

Krausite

$\text{KFe}^{3+}(\text{SO}_4)_2 \cdot \text{H}_2\text{O}$

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Crystal Data: Monoclinic. *Point Group:* $2/m$. Crystals are equant, may be tabular on {001} or short prismatic along [001]. Small crystals may exhibit prominent {110}, with $\{\bar{1}01\}$, $\{\bar{1}02\}$, $\{\bar{1}12\}$, {001}, {100}, {210}, $\{\bar{2}11\}$; larger crystals, to 5 mm, are typically rough; forms massive crusts.

Physical Properties: *Cleavage:* On {001}, perfect; on {100}, good. Hardness = 2.5
D(meas.) = 2.840 D(calc.) = 2.839 Slowly decomposed by H_2O , leaving Fe_2O_3 .

Optical Properties: Transparent to opaque. *Color:* Pale lemon-yellow, yellowish green, gray; pale yellow to colorless in transmitted light. *Streak:* White. *Luster:* Vitreous to dull.
Optical Class: Biaxial (+). *Pleochroism:* Distinct; X = colorless; Y = Z = pale yellow.
Orientation: Z = b; $X \wedge c = -35^\circ$. $\alpha = 1.588$ $\beta = 1.650$ $\gamma = 1.722$ $2V(\text{meas.}) = \text{Large}$.

Cell Data: *Space Group:* $P2_1/m$. $a = 7.908\text{--}7.920$ $b = 5.152\text{--}5.146$ $c = 8.988\text{--}9.014$
 $\beta = 102.75^\circ\text{--}102.76^\circ$ Z = 2

X-ray Powder Pattern: Borate, California, USA.
3.09 (100), 4.40 (74), 6.59 (66), 3.69 (64), 4.26 (45), 2.768 (40), 2.579 (38)

Chemistry:	(1)	(2)	(3)
SO_3	51.05	53.02	52.49
SiO_2	2.19		
Fe_2O_3	24.94	25.90	26.17
FeO	0.24		
CaO	0.12		
Na_2O	0.64		
K_2O	14.71	15.28	15.44
H_2O	5.59	5.80	5.90
insol.	0.92		
Total	100.40	[100.00]	100.00

(1) Borate, California, USA; with estimated 1%–2% impurities including coquimbite, metavoltine, clay. (2) Analysis (1) recalculated to 100% after deduction of impurities; corresponds to $\text{K}_{0.98}\text{Fe}_{0.98}(\text{SO}_4)_{2.00} \cdot 0.98\text{H}_2\text{O}$. (3) $\text{KFe}(\text{SO}_4)_2 \cdot \text{H}_2\text{O}$.

Occurrence: An uncommon secondary mineral in sulfate-bearing cherts (Borate, California, USA); formed on a dump by post-mine oxidation of pyrite (Velardeña mine, Mexico).

Association: Alunite, coquimbite, römerite, voltaite, metavoltine (Borate, California, USA); copiapite, voltaite, halotrichite (Velardeña mine, Mexico).

Distribution: In the USA, in the Sulfur Hole prospect, near Borate, about 10 km northeast of Yermo, Calico Hills, San Bernardino Co., California, and in the Coral Reefs district, Wayne Co., Utah, USA. At the Santa Maria mine, Velardeña, Durango, Mexico. In the Santa Bárbara sulfur mine, El Palmar district, Jujuy Province, Argentina. From Campi Flegrei, near Naples, Campania, Italy.

Name: To honor Dr. Edward Henry Kraus (1875–1973), American mineralogist, Professor of Mineralogy and Crystallography, University of Michigan, Ann Arbor, Michigan, USA.

Type Material: National Museum of Natural History, Washington, D.C., USA, 96094, R7652.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 462–463. (2) Effenberger, H., F. Pertlik, and J. Zemmann (1986) Refinement of the crystal structure of krausite: a mineral with an interpolyhedral oxygen-oxygen contact shorter than the hydrogen bond. *Amer. Mineral.*, 71, 202–205. (3) Graeber, E.J. and A. Rosenzweig (1965) The unit cell of krausite. *Amer. Mineral.*, 50, 504–507. (4) Foshag, W.F. (1931) Krausite, a new sulfate from California. *Amer. Mineral.*, 16, 352–360.

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