

Gismondine

Ca₂Al₄Si₄O₁₆•9H₂O

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Crystal Data: Monoclinic. *Point Group:* 2/m. Crystals dipyramidal, composite, to 2 cm. In stellate or radiating spherulitic aggregates; powdery. *Twinning:* On the normal to {100}, giving pseudotetragonal or pseudo-orthorhombic individuals.

Physical Properties: *Cleavage:* {232}, distinct. *Fracture:* Subconchoidal. Hardness = 4.5 D(meas.) = 2.20–2.26 D(calc.) = 2.28 Piezoelectric.

Optical Properties: Transparent to translucent. *Color:* White, grayish, bluish white, reddish; colorless in thin section. *Luster:* Vitreous.

Optical Class: Biaxial (–); sectored. *Orientation:* Y = b; Z ∧ c = 42.5°. α = 1.525–1.540 β = 1.531–1.544 γ = 1.541–1.550 2V(meas.) = 82°–86°

Cell Data: *Space Group:* P2₁/c. a = 10.02 b = 10.62 c = 9.84 β = 92°25' Z = 2

X-ray Powder Pattern: Round Top volcano, Hawaii, USA.
2.706 (100), 4.25 (70), 3.19 (70), 4.93 (60), 3.13 (60), 7.26 (55), 2.738 (55)

Chemistry:

	(1)	(2)	(3)
SiO ₂	33.89	38.03	33.45
Al ₂ O ₃	28.14	26.61	28.38
Fe ₂ O ₃	0.00	trace	
CaO	13.96	12.81	15.61
SrO	0.025		
BaO	0.27	0.00	
Na ₂ O		1.32	
K ₂ O	2.86	0.07	
H ₂ O	20.76	21.58	22.56
Total	99.91	100.42	100.00

(1) Capo di Bove, Italy; corresponds to (Ca_{1.78}K_{0.44})_{Σ=2.22}Al_{3.95}Si_{4.03}O₁₆•8.24H₂O.

(2) Eyrafjall, Reydarfjord, Iceland; corresponds to (Ca_{1.59}Na_{0.30}K_{0.02})_{Σ=1.91}Al_{3.63}Si_{4.40}O₁₆•8.34H₂O. (3) Ca₂Al₄Si₄O₁₆•9H₂O.

Mineral Group: Zeolite group.

Occurrence: In cavities in nepheline and olivine basalt and leucite tephrite.

Association: Zeolites, calcite, chlorite, quartz.

Distribution: At Capo di Bove and elsewhere around Rome, Lazio, Italy. In Germany, from the Hohenberg, near Bühne, Westphalia; on the Frauenberg, near Fulda, Hesse; at the Schlauroth, Görlitz, Saxony; on the Arensburg, near Zilsdorf; and from the Schellkopf, near Brenk, and elsewhere in the Eifel district. From near Zálezly (Salesel), Czech Republic. Found near the Gorner glacier, near Zermatt, Valais, Switzerland. In Ireland, at many localities in Co. Antrim, as in the Bruslee quarry, Ballyclare. On Iceland, many localities around Reydarfjord, Fáskrúðsfjord, and Fagradalur. At Round Top volcano, Oahu, and Alexander Dam, Kauai, Hawaii, USA. From Concepción del Oro, Zacatecas, Mexico. A number of other localities are known.

Name: For Professor Carlo Giuseppe Gismondi (1762–1824), Italian mineralogist, Rome, Italy, who first examined the mineral.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 586–587. (2) Deer, W.A., R.A. Howie, and J. Zussman (1963) Rock-forming minerals, v. 4, framework silicates, 401–407. (3) Walker, G.P.L. (1962) Low-potash gismondine from Ireland and Iceland. Mineral. Mag., 33, 187–201. (4) Fischer, K. (1963) The crystal structure determination of the zeolite gismondite. CaAl₂Si₂O₈•4H₂O. Amer. Mineral., 48, 664–672. (5) Iijima, A. and K. Harada (1969) Authigenic zeolites in zeolitic palagonite tuffs on Oahu, Hawaii. Amer. Mineral., 54, 182–197. (6) Nawaz, R. (1980) Morphology, twinning, and optical orientation of gismondine. Mineral. Mag., 43, 841–844. (7) Vezzalini, G. and R. Oberti (1984) The crystal chemistry of gismondines: the non-existence of K-rich gismondines. Bull. Minéral., 107, 805–812.

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