

**Crystal Data:** Tetragonal. *Point Group:* 4mm. Crystals tabular on {001}, exhibiting square or octagonal outline with vicinal forms, rarely showing pyramidal hemihedralism, to 2 cm; in subparallel aggregates; massive.

**Physical Properties:** *Cleavage:* {001}, perfect. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 2.5 D(meas.) = 5.42 D(calc.) = 5.48

**Optical Properties:** Transparent to translucent. *Color:* Deep blue; pale blue in transmitted light. *Streak:* Pale blue. *Luster:* Adamantine, pearly on cleavages. *Optical Class:* Uniaxial (-). *Absorption:* O > E, in thick fragments.  $\omega = 1.98(1)$   $\epsilon = 1.85(1)$

**Cell Data:** *Space Group:* P4mm.  $a = 5.880(1)$   $c = 5.500(2)$   $Z = 1$

**X-ray Powder Pattern:** Tiger, Arizona, USA.  
5.51 (10), 2.283 (10), 3.305 (9), 2.580 (9), 1.755 (9), 1.537 (9), 2.929 (8)

| Chemistry:           | (1)   | (2)   | (3)    |
|----------------------|-------|-------|--------|
| CuO                  | 12.90 | 12.68 | 12.90  |
| PbO                  | 72.09 | 72.01 | 72.36  |
| Cl                   | 10.89 | 11.42 | 11.49  |
| H <sub>2</sub> O     | 6.14  | 6.03  | 5.84   |
| insol.               |       | 0.19  |        |
| -O = Cl <sub>2</sub> | 2.46  | 2.57  | 2.59   |
| Total                | 99.56 | 99.76 | 100.00 |

(1) Mendip Hills, England; corresponding to Pb<sub>2.10</sub>Cu<sub>1.06</sub>Cl<sub>2.00</sub>(OH)<sub>4.44</sub>. (2) Tiger, Arizona, USA; corresponding to Pb<sub>1.98</sub>Cu<sub>0.98</sub>Cl<sub>1.98</sub>(OH)<sub>4.01</sub>. (3) Pb<sub>2</sub>CuCl<sub>2</sub>(OH)<sub>4</sub>.

**Occurrence:** In oxidized manganese ores (Mendip Hills, England); a secondary mineral in deeply oxidized Pb-Cu ores (Tiger, Arizona, USA); in slag exposed to seawater.

**Association:** Chloroxiphite, hydrocerussite, mendipite, cerussite (Mendip Hills, England); boleite, wherryite, hydrocerussite, leadhillite, phosgenite, caledonite, atacamite, paratacamite, cerussite (Tiger, Arizona, USA).

**Distribution:** In England, at the Higher Pitts Farm, Mendip Hills, and the Merehead quarry, near Shepton Mallet, Somerset; at Padstow Consols, Padstow, Cornwall. In Germany, from the Christian-Levin mine, near Essen, North Rhine-Westphalia, and from Richelsdorf, Hesse, in slag. Along Baratti Beach, Tuscany, Italy, in slag. At Laurium, Greece, in slag. In the USA, exceptional crystals from the Mammoth-St. Anthony mine, Tiger, Pinal Co., and from the Rowley mine, Maricopa Co., Arizona. In Iran, in the Tchah Khuni and other mines in the Anarak district; the Seh-Changi mine, near Neyband, Khorassan; and at Abdol Abad, Tabas. From Moolyella, and at the Anticline prospect, 11 km west-southwest of Ashburton Downs homestead, Capricorn Range, Western Australia. In the Santa Ana mine, Caracoles, Sierra Gorda district, Chile. Found at an undefined locality in the Kopet-Dag Range, Cheleken Peninsula, Russia.

**Name:** From the Greek for *separate from*, and the related mineral *boleite*.

**Type Material:** The Natural History Museum, London, England, 1923,521; National Museum of Natural History, Washington, D.C., USA, 94813.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 82-83. (2) Winchell, R.E. and H.E. Wenden (1968) Synthesis and study of diaboleite. *Mineral. Mag.*, 36, 932-939. (3) Rouse, R.C. (1971) The crystal chemistry of diaboleite. *Zeits. Krist.*, 134, 69-80. (4) Bideaux, R.A. (1980) Tiger, Arizona. *Mineral. Record*, 11, 155-181. (5) Cooper, M.A. and F.C. Hawthorne (1995) Diaboleite, Pb<sub>2</sub>Cu(OH)<sub>4</sub>Cl<sub>4</sub>, a defect perovskite structure with stereoactive lone-pair behavior of Pb<sup>2+</sup>. *Can. Mineral.*, 33, 1125-1129.