}) $\Sigma=2.17$ (SO₄)_{2.00}(OH)_{6.17} • 0.47H₂O. (3) PbCuAl₂(SO₄)₂(OH)₆.

Mineral Group: Alunite group.

Occurrence: An uncommon mineral in the oxidized zone of hydrothermal Pb–Zn–Cu deposits.

Association: Anglesite, beaverite, hidalgite, duftite, bindheimite, conichalcite, olivenite, quartz, clay, goethite.

Distribution: From the Osarizawa copper mine, Kazuno, Akita Prefecture, Japan. In Australia, on the Mt. Edgar Station, 56 km east-southeast of Marble Bar, at Whim Creek, Pilbara district, and in the Teutonic Bore deposit, 300 km north of Kalgoorlie, Western Australia. At the Tui mine, Mt. Te Aroha, New Zealand. In the Ortiz mine, Capillitas, Catamarca Province, Argentina. From the Herminia mine, Sierra Gorda district, southwest of Calama, Antofagasta, and in the El Indio mine, El Indio-Tambo district, east of La Serena, Coquimbo, Chile. At Onovas, Sonora, Mexico. In the USA, in Arizona, from Bisbee and Tombstone, Cochise Co.; in the Omega mine, Helvetia, and at the Silver Hill mine, Waterman Mountains, Pima Co.; from the Fat Jack mine, Bradshaw Mountains, Yavapai Co.; in the Church Hills, Millard Co., Utah; at the Titusville mine, San Juan Co., and in the Silver Cliff district, Custer Co., Colorado. From Alderly Edge, Cheshire, England. At the Cap Garonne mine, near le Pradet, Var, France. In the Clara mine, near Oberwolfach, Black Forest, Germany.

Name: For its first-noted occurrence in the Osarizawa mine, Japan.

Type Material: National Science Museum, Tokyo, Japan, M-15598.

References: (1) Taguchi, Y. (1961) On osarizawaite, a new mineral of the alunite group, from the Osarizawa mine, Japan. *Mineral. J. (Japan)*, 3, 181–194. (2) (1962) *Amer. Mineral.*, 47, 1216–1217 (abs. ref. 1). (3) Morris, R.C. (1962) Osarizawaite from Western Australia. *Amer. Mineral.*, 47, 1079–1093. (4) Paar, W.H., J. Burgstaller, and T.T. Chen (1980) Osarizawaite-beaverite intergrowths from Sierra Gorda, Chile. *Mineral. Record*, 11, 101–104. (5) Giuseppetti, G. and C. Tadini (1980) The crystal structure of osarizawaite. *Neues Jahrb. Mineral., Monatsh.*, 401–407.

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