

Christelite**Zn₃Cu₂(SO₄)₂(OH)₆•4H₂O**

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Crystal Data: Triclinic. *Point Group:* $\bar{1}$. As thin bladed crystals, flattened on {001}, to 13 mm.

Physical Properties: *Cleavage:* On {001}, perfect. Hardness = n.d. D(meas.) = 3.14 D(calc.) = 3.20

Optical Properties: Transparent. *Color:* Greenish blue. *Streak:* Bright greenish blue. *Luster:* Vitreous.

Optical Class: Biaxial (-). *Pleochroism:* X = pale blue; Y = Z = blue. $\alpha = 1.598$ $\beta = 1.626$ $\gamma = 1.635$ $2V(\text{meas.}) = 59.4^\circ$ $2V(\text{calc.}) = 59^\circ$

Cell Data: *Space Group:* $P\bar{1}$. $a = 5.4143(8)$ $b = 6.336(1)$ $c = 10.470(3)$ $\alpha = 94.32(3)^\circ$ $\beta = 90.06(2)^\circ$ $\gamma = 90.27(2)^\circ$ $Z = 2$

X-ray Powder Pattern: San Francisco mine, Chile.

5.230 (100), 10.459 (82), 3.486 (54), 1.743 (12), 2.493 (10), 2.355 (10), 3.157 (8)

Chemistry:

	(1)	(2)
SO ₃	23.53	23.22
CuO	18.62	23.08
ZnO	36.25	35.41
H ₂ O	23.05	18.29
Total	101.45	100.00

(1) San Francisco mine, Chile; by electron microprobe, H by CHN analyzer, H₂O and (OH)¹⁻ then proportioned by crystal-structure analysis; corresponds to Zn_{2.82}Cu_{1.48}(SO₄)_{1.86}(OH)_{4.88}•5.66H₂O. (2) Zn₃Cu₂(SO₄)₂(OH)₆•4H₂O.

Occurrence: A secondary mineral in the oxidized portions of a Cu–Zn sulfide deposit.

Association: Zincian paratacamite, anglesite, hemimorphite, gordaite, quartz.

Distribution: From the San Francisco mine, two km west of the Sierra Gorda railway station, Sierra Gorda district, Antofagasta, Chile.

Name: Honors Christel Gebhard-Giesen (1950–), German mineral collector.

Type Material: University of Hamburg, Hamburg, Germany.

References: (1) Schlüter, J., K.-H. Klaska, G. Adiwidjaja, and G. Gebhard (1996) Christelite, Zn₃Cu₂(SO₄)₂(OH)₆•4H₂O, a new mineral from the San Francisco mine, Antofagasta, Chile. Neues Jahrb. Mineral., Monatsh., 188–192. (2) (1997) Amer. Mineral., 82, 207–210 (abs. ref. 1). (3) Adiwidjaja, G., K. Friese, K.-H. Klaska, and J. Schlüter (1996) The crystal structure of christelite Zn₃Cu₂(SO₄)₂(OH)₆•4H₂O. Zeits. Krist., 211, 518–521.