

**Crystal Data:** Triclinic. *Point Group:*  $\bar{1}$ . As bladed crystals, flattened on {011}, or as crestlike crystalline aggregates, to 0.3 mm. *Twinning:* On {011}.

**Physical Properties:** *Fracture:* Uneven. Hardness = n.d. D(meas.) = n.d. D(calc.) = 4.36

**Optical Properties:** Translucent to opaque. *Color:* Blue-green. *Streak:* Pale blue to white. *Luster:* Vitreous.

*Optical Class:* Biaxial (+) or (-). *Pleochroism:* Weak; azure-blue to pale blue.  $\alpha = 1.786$  ( $\alpha'$ )  
 $\beta = \text{n.d.}$   $\gamma = 1.840$  ( $\gamma'$ )  $2V(\text{meas.}) = \text{Large}$ .

**Cell Data:** *Space Group:*  $P\bar{1}$ .  $a = 4.446(3)$   $b = 5.871(4)$   $c = 8.680(7)$   $\alpha = 103.9(2)^\circ$   
 $\beta = 90.3(2)^\circ$   $\gamma = 93.2(2)^\circ$   $Z = 1$

**X-ray Powder Pattern:** Ludjiba mine, Congo.

4.46 (100), 2.462 (50), 2.353 (50), 3.02 (20), 2.408 (20), 2.017 (20), 1.572 (20)

**Chemistry:**

	(1)	(2)
P <sub>2</sub> O <sub>5</sub>	24.6	24.65
CuO	69.1	69.09
H <sub>2</sub> O	6.3	6.26
Total	100.0	100.00

(1) Ludjiba mine, Congo; by electron microprobe, H<sub>2</sub>O by difference. (2) Cu<sub>5</sub>(PO<sub>4</sub>)<sub>2</sub>(OH)<sub>4</sub>.

**Polymorphism & Series:** Trimorphous with pseudomalachite and reichenbachite.

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

**Association:** Pseudomalachite, libethenite (Ludjiba mine, Congo); pseudomalachite (Lubietová, Slovakia).

**Distribution:** From the Ludjiba mine, about 12 km southeast of Kambove, Katanga Province, Congo (Shaba Province, Zaire). At Lubietová, near Baňská Bystrica (Libethen, near Neusohl), Slovakia. In the Käusersteimel mine, near Kausen, Siegerland, Germany.

**Name:** For its occurrence at Ludjiba, Congo.

**Type Material:** Royal Institute of Natural Sciences, Brussels, RC3514; Royal Museum of Central Africa, Tervuren, Belgium, RMG4445.

**References:** (1) Piret, P. and M. Deliens (1988) Description de la ludjibaïte, un polymorphe de la pseudomalachite, Cu<sub>5</sub>(PO<sub>4</sub>)<sub>2</sub>(OH)<sub>4</sub>. Bull. Minéral., 111, 167–171 (in French with English abs.). (2) (1988) Amer. Mineral., 73, 1495 (abs. ref. 1). (3) Shoemaker, G.L., J.B. Anderson, and E. Kostiner (1981) The crystal structure of a third polymorph of Cu<sub>5</sub>(PO<sub>4</sub>)<sub>2</sub>(OH)<sub>4</sub>. Amer. Mineral., 66, 169–175.