

# Hydromagnesite

# Mg<sub>5</sub>(CO<sub>3</sub>)<sub>4</sub>(OH)<sub>2</sub>•4H<sub>2</sub>O

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**Crystal Data:** Monoclinic, pseudo-orthorhombic. *Point Group:* 2/m. As acicular to bladed crystals, flattened on {100}, terminated by {011} with {100} striated || [001] by repetition of {110} and {100}, to 10 cm; in divergent sprays, massive, chalky. *Twinning:* Polysynthetic lamellar twinning on {100}, common.

**Physical Properties:** *Cleavage:* {010}, perfect. *Tenacity:* Brittle. Hardness = 3.5  
D(meas.) = 2.24–2.25 D(calc.) = 2.25

**Optical Properties:** Transparent to translucent. *Color:* Colorless to white. *Luster:* Vitreous; silky to pearly to dull in aggregates.

*Optical Class:* Biaxial (+). *Orientation:* Z = b; X ∧ c = 47°09'. α = 1.523(3) β = 1.527(3)  
γ = 1.545(1) 2V(meas.) = 50°

**Cell Data:** *Space Group:* P2<sub>1</sub>/c. a = 10.105(5) b = 8.954(2) c = 8.378(4)  
β = 114.44(5)° Z = 2

**X-ray Powder Pattern:** Soghan mine, Iran.  
5.79 (100), 2.899 (82), 9.20 (39), 6.40 (38), 2.298 (33), 4.186 (31), 3.317 (28)

Chemistry:	(1)	(2)
CO <sub>2</sub>	37.10	37.64
MgO	43.16	43.10
H <sub>2</sub> O	19.65	19.26
Total	99.91	100.00

(1) Emarese, Italy. (2) Mg<sub>5</sub>(CO<sub>3</sub>)<sub>4</sub>(OH)<sub>2</sub>•4H<sub>2</sub>O.

**Occurrence:** Incrusting and filling fractures in altered ultramafic rocks and serpentinites; in low-temperature hydrothermally altered dolomitic xenoliths and marble; common in caves as a component of “moonmilk” and speleothems.

**Association:** Calcite, dolomite, aragonite, brucite, magnesite, artinite, pyroaurite, periclase, “opal”, chromite.

**Distribution:** Widespread, with numerous minor localities. Studied material from: in the USA, from Hoboken, Hudson Co., New Jersey; at Wood’s Chrome and Low’s mines, near Texas, Lancaster Co., Pennsylvania; in Nevada, abundant at Luning, Mineral Co., and near Gabbs, Gabbs district, Nye Co.; numerous localities in California, as at the Crestmore quarry, Riverside Co.; to 25% in a surface zone, about 55 km northwest of Coalinga, Fresno Co.; near Red Mountain, Stanislaus Co.; at Fort Point, San Francisco Co. In Canada, in the Cariboo, Atlin, and Kamloops districts, British Columbia. In the São Felix do Minato mine, Bahia, Brazil. From Kraubath, Salzburg, Austria. In Italy, from Emarese and Montjovet, Val d’Aosta, Piedmont; at Predazzo, Trentino-Alto Adige, on Monte Somma, Campania. In Iran, exceptional crystals from the Soghan mine, south of Kerman, Esfandaque district; and in the Dovez open pit, near the Shariar mine, Minab district. From the Shabani and Mtoroshanga areas, Zimbabwe. In the Vestfold Hills, East Antarctica. The most common carbonate after calcite and aragonite in caves worldwide.

**Name:** In allusion to its content of water and similarity to *magnesite*.

**Type Material:** Natural History Museum, Paris, France, 97592.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana’s system of mineralogy, (7th edition), v. II, 271–274. (2) Bariand, P., F. Cesbron, H. Vachey, and M. Sadrzadeh (1973) Hydromagnesite from Soghan, Iran. Mineral. Record, 4, 18–20. (3) Akao, M. and S. Iwai (1977) The hydrogen bonding of hydromagnesite. Acta Cryst., 33, 1273–1275. (4) Hill, C. and P. Forti (1997) Cave minerals of the world (2nd edition), National Speleological Soc., Huntsville, Alabama, 151.

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