Chenevixite $Cu_2Fe_2^{3+}(AsO_4)_2(OH)_4 \cdot H_2O$

Crystal Data: Monoclinic, pseudo-orthorhombic. *Point Group:* $2/m$. Crystals, tabular on {100} with diamond-shaped outline, to 0.5 mm; usually microcrystalline, spheroidal, earthy to compact massive. *Twinning:* Observed during crystal structure refinement, at a very fine scale.

Physical Properties: *Fracture:* Subconchoidal to earthy. *Tenacity:* Brittle.
Hardness = 3.5–4.5 D(meas.) = 4.38 D(calc.) = 4.40

Optical Properties: Semitransparent. *Color:* Greenish yellow to olive-green, dark green.
Streak: Greenish yellow.
Optical Class: Biaxial (+). *Pleochroism:* Very weak. *Orientation:* $X = b$; $Z \simeq c$. $\alpha = 1.92$
$\beta = 1.96$ $\gamma = 2.04$ 2V(meas.) = n.d. 2V(calc.) = 73°

Cell Data: *Space Group:* $P2_1/m$ or $P2_1/a$. $a = 14.985$–15.006 $b = 5.170$–5.189
$c = 5.658$–5.724 $\beta = 102°15'$–$102°55'$ Z = 2

X-ray Powder Pattern: Las Animas, Sonora, Mexico.
3.557 (10), 2.553 (7), 3.817 (5), 2.994 (5), 2.448 (5), 7.322 (4), 2.504 (4)

Chemistry:

	(1)	(2)	(3)
As_2O_5	34.62	37.95	38.13
Al_2O_3	1.17		
Fe_2O_3	26.94	26.6	26.50
CuO	26.88	26.55	26.40
MgO	0.23		
CaO	0.55		
H_2O	9.25	8.5	8.97
rem.	0.71		
Total	100.35	99.6	100.00

(1) American Eagle mine, Utah, USA; remnant is quartz. (2) Las Animas, Sonora, Mexico; average of two analyses, H_2O by the Penfield method. (3) $Cu_2Fe_2^{3+}(AsO_4)_2(OH)_4 \cdot H_2O$.

Mineral Group: Forms a series with luetheite.

Occurrence: An uncommon secondary mineral in the oxidized zone of some hydrothermal polymetallic mineral deposits.

Association: Quartz (Cornwall, England); olivenite, quartz (Tintic district, Utah, USA); olivenite, scorodite (Majuba Hill, Nevada, USA); malachite, bystromite, ordoñezite (Naco, Sonora, Mexico).

Distribution: In England, from Wheal Gorland and Wheal Unity, Gwennap, at the Phoenix United mines, Linkinhorne, and in the Old Gunnislake mine, Calstock, Cornwall; from the Brandy Gill mine, Caldbeck Fells, Cumbria. In the USA, in the American Eagle and Mammoth mines, Tintic district, Juab Co., and the Gold Hill mine, Tooele Co., Utah; at the Majuba Hill mine, Antelope district, Pershing Co., Nevada; from Alum Gulch, near Patagonia, Santa Cruz Co., Arizona. On Benjamín Hill, Las Animas, and on Cerro Morita, about 27 km southwest of Agua Prieta, Sonora, Mexico. In Chile, at Chuquicamata, and the Emma Luisa gold mine, Guanaco district, about 100 km east-northeast of Taltal, Antofagasta; from Collahuasi, Tarapacá. At Musonoi, near Kolwezi, Katanga Province, Congo (Shaba Province, Zaire). In Australia, from the Consols mine, Broken Hill, New South Wales; at the Dome Rock copper mine, about 40 km northwest of Mingary, South Australia; and from the Anticline prospect, 11 km west-southwest of Ashburton Downs homestead, Capricorn Range, Western Australia. Reported from additional localities, for some of which modern confirmation would be desirable.

Name: To honor Richard Chenevix (1774–1830), Irish chemist, who early analyzed a Cornish Cu–Fe arsenate.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 840–841. (2) Williams, S.A. (1977) Luetheite, $Cu_2Al_2(AsO_4)_2(OH)_4 \cdot H_2O$, a new mineral from Arizona, compared with chenevixite. Mineral. Mag., 41, 27–32. (3) Burns, P.C., J.V. Smith, and I.M. Steele (2000) Arizona porphyry copper/hydrothermal deposits. I. The structure of chenevixite and leutheite. Mineral. Mag., 64, 25–30.