

Lautenthalite

PbCu₄(SO₄)₂(OH)₆•3H₂O

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Crystal Data: Monoclinic. *Point Group:* 2/m. Tabular crystals, to 0.7 mm, flattened on {100}, may be elongated along [010], with prominent {100}, {010}, {101}, also {102}, {110}, $\{\bar{5}14\}$; in sheaflike or irregular aggregates. *Twining:* With {100} as twin plane, commonly polysynthetic.

Physical Properties: *Cleavage:* On {001} and {010}, good. Hardness = n.d.
D(meas.) = n.d. D(calc.) = 3.84

Optical Properties: Transparent. *Color:* Bright blue. *Streak:* White. *Luster:* Vitreous. *Optical Class:* Biaxial (-). *Pleochroism:* Faint; X = pale blue; Y = Z = blue. *Orientation:* Z = b; Y \wedge c = 4(1)°. *Dispersion:* r > v, distinct. $\alpha = 1.659(2)$ $\beta = 1.703(2)$ $\gamma = 1.732(2)$
2V(meas.) = 79(1)° 2V(calc.) = 78°

Cell Data: *Space Group:* P2₁/c. a = 21.642(8) b = 6.040(2) c = 22.544(8)
 $\beta = 108.2(1)^\circ$ Z = 8

X-ray Powder Pattern: Lautenthal, Germany.
5.14 (100), 3.40 (80), 4.53 (60), 2.631 (50), 2.531 (40), 2.821 (30), 2.421 (30)

Chemistry:	(1)	(2)
SO ₃	19.7	19.78
CuO	39.3	39.30
PbO	27.2	27.57
H ₂ O	[13.8]	13.35
Total	[100.0]	100.00

(1) Lautenthal, Germany; by electron microprobe, average of determinations on three crystals, H₂O by difference, both (OH)¹⁻ and H₂O shown to be present by IR; corresponds to Pb_{0.99}Cu_{4.01}(SO₄)_{2.00}(OH)₆•3.10H₂O. (2) PbCu₄(SO₄)₂(OH)₆•3H₂O.

Occurrence: Formed in the oxidation zone of Pb–Cu sulfide deposits (Wales); an oxidation product in cavities in smelter slag (Germany, Austria, Scotland).

Association: Anglesite, devilline–serpierite, galena (Lautenthal, Germany); linarite, brochantite, schulenbergite, wroewolfeite (Penrhiw mine, Wales).

Distribution: From [the Trogtal quarry, near] Lautenthal, Harz Mountains, Germany. At Öblarn, Steiermark, Austria. Found at the Meadowfoot smelter, northwest of Wanlockhead, Dumfriesshire, Scotland. In Wales, from the Hendrefelen mine, Central Wales district; in Dyfed, at the Penrhiw mine, Ystumtuen, and the Frongoch mine.

Name: For its occurrence at Lautenthal, Germany.

Type Material: Institute for Mineralogy, Ruhr University, Bochum, Germany.

References: (1) Medenbach, O. and W. Gebert (1993) Lautenthalite, PbCu₄[(OH)₆|(SO₄)₂]•3H₂O, the Pb analogue of devillite – a new mineral from the Harz mountains, Germany. Neues Jahrb. Mineral., Monatsh., 401–407. (2) (1994) Amer. Mineral., 79, 571 (abs. ref. 1).