

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Crystals tabular on {010}, {100}, or {001} or equant with large pinacoidal faces; elongated along [100] or [001], to 15 cm, with about 40 forms recorded. Typically granular, nodular, parallel or divergent fibrous, massive. *Twinning:* Simple or repeatedly on {011}, common; contact twins rare on {120}.

Physical Properties: *Cleavage:* On {010}, perfect; on {100} nearly perfect; on {001} good to imperfect, yielding pseudocubic fragments. *Fracture:* Uneven to splintery. *Tenacity:* Brittle. Hardness = 3–3.5 D(meas.) = 2.98(1) D(calc.) = 2.95

Optical Properties: Transparent to translucent. *Color:* Colorless to pale blue or violet if transparent; white, mauve, rose, pale brown or gray from included impurities; colorless in transmitted light. *Streak:* White to pale gray. *Luster:* Pearly on {010}, vitreous to greasy on {001}; vitreous on {100}.

Optical Class: Biaxial (+). *Pleochroism:* For violet varieties; X = colorless to pale yellow or rose; Y = pale violet or rose; Z = violet. *Orientation:* X = b; Y = a; Z = c. *Dispersion:* $r < v$, strong. *Absorption:* $Z > Y > X$. $\alpha = 1.567\text{--}1.574$ $\beta = 1.574\text{--}1.579$ $\gamma = 1.609\text{--}1.618$ $2V(\text{meas.}) = 42^\circ\text{--}44^\circ$

Cell Data: *Space Group:* *Amma*. $a = 6.993(2)$ $b = 6.995(2)$ $c = 6.245(1)$ $Z = 4$

X-ray Powder Pattern: Synthetic.

3.499 (100), 2.849 (29), 2.3282 (20), 2.2090 (20), 1.8692 (16), 1.6483 (15), 1.7500 (11)

Chemistry:	(1)	(2)	(1)	(2)
SO ₃	58.37	58.81	CaO	41.13
CO ₂	0.17		FeS ₂	0.02
(Al,Fe) ₂ O ₃	0.06		Total	99.75
				100.00

(1) Yonaibata mine, Hukusima Prefecture, Japan; after deduction of CO₂ as calcite, corresponds to Ca_{0.99}S_{1.00}O₄. (2) CaSO₄.

Occurrence: A major component in sedimentary evaporite deposits and in the cap rocks above salt domes, commonly formed by dehydration of gypsum; in igneous rocks, fumarolic deposits, and in seafloor hydrothermal chimneys, also an alteration product in hydrothermal mineral deposits.

Association: Gypsum, halite, sylvite, polyhalite, dolomite, calcite, magnesite, celestine, sulfur.

Distribution: Numerous occurrences worldwide. In Austria, from Hall, Tirol, at Ischl and Hallein, Salzburg, and Aussee, Styria. In Germany, in Saxony-Anhalt, from Stassfurt-Leopoldshall and Douglashall, near Westeregeln; at Wathlingen, near Celle, Lower Saxony, and elsewhere. Gemmy crystals from the Simplon Tunnel, Valais, Switzerland. In Italy, from the Campiano mine, Boccheggiano district, Tuscany; on Vesuvius, Campania. From the Faraday mine, Bancroft, Ontario, Canada. In the USA, from Paterson, Passaic Co., New Jersey; in the Fairfax quarry, Centreville, Fairfax Co., Virginia; large deposits in the Carlsbad potash district, Eddy Co., New Mexico; at the Boiling Salt Dome, Wharton Co., Texas. From Naica, Chihuahua, Mexico. In the Salt Range, Punjab, India. On Mt. Pinatubo, Philippines. At Morococha, Peru.

Name: From the Greek for *without water*, in contrast to hydrous calcium sulfate minerals.

Type Material: Mining Academy, Freiberg, Germany, 16538.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 424–428. (2) Chang, L.L.Y., R.A. Howie, and J. Zussman (1996) Rock-forming minerals, (2nd edition), v. 5B, non-silicates, 74–94. (3) Hawthorne, F.C. and R.B. Ferguson (1975) Anhydrous sulphates. II. Refinement of the crystal structure of anhydrite. *Can. Mineral.*, 13, 289–292. (4) Kirfel, A. and G. Will (1980) Charge density in anhydrite, CaSO₄, from X-ray and neutron diffraction measurements. *Acta Cryst.*, 36, 2881–2890. (5) McMurdie, H.F., M.-C. Morris, E.H. Evans, B. Paretzkin, W. Wong-Ng, and C.R. Hubbard (1986) Standard X-ray diffraction powder patterns from the JCPDS research associateship. *Powder Diffraction*, 1, 267.

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