Gilmarite $Cu_3(AsO_4)(OH)_3$

Crystal Data: Triclinic. *Point Group:* 1. Lozenge-shaped crystals, elongated along [101] or [100], flattened on {010}, also showing {100}, {101}, {001}, to 0.1 mm; typically in rosettes.

Physical Properties: *Cleavage:* Good on {010}. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = ∼3 D(meas.) = 4.2(1) D(calc.) = 4.21

Optical Properties: Transparent. *Color:* Blue-green. *Streak:* Blue-green. *Luster:* Vitreous. *Optical Class:* Biaxial (–). *Pleochroism:* Weak; $X = Y$ = light green; Z = green. *Orientation:* On {010}, $X \wedge c = 33°$ and $Y \wedge a = 37.1°$; on {001}, $Y \wedge a = 34.3°$ and $Z \wedge b = 30.1°$; on {101}, $Z \wedge b = 44°$ and $Y' \wedge [101] = 36.5°$. *Dispersion:* $r > v$, weak. $\alpha = 1.760(5)$ $\beta = 1.80(1)$ $\gamma = 1.83(1)$ 2V(meas.) = 77(4)° 2V(calc.) = 80(1)°

Cell Data: *Space Group:* $P1$. $a = 5.445(4)$ $b = 5.873(3)$ $c = 5.104(3)$ $\alpha = 114.95(3)°$ $\beta = 93.05(5)°$ $\gamma = 91.92(4)°$ Z = 1

X-ray Powder Pattern: Roua mines, France.
4.613 (100), 3.390 (60), 4.580 (50), 2.713 (40), 2.543 (40), 2.445 (30), 3.654 (20)

Chemistry:

	(1)	(2)
As_2O_5	29.64	30.20
CuO	63.0	62.70
H_2O	[7.36]	7.10
Total	[100.00]	100.00

(1) Roua mines, France; by electron microprobe, average of five analyses, H_2O by difference; corresponds to $Cu_{3.00}(As_{0.98}O_4)(OH)_{3.10}$. (2) $Cu_3(AsO_4)(OH)_3$.

Polymorphism & Series: Dimorphous with clinoclase.

Occurrence: A rare secondary mineral associated with other copper arsenates and copper arsenides in the oxidized zone.

Association: Cuprite, posnjakite, langite, clinotyrolite, connellite, brochantite, malachite, vésigniéite, cornubite, olivenite, trippkeite, domeykite, djurleite.

Distribution: From the Roua copper mines, about 50 km north of Nice, Alpes Maritimes, France.

Name: To honor Gilbert Mari (1944–), mineralogist, University of Nice-Sophia Antipolis, Nice, France, who collected the samples in which the mineral was found.

Type Material: Natural History Musem, Geneva, Switzerland, 477.006.

References: (1) Sarp, H. and R. Černý (1999) Gilmarite, $Cu_3(AsO_4)(OH)_3$, a new mineral: its description and crystal structure. Eur. J. Mineral., 11, 549–555. (2) (2000) Amer. Mineral., 85, 263 (abs. ref. 1).