

Zippeite

$K(UO_2)_2(SO_4)(OH)_3 \cdot H_2O$

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Crystal Data: Monoclinic, pseudo-orthorhombic. *Point Group:* $2/m$. Rare crystals are rhomboidal or elongated along [001], to 0.5 mm; in radial or vermicular aggregates, earthy efflorescences, powdery coatings, and crusts. *Twinning:* Probable, observed in synthetic material.

Physical Properties: Hardness = ~ 2 D(meas.) = 4.8 D(calc.) = 4.696 Radioactive; commonly fluoresces yellow-green to green under SW and LW UV.

Optical Properties: Semitransparent. *Color:* Deep yellow, yellow-orange, red, brownish yellow, brownish orange. *Luster:* Vitreous. *Optical Class:* Biaxial (-) (synthetic). *Pleochroism:* X = nearly colorless; Y = pale yellow to yellow-orange; Z = deep yellow to yellow-orange. $\alpha = 1.625(1)$ $\beta = 1.710(2)$ $\gamma = 1.740(2)$ $2V(\text{meas.}) = \text{Large}$ $2V(\text{calc.}) = 59^\circ$

Cell Data: *Space Group:* $C2/c$. $a = 8.656(2)$ $b = 14.240(4)$ $c = 17.706(5)$
 $\beta = 104.112(4)^\circ$ $Z = 8$

X-ray Powder Pattern: Jáchymov, Czech Republic.
7.06 (10), 3.50 (9), 3.12 (8), 2.87 (4), 2.65 (4), 2.22 (4), 5.45 (3)

Chemistry:	(1)	(2)	(3)
SO ₃	10.02		10.76
UO ₃	71.98		76.86
Fe ₂ O ₃	1.17		
CaO	1.88		
Na ₂ O		0.62	
K ₂ O	n.d.	8.06	6.33
H ₂ O	13.95		6.05
Total	99.00		100.00

(1) Jáchymov, Czech Republic; probably an analysis of several undifferentiated “zippeite” species. (2) Do.; partial analysis. (3) $K(UO_2)_2(SO_4)(OH)_3 \cdot H_2O$, determined from the structure of the synthetic compound.

Occurrence: An uncommon secondary mineral, in part post-mine, in oxidized uranium deposits containing sulfides.

Association: Uranopilite, sodium-zippeite, nickel-zippeite, magnesium-zippeite, johannite, uranophane, schrockingerite, gypsum.

Distribution: From Jáchymov (Joachimsthal), Czech Republic. At Nowa Ruda, Lower Silesia, Poland. In England, from Cornwall, at the Gunnislake mine, Calstock; the South Terras mine, St. Stephen-in-Brannel; the Carharrack mine, St. Day; Wheal Buller, Redruth; Wheal Edward and Wheal Owles, St. Just. From the USA, in Colorado, at the Diamond Joe and Remington mines, Idaho Springs district, Clear Creek Co., and in the Telegraph, Wood, and Kirk mines, Gilpin Co.; at the Apex mine, Reese River district, Lander Co., Nevada; in Arizona, from the Hillside mine, about 5.5 km north of Bagdad, Eureka district, Yavapai Co., in the Monument No. 1 and Mitten No. 2 mines, Navajo Co., and at the Huskon No. 7 and No. 8 claims, and the Sun Valley mine, in the Cameron area, Coconino Co. Other localities are probable but require modern confirmation.

Name: To honor Dr. František Xaver Maximillian Zippe (1791–1863), Austrian mineralogist and geologist.

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