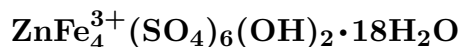


Zincocopiapite



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Crystal Data: Triclinic, pseudo-orthorhombic. *Point Group:* $\bar{1}$. Thin scaly crystals, to 1 mm, showing {010}, {100}, {101}, {0 $\bar{1}$ 1}, minor {1 $\bar{2}$ 0}, {001}; also in compact massive aggregates.

Physical Properties: *Cleavage:* Perfect on {010}. *Hardness* = 2 *D*(meas.) = 2.181 *D*(calc.) = 2.15

Optical Properties: Transparent to translucent. *Color:* Canary-yellow, yellowish green. *Luster:* Vitreous, pearly to greasy.

Optical Class: Biaxial (+). *Pleochroism:* Strong; *X* = yellow; *Y* = colorless; *Z* = deep canary-yellow. *Orientation:* $X \simeq b$; $Y \wedge c = 39^\circ$; $Z \wedge a = 51^\circ$; $\text{OAP} \simeq \{101\}$. *Dispersion:* $r > v$, strong. $\alpha = 1.532\text{--}1.534$ $\beta = 1.540\text{--}1.554$ $\gamma = 1.586\text{--}1.592$ $2V(\text{meas.}) = \text{n.d.}$ $2V(\text{calc.}) = 44^\circ\text{--}78^\circ$

Cell Data: *Space Group:* $P\bar{1}$. $a = 7.35\text{--}7.36$ $b = 18.16\text{--}18.40$ $c = 7.28$
 $\alpha = 93.8^\circ\text{--}95.83^\circ$ $\beta = 101.5^\circ\text{--}102.8^\circ$ $\gamma = 98.5^\circ\text{--}99.37^\circ$ $Z = 1$

X-ray Powder Pattern: Les Vallettes, Switzerland.
18.2 (100), 9.06 (90), 6.06 (50), 3.568 (50), 6.55 (30), 5.20 (30), 4.87 (25)

Chemistry:	(1)	(2)	(1)	(2)
SO ₃	41.23	39.7	CaO	0.20
Al ₂ O ₃	0.00		Na ₂ O	0.05
Fe ₂ O ₃	25.35	26.1	K ₂ O	0.15
FeO	0.42		H ₂ O ⁺	22.03
MnO	0.39		H ₂ O [−]	5.58
ZnO	5.22	6.3	H ₂ O	27.0
MgO	0.00		Total	100.62 99.1

(1) Xitieshan mine, China; corresponds to $(\text{Zn}_{0.82}\text{Fe}_{0.08}^{2+}\text{Mn}_{0.06}^{2+}\text{Ca}_{0.04})_{\Sigma=1.00}\text{Fe}_{4.00}^{3+}(\text{SO}_4)_{6.50}(\text{OH})_2 \cdot 18.4\text{H}_2\text{O}$. (2) Les Vallettes, Switzerland; H₂O by TGA; corresponds to $\text{Zn}_{0.97}\text{Fe}_{4.03}^{3+}(\text{SO}_4)_{6.13}(\text{OH})_{1.75} \cdot 17.69\text{H}_2\text{O}$.

Mineral Group: Copiapite group.

Occurrence: A rare secondary mineral formed in the oxidation zone of a Pb–Zn deposit in a very arid climate (Xitieshan mine, China); a precipitate from thermal hot springs (Kopet-Dag Mountains, Turkmenistan); an alteration product of pyrite and sphalerite in schists (Les Vallettes, Switzerland).

Association: Copiapite, halotrichite, coquimbite, römerite, sideronatrite, melanterite (Xitieshan mine, China); sulfur, gypsum, calcite, pyrite, sphalerite, quartz, “limonite” (Kopet-Dag Mountains, Turkmenistan); boyleite, gunningite, coquimbite, jarosite, melanterite, römerite, siderotil, voltaite, chalcantite, hexahydrite, gypsum (Les Vallettes, Switzerland).

Distribution: From an undisclosed Pb–Zn deposit [Xitieshan mine, south of Mt. Qilianshan, Chaidamu], Qinghai Province, China. Along the northern front range of the Kopet-Dag Mountains, Turkmenistan. From Băișoara, Romania. At Les Vallettes, Valais, Switzerland.

Name: For its dominant content of *zinc* and relation to *copiapite*.

Type Material: n.d.

References: (1) Tu Kwang-chih, Li Hsi-lin, Hsieh Hsien-deh, and Yin Shu-sen (1964) Zincobotryogen and zincocopiapite, two new varieties of sulphate minerals. *Acta Geologica Sinica*, 44(1), 99–101. (in Chinese with English abs.). (2) (1964) *Amer. Mineral.*, 49, 1777 (abs. ref. 1). (3) Perroud, P., N. Meisser, and H. Sarp (1987) Présence de zincocopiapite en Valais. *Schweiz. Mineral. Petrog. Mitt.*, 67, 115–117 (in French with English abs.).

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