

Philipsbornite

PbAl₃(AsO₄)₂(OH)₅•H₂O

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Crystal Data: Hexagonal. *Point Group:* $\bar{3}2/m$. As pseudocubic rhombohedral crystals, with {10 $\bar{1}$ 1}, {01 $\bar{1}$ 2}, {0001}, to 100 μ m; usually as massive to earthy crusts.

Physical Properties: *Fracture:* Conchoidal. Hardness = [~4.5] (by analogy to hidalgoite). D(meas.) = > 4.1 D(calc.) = 4.33–4.45

Optical Properties: Translucent to transparent. *Color:* Colorless, grayish green; yellowish in transmitted light.

Optical Class: Biaxial in pseudocubic sectors, anomalously isotropic. $n = 1.790(3)$

Cell Data: *Space Group:* $R\bar{3}m$. $a = 7.11\text{--}7.17$ $c = 17.05\text{--}17.18$ $Z = 3$

X-ray Powder Pattern: Tsumeb, Namibia.

3.042 (100), 5.85 (60), 3.592 (50), 2.281 (30), 1.944 (30), 5.73 (20), 3.538 (20)

Chemistry:

	(1)	(2)	(3)
CrO ₃	6.3		
SO ₃	1.3		
P ₂ O ₅		0.3	
As ₂ O ₅	28.6	34.4	34.36
Al ₂ O ₃	22.3	18.5	22.86
Fe ₂ O ₃	0.6	5.7	
MnO	0.3		
CuO	0.9		
ZnO	1.1		
PbO	32.0	31.7	33.36
H ₂ O	9.4	9.4	9.42
Total	102.8	100.0	100.00

(1) Dundas, Tasmania; by electron microprobe, total Fe as Fe₂O₃, H₂O by LOI; corresponding to (Pb_{0.90}Mn_{0.03}) $\Sigma=0.93$ (Al_{2.76}Zn_{0.09}Cu_{0.07}Fe_{0.05}) $\Sigma=2.97$ [(AsO₄)_{1.57}(CrO₄)_{0.40}(SO₄)_{0.10}] $\Sigma=2.07$ H_{6.58}O_{5.72}. (2) Tsumeb, Namibia; by electron microprobe, average of four analyses, total Fe as Fe₂O₃, H₂O by TGA. (3) PbAl₃(AsO₄)₂(OH)₅•H₂O.

Mineral Group: Crandallite group.

Occurrence: A rare secondary mineral in the oxidized zone of hydrothermal polymetallic mineral deposits.

Association: Crocoite, hidalgoite, gorceixite (Tasmania); azurite, tsumcorite, bayldonite, malachite, hematite, quartz (Tsumeb, Namibia).

Distribution: In Australia, from the Dundas district, Tasmania, and in the Anticline and Bali Lo prospects, 11 km west-southwest of Ashburton Downs homestead, Capricorn Range, Western Australia. At Tsumeb, Namibia. From Cínovec (Zinnwald), and at Moldava, 20 km northwest of Teplice, Czech Republic. In Germany, from the Clara mine, near Oberwolfach, in the Michael mine, Weiler, near Lahr, and at Neubulach, Black Forest.

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Type Material: National Museum of Natural History, Washington, D.C., USA, 148463.

References: (1) Walenta, K., M. Zwiener, and P.J. Dunn (1982) Philipsbornit, ein neues Mineral der Crandallitreihe von Dundas auf Tasmanien. Neues Jahrb. Mineral., Monatsh., 1–5 (in German with English abs.). (2) (1982) Amer. Mineral., 67, 859 (abs. ref. 1). (3) Schmetzer, K., G. Tremmel, and O. Medenbach (1982) Philipsbornit, PbAl₃H[(OH)₆(AsO₄)₂], aus Tsumeb, Namibia - ein zweites Vorkommen. Neues Jahrb. Mineral., Monatsh., 248–254 (in German with English abs.).

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