Olivenite $Cu_2(AsO_4)(OH)$

Crystal Data: Monoclinic, pseudo-orthorhombic. *Point Group:* $2/m$. Crystals may be elongated along [010] or [001], with {100}, {010}, {110}, {101}, many other forms, to 2.5 cm. Commonly curved, lamellar, matted fibrous, globular and reniform; granular, earthy, massive. *Twinning:* On {010}.

Physical Properties: *Cleavage:* {101}, {110}, indistinct. *Fracture:* Conchoidal to irregular. Hardness = 3 D(meas.) = 4.46 D(calc.) = 4.45

Optical Properties: Translucent to opaque. *Color:* Olive-green, greenish brown, brown; grayish green, grayish white, straw-yellow if fibrous; pale green in transmitted light. *Streak:* Olive-green to brown. *Luster:* Adamantine to vitreous, pearly to silky if fibrous. *Optical Class:* Biaxial (+), may be biaxial (–). *Pleochroism:* Weak; in green and yellow. *Orientation:* $Y = c$. *Dispersion:* $r < v$ or $r > v$, strong. *Absorption:* $Y > X = Z$. $\alpha = 1.747$–1.780 $\beta = 1.788$–1.820 $\gamma = 1.829$–1.865 2V(meas.) = $\sim 90°$

Cell Data: *Space Group:* $P2_1/n$. $a = 8.5894(2)$ $b = 8.2073(2)$ $c = 5.9285(1)$ $\beta = 90.088(3)°$ Z = 4

X-ray Powder Pattern: Cornwall, England or Tintic, Utah, USA.
2.98 (10), 4.82 (9), 5.91 (7), 2.47 (7), 2.39 (7), 4.19 (6), 2.65 (6)

Chemistry:

	(1)	(2)
As_2O_5	39.80	40.61
CuO	56.65	56.21
H_2O	3.55	3.18
Total	100.00	100.00

(1) Cornwall, England. (2) $Cu_2(AsO_4)(OH)$.

Mineral Group: Forms a series with adamite.

Occurrence: The most common secondary copper arsenate in the oxdized zone of hydrothermal copper deposits.

Association: Conichalcite, clinoclase, tyrolite, cornetite, cornwallite, metazeunerite, scorodite, pharmacosiderite, spangolite, chalcophyllite, brochantite, malachite, azurite, chrysocolla.

Distribution: Many localities. In England, from Cornwall, at the Carharrack mine, Wheals Gorland, Unity, and others in Gwennap, Linkinhorne, and elsewhere; at Alston Moor, Cumbria, and Tavistock, Devon. From the Cap Garonne mine, near le Pradet, Var, France. In the Clara Mine, near Oberwolfach, and many other places in the Black Forest, Germany. At the Kamariza mine, Laurium, Greece. From the Touissit mine, near Oujda, Morocco. Large crystals at Tsumeb, Namibia. In the USA, fine examples from the Mammoth, American Eagle, and other mines in the Tintic district, Juab Co., Utah; at the Majuba Hill mine, Antelope district, Pershing Co., Nevada. In Chile, from Chuquicamata, Antofagasta; Collahuasi, Tarapacá; and the Copiapó district, Atacama. From Ashburton Downs, Western Australia.

Name: In allusion to its common olive-green color.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 859–861. (2) Berry, L.G. (1951) Observations on conichalcite, cornwallite, euchroite liroconite and olivenite. Amer. Mineral., 36, 484–503, esp. 502. (3) Burns, P.C. and F.C. Hawthorne (1995) Rietveld refinement of the crystal structure of olivenite: a twinned monoclinic structure. Can. Mineral., 33, 885–888.