

Hydroboracite

CaMgB₆O₈(OH)₆•3H₂O

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Crystal Data: Monoclinic. *Point Group:* 2/*m*. As slender crystals, prismatic along [001] and flattened on {010}, to 10 cm; in fanlike to radial spherical aggregates and in swallowtail composites; as drusy coatings; compact, fine-grained.

Physical Properties: *Cleavage:* {010}, perfect; {100}, distinct. Hardness = 2–3; 5–6 in some specimens. *D*(meas.) = 2.15–2.17 *D*(calc.) = 2.170 Partly soluble in boiling H₂O.

Optical Properties: Transparent to translucent. *Color:* Colorless to white. *Luster:* Vitreous, silky if fibrous.

Optical Class: Biaxial (+). *Orientation:* *Y* = *b*; *X* ∧ *c* = 33°. *Dispersion:* *r* < *v*, perceptible. *α* = 1.520–1.523 *β* = 1.534–1.535 *γ* = 1.569–1.571 2*V*(meas.) = 60°–66°

Cell Data: *Space Group:* *P*2/*c*. *a* = 11.769(2) *b* = 6.684(2) *c* = 8.235(4)
β = 102.59(2)° *Z* = 2

X-ray Powder Pattern: Bigadiç district, Turkey.
5.78 (100), 6.69 (85), 3.32 (74), 1.914 (16), 4.47 (14), 2.436 (14), 4.36 (13)

Chemistry:	(1)	(2)
B ₂ O ₃	49.04	50.53
SiO ₂	0.33	
CO ₂	1.65	
(Al, Fe) ₃ O ₃	0.38	
MgO	9.84	9.75
CaO	13.63	13.57
alkalies	0.15	
H ₂ O	25.45	26.15
Total	100.47	100.00

(1) Inder deposit, Kazakhstan. (2) CaMgB₆O₈(OH)₆•3H₂O.

Occurrence: Typically formed by groundwater alteration of colemanite; may be primary.

Association: Colemanite, hydroboracite, tunellite.

Distribution: Originally described from an unknown locality in the “Caucasus”, at that time a general name for the areas south of European Russia. From the Inder boron deposit, Kazakhstan. At the Niedersachswerfen anhydrite deposit, near Nordhausen, Harz Mountains, Germany. In the USA, from the Thompson mine, near Ryan, in the Terry deposit, and at the Eagle Borax Spring, Furnace Creek district, Death Valley, Inyo Co., in the Kramer borate deposit, Boron, Kern Co., and elsewhere in California. From the Potash Corporation of America mine, Penobscquis evaporite deposit, and in the Salt Springs evaporite deposit, near Sussex, New Brunswick, Canada. In Turkey, from several deposits in the Bigadiç borate district, Balıkesir Province; at the Killik, Hisarcık, and Espey borate mines, near Emet, Kütahya Province. Fine examples from Kara Göl, Zanjan, Iran. From Pampa Pique III, about one km north of Oficina Lautaro, Taltal district, Antofagasta, Chile. At Pastos Grandes, and in the Monte Amarillo and Apalacheana mines, Sijes district, Salta Province, Argentina.

Name: In allusion to essential water and a supposed relation to *boracite*.

Type Material: Lost.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana’s system of mineralogy, (7th edition), v. II, 353–354. (2) Sabelli, C. and A. Stoppioni (1978) Refinement of the crystal structure of hydroboracite. *Can. Mineral.*, 16, 75–80. (3) Pekov, I.V. (1998) Minerals first discovered on the territory of the former Soviet Union. *Ocean Pictures*, Moscow, 97–98.

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