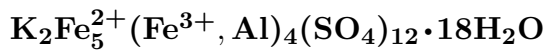


# Voltaite



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**Crystal Data:** Cubic. *Point Group:*  $4/m\bar{3}2/m$ . Crystals are commonly octahedral, modified by the cube, dodecahedron, and rarely other minor forms, to 2 cm; granular, massive, and in efflorescences.

**Physical Properties:** *Fracture:* Conchoidal. Hardness = 3 D(meas.) = 2.645 (synthetic). D(calc.) = 2.663 Soluble in  $\text{H}_2\text{O}$ , yielding an acid solution and citron-yellow residue.

**Optical Properties:** Opaque, translucent in thin splinters. *Color:* Greenish black, black, dark oil-green; pale green to oil-green in transmitted light. *Streak:* Grayish green. *Luster:* Resinous. *Optical Class:* Isotropic, but typically sectoried with anomalously biaxial parts.  $n = 1.593\text{--}1.608$

**Cell Data:** *Space Group:*  $Fd\bar{3}c$ .  $a = 27.254(8)$   $Z = 16$

**X-ray Powder Pattern:** Konomai mine, Hokkaido, Japan.  
3.54 (10), 3.41 (9), 5.57 (7), 3.04 (5), 9.66 (3), 6.79 (3), 3.15 (3)

Chemistry:	(1)	(2)		(1)	(2)
SO <sub>3</sub>	46.78	46.68	ZnO	1.69	
Al <sub>2</sub> O <sub>3</sub>	1.58		MgO	0.48	
Fe <sub>2</sub> O <sub>3</sub>	13.47	15.52	Na <sub>2</sub> O	0.50	
FeO	14.07	17.46	K <sub>2</sub> O	4.73	4.58
NiO	0.08		H <sub>2</sub> O	15.70	15.76
CuO	0.55		Total	99.63	100.00

(1) Smolník, Czech Republic; corresponding to  $(\text{K}_{2.06}\text{Na}_{0.33})_{\Sigma=2.39}(\text{Fe}_{4.02}^{2+}\text{Zn}_{0.43}\text{Mg}_{0.24}\text{Cu}_{0.14}\text{Ni}_{0.02})_{\Sigma=4.85}(\text{Fe}_{3.46}^{3+}\text{Al}_{0.64})_{\Sigma=4.10}(\text{SO}_4)_{11.98} \cdot 17.87\text{H}_2\text{O}$ . (2)  $\text{K}_2\text{Fe}_5^{2+}\text{Fe}_4^{3+}(\text{SO}_4)_{12} \cdot 18\text{H}_2\text{O}$ .

**Occurrence:** In volcanic fumaroles, solfataras, and mud volcanos; an alteration product in mineral deposits high in pyrite, especially in arid climates, where it may also be a post-mining product.

**Association:** Halotrichite, pickeringite, alunogen, metavoltine, römerite, hexahydrate, coquimbite, copiapite, rhomboclase, krausite, jarosite, goldichite, botryogen, melanterite.

**Distribution:** From the Solfatara di Pozzuoli, Campi Flegrei, near Naples, and on Vesuvius, Campania, Italy. Large crystals in the Rio Tinto mine, Huelva Province, Spain. In Slovakia, at Smolník (Szomolnok), 16 km northeast of Rožňava, Baňská Štiavnica (Schemnitz), and Kremnica (Kremnitz), Czech Republic. At the Rammelsberg mine, near Goslar, Harz Mountains, Germany. In the Rozdol deposit, Ukraine. From volcanoes on the Kamchatka Peninsula, Russia. At Saghand, Yazd district, Iran. In Chile, at Chuquicamata, Quetena, west of Calama, and Alcaparrosa, near Cerritos Bayos, southwest of Calama, Antofagasta. In Argentina, at the Jujuy and Capillitas mines, Catamarca Province, and in the Santa Bárbara sulfur mine, El Palmar district, Jujuy Province. In the USA, large crystals from Bisbee, Cochise Co., at Jerome, Yavapai Co., and in the Magma mine, Superior, Gila Co.; in California, in the Redington mercury mine, Knoxville, Napa Co.; at the Geysers, Sonoma Co.; and from the Sulfur Hole prospect, about 10 km northeast of Yermo, Calico Hills, San Bernardino Co.; at the Dexter No. 7 mine, Calf Mesa, San Rafael district, Emery Co., Utah. There are many other minor localities.

**Name:** To honor Alessandro Giuseppe Antonio Anastasio Volta (1745–1827), Italian physicist, early experimenter with electricity.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 464–465. (2) Mereiter, K. (1972) Die Kristallstruktur des Voltaits,  $\text{K}_2\text{Fe}_5^{2+}\text{Fe}_4^{3+}\text{Al}[\text{SO}_4]_{12} \cdot 18\text{H}_2\text{O}$ . *Tschermaks Mineral. Petrog. Mitt.*, 18, 185–202 (in German with English abs.). (3) Sakurai, K., A. Kato, I. Fujiyama, and T. Imayoshi (1958) Voltaite from Konomai mine, Hokkaido. *J. Min. Soc. Japan*, 3, 777–781.

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