

Austinite**CaZn(AsO₄)(OH)**

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Crystal Data: Orthorhombic. *Point Group:* 222. As enantiomorphous bladed crystals exhibiting {011}, {111}, {1 $\bar{1}$ 1}, {010} and several other forms, sometimes forming scepters. Also as radially fibrous crusts and nodules. *Twinning:* Left- and right-handed individuals joined on (100), with (010) and (001) coincident.

Physical Properties: *Cleavage:* Good on {011}. *Tenacity:* Brittle. Hardness = 4–4.5 D(meas.) = 4.13 D(calc.) = [4.31]

Optical Properties: Translucent to transparent. *Color:* Colorless, white to pale yellowish white, green. *Luster:* Subadamantine to silky in aggregates.

Optical Class: Biaxial (+). *Orientation:* X = a; Y = c; Z = b. *Dispersion:* r > v, weak. $\alpha = 1.759(3)$ $\beta = 1.763(3)$ $\gamma = 1.783(3)$ 2V(meas.) = $\sim 45^\circ$

Cell Data: *Space Group:* P2₁2₁2₁. a = 7.505–7.509 b = 9.037–9.046 c = 5.921–5.934 Z = 4

X-ray Powder Pattern: Gold Hill, Utah, USA.

3.171 (10), 2.801 (10), 2.637 (10), 1.616 (9), 1.509 (7), 2.529 (6), 5.781 (5)

Chemistry:	(1)	(2)	(3)	(1)	(2)	(3)
P ₂ O ₅	0.1	0.90		CaO	19.2	21.45
As ₂ O ₅	42.7	42.85	43.96	H ₂ O	3.6	[3.45]
FeO		0.49		insol.	2.4	
CuO		0.88				
ZnO	32.5	30.10	31.14	Total	100.5	[100.00]
						100.00

(1) Gold Hill, Utah, USA; insoluble is quartz, some adamite adhering. (2) Kamariza mine, Greece; by electron microprobe, H₂O by difference; corresponding to Ca_{1.00}(Zn_{0.96}Cu_{0.03}Fe_{0.01})_{Σ=1.00}[(As_{0.97}P_{0.03})_{Σ=1.00}O₄](OH). (3) CaZn(AsO₄)(OH).

Polymorphism & Series: Forms a series with conichalcite.

Mineral Group: Adelite group.

Occurrence: A rare secondary mineral in the oxidized zone of some arsenic-rich base-metal deposits.

Association: Adamite, talmessite, “limonite”, quartz (Gold Hill, Utah, USA).

Distribution: In the USA, in the Western Utah mine, Gold Hill, Tooele Co., Utah; at the Mohawk mine, Clark Mountains, San Bernardino Co., California; from the Table Mountain mine, Galiuro Mountains, Pinal Co., Arizona; at Sterling Hill, Ogdensburg, Sussex Co., New Jersey; in the Tucker’s tunnel uranium deposit, near Durango, Hinsdale Co., Colorado. From the Ojuela mine, Mapimí, Durango, Mexico. At the Lili mine, near Lomitos, Bolivia. From the Kamariza mine, Laurium, Greece. At Tsumeb and Guchab, Otavi district, Namibia. In the Puttapa zinc mine, near Beltana, South Australia.

Name: To honor Professor Austin Flint Rogers (1877–1957), American mineralogist, Stanford University, Palo Alto, California, USA.

Type Material: n.d.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana’s system of mineralogy, (7th edition), v. II, 809–810. (2) Williams, S.A. and J. de Azevedo (1967) Austinite from Gold Hill, Utah. *Amer. Mineral.*, 52, 1224–1226. (3) Radcliffe, D. and W.B. Simmons, Jr. (1971) Austinite: chemical and physical properties in relation to conichalcite. *Amer. Mineral.*, 56, 1359–1365. (4) Giuseppetti, G. and C. Tadini (1988) The crystal structure of austinite, CaZn(AsO₄)(OH), from Kamareza, Laurion (Greece). *Neues Jahrb. Mineral., Monatsh.*, 159–166. (5) Clark, L.A., J.J. Pluth, I. Steele, J.V. Smith, and S.R. Sutton (1997) Crystal structure of austinite, CaZn(AsO₄)OH. *Mineral. Mag.*, 61, 677–683.

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