

Changoite

Na₂Zn(SO₄)₂·4H₂O

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Crystal Data: Monoclinic. *Point Group:* 2/m. Anhedral crystals, in veinlets, to 1 cm wide.

Physical Properties: Hardness = 2–3 D(meas.) = 2.50 D(calc.) = 2.507 Soluble in H₂O.

Optical Properties: Transparent. *Color:* Colorless. *Streak:* White. *Luster:* Vitreous.
Optical Class: Biaxial (–) (synthetic). $\alpha = 1.507$ $\beta = 1.512$ $\gamma = 1.516$ 2V(meas.) = Large.
2V(calc.) = 83°

Cell Data: *Space Group:* P2₁/a. $a = 11.077(2)$ $b = 8.249(2)$ $c = 5.532(1)$
 $\beta = 100.18(2)^\circ$ Z = 2

X-ray Powder Pattern: San Francisco mine, Chile.
3.289 (100), 4.550 (58), 3.262 (35), 4.245 (32), 2.631 (27), 3.325 (25), 3.245 (25)

Chemistry:	(1)	(2)
SO ₃	34.85	42.64
ZnO	20.62	21.67
MgO	0.05	
CaO	0.02	
Na ₂ O	17.31	16.50
H ₂ O	18.99	19.19
Total	91.84	100.00

(1) San Francisco mine, Chile; by electron microprobe, average of four analyses, H₂O by CHN analyzer; corresponding to Na_{2.21}Zn_{1.00}(S_{0.86}O_{3.63})₂·4.16H₂O. (2) Na₂Zn(SO₄)₂·4H₂O.

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

Association: Thénardite, zincian paratacamite, gypsum.

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

Name: For the *Changos*, early inhabitants of Chile.

Type Material: University of Hamburg, Hamburg, Germany.

References: (1) Schlüter, J., K.-H. Klaska, and G. Gebhard (1999) Changoite, Na₂Zn(SO₄)₂·4H₂O, the Zn analogue of blödite, a new mineral from Sierra Gorda, Antofagasta, Chile. *Neues Jahrb. Mineral., Monatsh.*, 97–103. (2) (1999) *Amer. Mineral.*, 84, 1685 (abs. ref. 1).