Rollandite $Cu_3(AsO_4)_2 \cdot 4H_2O$

Crystal Data: Orthorhombic. *Point Group*: 2/*m* 2/*m* 2/*m*. Crystals to 0.5 mm are elongated along [100], flattened on {010}, and show {010}, {011}, {101}, and {001}. As aggregates, to 1 mm.

Physical Properties: *Cleavage*: Good on {001}. *Fracture*: Conchoidal. *Tenacity*: Brittle. Hardness = 4-4.5 D(meas.) = 3.9(1) D(calc.) = 3.80 Nonfluorescent. Soluble in HCl.

Optical Properties: Transparent. *Color*: Bottle-green. *Streak*: Light green. *Luster*: Vitreous. *Optical Class*: Biaxial (-). α = 1.745(5) β = 1.755(5) γ = 1.760(5) 2V(meas.) = 71(2)° 2V(calc.) = 70.1(4)° *Dispersion*: Strong, $r < v$. *Orientation*: $X = a$, $Y = c$, $Z = b$. Nonpleochroic.

Cell Data: *Space Group*: *Pnma*. a = 5.6906(4) b = 17.061(1) c = 9.732(1) Z = 4

X-ray Powder Pattern: Roua mines, upper Var valley, Alpes-Maritimes, France.
8.520 (100), 3.221 (90), 3.721 (60), 3.102 (40), 2.817 (35), 2.795 (35), 2.350 (25)

Chemistry:

	(1)	(2)
CuO	44.87	44.15
As_2O_5	42.44	42.53
H_2O	[12.69]	13.32
Total	100.00	100.00

(1) Roua mines, upper Var valley, Alpes-Maritimes, France; average electron microprobe analysis, H_2O by difference; corresponding to $Cu_{3.09}As_{2.02}H_{7.71}O_{12}$. (2) $Cu_3(AsO_4)_2 \cdot 4H_2O$.

Occurrence: A secondary mineral in small geodes.

Association: Olivenite, conichalcite, clinotyrolite, cornubite, kolfanite, pharmacosiderite, gerhardtite, atacamite, gilmarite, wallkilldellite-Fe, cuprite, domeykite, algodonite, native copper.

Distribution: From the old Cu mines of Roua, upper Var valley (the Daluis gorge), western margin of the Barrot Dome, Alpes-Maritimes, France.

Name: Honors Pierre *Rolland* (b. 1940), who collected the material studied.

Type Material: Natural History Museum, Geneva, Switzerland (447.008).

References: (1) Sarp, H. and R. Cěrny (2000) Rollandite, $Cu_3(AsO_4)_2 \cdot 4H_2O$, a new mineral: its description and crystal structure. Eur. J. Mineral., 12, 1045-1050. (2) (2001) Amer. Mineral., 86, 768-769, (abs. ref. 1).