Boyleite $(Zn,Mg)SO_4 \cdot 4H_2O$

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Crystal Data: Monoclinic. *Point Group:* $2/m$. In thin crusts and earthy aggregates.

Physical Properties: *Fracture:* Uneven. Hardness = ∼2 D(meas.) = n.d. D(calc.) = 2.41 (synthetic $ZnSO_4 \cdot 4H_2O$). Soluble in H_2O; slowly alters to gunningite in a dry atmosphere.

Optical Properties: Semitransparent. *Color:* White. *Streak:* White.
Optical Class: Biaxial (–). $\alpha = 1.522(2)$ $\beta = [1.531]$ $\gamma = 1.536(2)$ 2V(meas.) = ∼70°

Cell Data: *Space Group:* $P2_1/n$ (synthetic $ZnSO_4 \cdot 4H_2O$). $a = 5.95$ $b = 13.60$ $c = 7.96$ $\beta = 90°18'$ Z = 4

X-ray Powder Pattern: Kropbach quarry, Germany.
5.46 (10), 4.47 (10), 6.85 (8), 3.96 (8), 3.39 (7), 2.95 (7), 2.55 (5)

Chemistry:

	(1)
SO_3	38.89
ZnO	33.09
MgO	3.19
H_2O	24.83
Total	[100.00]

(1) Kropbach quarry, Germany; recalculated after deduction of estimated gypsum 11.60%, then corresponding to $(Zn_{0.84}Mg_{0.16})SO_4 \cdot 4H_2O$.

Mineral Group: Rozenite group.

Occurrence: A rare alteration product of sphalerite in a hydrothermal Pb–Zn vein (Kropbach quarry, Germany).

Association: Gypsum, gunningite, sphalerite (Kropbach quarry, Germany); gunningite, coquimbite, zincocopiapite, jarosite, melanterite, römerite, siderotil, voltaite, chalcanthite, hexahydrite, gypsum (Les Vallettes, Switzerland).

Distribution: From the Kropbach quarry, Münstertal, Black Forest, Germany. At Les Vallettes, Valais, Switzerland. From Keno Hill, Yukon Territory, Canada.

Name: Honoring Dr. Robert William Boyle (1920–), Canadian geochemist, Geological Survey of Canada, Ottawa, Canada.

Type Material: National Museum of Natural History, Washington, D.C., USA, 137413.

References: (1) Walenta, K. (1978) Boyleit, ein neues Sulfatmineral von Kropbach im südlichen Schwarzwald. Chem. Erde. 37, 73–79 (in German with English abs.). (2) (1979) Amer. Mineral., 64, 241, 464 (abs. ref. 1).

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