

Crystal Data: Orthorhombic, pseudohexagonal; triclinic below about 100 °C. *Point Group:* 222 or lower; 1. As pseudohexagonal plates || {0001} with prism faces {10 $\bar{1}$ 0}, to 1 cm. Typically wedge-shaped or tabular; in radiating and rosettelike aggregates. *Twinning:* Paramorphs have simple, trilling, or multiple contact twins on {1016}, very common; contact or penetration twins on {3034}.

Physical Properties: *Cleavage:* Prismatic, poor. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 7 D(meas.) = 2.25–2.28 D(calc.) = [2.28]

Optical Properties: Transparent. *Color:* Colorless to white; in transmitted light, colorless. *Luster:* Vitreous, may be pearly on {0001}.

Optical Class: Biaxial (+). *Orientation:* X = b; Y = a; Z = c. $\alpha = 1.468\text{--}1.482$
 $\beta = 1.470\text{--}1.484$ $\gamma = 1.474\text{--}1.486$ $2V(\text{meas.}) = 40^\circ\text{--}86^\circ$

Cell Data: *Space Group:* C222 or lower. a = 9.88 b = 17.1 c = 16.3 Z = 64, or
Space Group: F1. a = 9.932(5) b = 17.216(6) c = 81.864(9) $\alpha = 90^\circ$ $\beta = 90^\circ$ $\gamma = 90^\circ$
Z = 320

X-ray Powder Pattern: Mule Springs, Oregon, USA.

4.30 (100), 4.09 (90), 3.80 (60), 3.249 (30), 2.964 (16), 2.483 (16), 2.305 (8)

Chemistry:	(1)	(2)	(1)	(2)
SiO ₂	[95.1]	99.03	MgO	0.3 trace
TiO ₂	0.26	0.02	CaO	0.4 trace
Al ₂ O ₃	2.4	0.50	Na ₂ O	0.80 0.24
Fe ₂ O ₃	0.36	0.01	K ₂ O	0.37 0.08
MnO	trace	0.00	H ₂ O ⁺	0.1
			Total	[100.0] 99.98

(1) Cerro San Cristóbal, Mexico; spectrographic analysis, SiO₂ by difference. (2) Mule Springs, Oregon, USA.

Polymorphism & Series: Quartz, cristobalite, stishovite, and coesite are polymorphs; high tridymite is formed between 870 °C and 1470 °C; a number of stacking polytypes are known, especially non-terrestrial.

Occurrence: Deposited from hot gases in vesicles and lithophysae; as phenocrysts in felsic volcanic rocks, and less commonly, in basalts; in contact metamorphosed sandstone.

Association: Cristobalite, sanidine, quartz, augite, fayalite, “hornblende,” hematite, ferroan enstatite, troilite.

Distribution: Prominent localities include: on Cerro San Cristóbal, Pachuca, Hidalgo, Mexico. In the USA, in California, from near Portola, Plumas Co., Pomona, Los Angeles Co., and at Bumpass Hill, Lassen National Park, Shasta Co.; at Mule Springs, 160 km northeast of Lakeview, Harney Co., Oregon; in the San Juan Mountains, San Juan Co., Colorado; large crystals from the Thomas Range, Juab Co., Utah. At the Bellerberg volcano, two km north of Mayen, Eifel district, Germany. From the Colli Euganei, near Padua, Vicenza, and Marriabu, Sardinia, Italy. At Puy Capuchin, Puy-de-Dôme, France. On Tardree Mt., Co. Antrim, Ireland. In Japan, at Kumamoto, Kumamoto Prefecture, and Yugawara, Kanagawa Prefecture. In a number of meteorites.

Name: From the Greek meaning *three-twin*, in allusion to the common occurrence of trillings.

References: (1) Frondel, C. (1962) Dana's system of mineralogy, (7th edition), v. III, silica minerals, 259–272. (2) Deer, W.A., R.A. Howie, and J. Zussman (1963) Rock-forming minerals, v. 4, framework silicates, 179–230. (3) Grant, R.W. (1967) New data on tridymite. Amer. Mineral., 52, 536–541. (4) Konnert, J.H. and D.E. Appleman (1978) The crystal structure of low tridymite. Acta Cryst., 34, 391–403. (5) Wennemer, M. and A.B. Thompson (1984) Tridymite polymorphs and polytypes. Schweiz. Mineral. Petrog. Mitt., 64, 335–353.

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