

Claringbullite

$\text{Cu}_4\text{Cl}(\text{OH})_7$

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Crystal Data: Hexagonal. *Point Group:* $6/m\ 2/m\ 2/m$. As micaceous or platy crystals, to 1 cm, flattened on {1000}; in groups of divergent plates.

Physical Properties: *Cleavage:* Perfect on {0001}; distinct on $\{10\bar{1}0\}$ and $\{11\bar{2}0\}$.
Hardness = Soft. D(meas.) = 3.9 D(calc.) = 3.99

Optical Properties: Transparent to translucent. *Color:* Blue; pale blue in transmitted light.
Luster: Pearly.
Optical Class: Uniaxial (-). $\omega = 1.782$ $\epsilon = [1.780]$

Cell Data: *Space Group:* $P6_3/mmc$. $a = 6.6733(5)$ $c = 9.185(1)$ $Z = 2$

X-ray Powder Pattern: Nchanga mine, Zambia or Kambove, Congo.
5.75 (vvs), 2.700 (vvs), 2.445 (vs), 4.89 (s), 4.58 (s), 2.889 (ms), 1.797 (ms)

Chemistry:	(1)	(2)	(3)
CuO	78.18	74.42	77.85
Cl	8.55	8.30	8.68
H ₂ O	[15.14]	[19.03]	15.43
SO ₃	0.06	0.12	
-O = Cl ₂	1.93	1.87	1.96
Total	[100.00]	[100.00]	100.00

(1) Nchanga mine, Zambia; by electron microprobe, H₂O by difference, presence confirmed by elemental analyzer. (2) Kambove, Congo; by electron microprobe, H₂O by difference, presence confirmed by elemental analyzer; the mean of five analyses from both localities above corresponds to $\text{Cu}_{8.00}(\text{SO}_4)_{0.01}\text{Cl}_{1.99}(\text{OH})_{14.00} \cdot 0.68\text{H}_2\text{O}$. (3) $\text{Cu}_4\text{Cl}(\text{OH})_7$.

Occurrence: In oxidized copper ore or slag, produced under chlorine-rich conditions.

Association: Cuprite, malachite, quartz, brochantite, nantokite, paratacamite, connellite, spangolite.

Distribution: In the Nchanga mine, Chingola, Zambia. From the M'sesa mine, Kambove, Katanga Province, Congo (Shaba Province, Zaire). In the USA, from the Cole and Southwest mines, Bisbee, Cochise Co., Arizona. In the Malanjhand copper deposit, north of Durg, Madhya Pradesh, India. At the Great Australia mine, near Cloncurry, Queensland, Australia.

Name: Honors Gordon Frank Claringbull (1911–1990), formerly Keeper of Mineralogy and Director of the British Museum (Natural History), London, England.

Type Material: The Natural History Museum, London, England, 1976,109; University of Pierre and Marie Curie, Paris; National School of Mines, Paris, France; National Museum of Natural History, Washington, D.C., USA, 145660.

References: (1) Fejer, E.E., A.M. Clark, A.G. Couper, and C.J. Elliott (1977) Claringbullite, a new hydrated copper chloride. *Mineral. Mag.*, 41, 433–436. (2) (1978) *Amer. Mineral.*, 63, 793 (abs. ref. 1). (3) Burns, P.C., M.A. Cooper, and F.C. Hawthorne (1995) Claringbullite: a Cu^{2+} oxysalt with Cu^{2+} in trigonal-prismatic coordination. *Can. Mineral.*, 33, 633–639.