

**Crystal Data:** Orthorhombic. *Point Group:*  $2/m\ 2/m\ 2/m$ . Crystals, to 1.5 mm, show a rectangular section, tabular on {001}, with {010}, {100}, {101}, {012}, {014}, {018}.

**Physical Properties:** *Cleavage:* Perfect on {001}. *Hardness* = n.d. *D(meas.)* = 2.96–2.98 *D(calc.)* = 2.97

**Optical Properties:** Transparent. *Color:* Sky-blue.

*Optical Class:* Biaxial. *Pleochroism:*  $X$  = pale greenish blue;  $Y$  = purplish blue. *Orientation:*  $X = a$ ;  $Z = b$ .  $\alpha = 1.61$ – $1.615$   $\beta = \text{n.d.}$   $\gamma = 1.685$ – $1.69$   $2V(\text{meas.}) = \text{n.d.}$

**Cell Data:** *Space Group:*  $Pc\bar{m}n$ .  $a = 5.830(1)$   $b = 6.775(1)$   $c = 21.711(5)$   $Z = 4$

**X-ray Powder Pattern:** Likasi, Congo.

5.75 (FFF), 10.8 (FF), 2.722 (mF), 2.518 (mF), 2.168 (mF), 3.23 (m), 3.18 (m)

**Chemistry:** (1) Composition established by crystal-structure analysis.

**Occurrence:** A rare secondary mineral in the oxidized zone of copper deposits.

**Association:** Cuprite, brochantite, malachite, copper, silver, buttgenschite, gerhardtite, miersite, iron oxides (Likasi mine, Congo).

**Distribution:** From Likasi, Katanga Province, Congo (Shaba Province, Zaire). At Dzhezkazgan, Kazakhstan. In the Hingston Down quarry, Calstock, Cornwall, England. From Huelgoat, Brittany, France. In the Copper Cities deposit, Gila Co., Arizona, USA. From the Spring Creek mine, near Wilmington, South Australia.

**Name:** For the locality where it was first found, Likasi, Congo.

**Type Material:** Royal Museum of Central Africa, Tervuren, Belgium, RGM655; National School of Mines, Paris, France; National Museum of Natural History, Washington, D.C., USA, 107463, 112521, 137714.

**References:** (1) Schoep, A., W. Borchert, and K. Kohler (1955) La likasite  $\text{Cu}_{12}(\text{OH})_{12}(\text{NO}_3)_4(\text{PO}_4)_2$ , nouveau minéral. Bull. Minéral., 78, 84–88 (in French). (2) (1955) Amer. Mineral., 40, 942 (abs. ref. 1). (3) Deliens, M. (1973) La likasite de Likasi (République du Zaïre). Bull. Minéral., 96, 143–145 (in French). (4) Effenberger, H. (1986) Likasite,  $\text{Cu}_3(\text{OH})_5(\text{NO}_3) \cdot 2\text{H}_2\text{O}$ : revision of the chemical formula and redetermination of the crystal structure. Neues Jahrb. Mineral., Monatsh., 101–110.