## Leightonite $K_2Ca_2Cu(SO_4)_4 \cdot 2H_2O$



**Crystal Data:** Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Lathlike crystals, flattened on {100}, elongated along [010], or equant, showing {100}, {101}, {110}, {113}, several other forms, to 4 mm; commonly forms cross-fiber veinlets. *Twinning:* On $\{20\overline{1}\}$.

**Physical Properties:** Hardness = 3 D(meas.) = 2.95 D(calc.) = 2.95

**Optical Properties:** Transparent to translucent. *Color:* Pale watery blue to greenish blue; pale blue in transmitted light. *Luster:* Vitreous.
*Optical Class:* Biaxial (–). *Orientation:* $X = c$; $Y = b$; $Z = a$. *Dispersion:* $r > v$, moderately strong. $\alpha = 1.574$–$1.578$ $\beta = 1.587$ $\gamma = 1.595$ 2V(meas.) = ∼60° 2V(calc.) = 89°06′

**Cell Data:** *Space Group: Fmmm.* $a = 11.654(2)$ $b = 7.497(1)$ $c = 10.097(1)$
$\beta = 125.21(1)°$ Z = 2

**X-ray Powder Pattern:** Chuquicamata, Chile.
2.90 (100), 3.18 (60), 1.781 (30), 2.22 (20), 2.51 (10), 2.40 (10), 1.461 (10)

**Chemistry:**

| | (1) | (2) |
|---|---|---|
| $SO_3$ | 49.33 | 49.87 |
| CuO | 11.97 | 12.39 |
| CaO | 18.41 | 17.46 |
| $Na_2O$ | 0.56 | |
| $K_2O$ | 13.93 | 14.67 |
| $H_2O$ | 5.71 | 5.61 |
| Total | 99.91 | 100.00 |

(1) Chuquicamata, Chile; corresponds to $(K_{1.92}Na_{0.12})_{\Sigma=2.04}Ca_{2.13}Cu_{0.98}(SO_4)_{4.00} \cdot 2.06H_2O$.
(2) $K_2Ca_2Cu(SO_4)_4 \cdot 2H_2O$.

**Occurrence:** Of localized occurrence in the oxidized zone of a copper deposit, probably formed under conditions of low acidity (Chuquicamata, Chile).

**Association:** Natrochalcite, blödite, atacamite, bellingerite, kröhnkite, gypsum, quartz (Chuquicamata, Chile); chalcanthite, anhydrite, lammerite (Tsumeb, Namibia).

**Distribution:** From Chuquicamata, Antofagasta, Chile. At Tsumeb, Namibia.

**Name:** Honors Tomás Leighton Donoso (1896–1967), Chilean mining engineer and Professor of Mineralogy, University of Santiago, Santiago, Chile.

**Type Material:** The Natural History Museum, London, England, 1938,56; Harvard University, Cambridge, Massachusetts, 97540–97544; National Museum of Natural History, Washington, D.C., USA, C5536.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 461–462. (2) Van Loan, P.R. (1962) An X-ray study of leightonite. Can. Mineral., 7, 272–277. (3) Manchetti, S., L. Bindi, P. Bonazzi, and F. Olmi (2002) Disordered distribution of Cu in the crystal structure of leightonite, $K_2Ca_2Cu(SO_4)_4 \cdot 2H_2O$. Amer. Mineral., 87,721–725.