

**Kroupaite****KPb<sub>0.5</sub>[(UO<sub>2</sub>)<sub>8</sub>O<sub>4</sub>(OH)<sub>10</sub>]·10H<sub>2</sub>O**

**Crystal Data:** Orthorhombic. *Point Group:* 2/m 2/m 2/m. As radial aggregates of thick platy crystals, to 1 mm, flattened on {100}, with prominent {100}, {013}, and {021}.

**Physical Properties:** *Cleavage:* Perfect on {100}. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = ~2 D(meas.) = n.d. D(calc.) = 5.058 Readily soluble in dilute HCl, without effervescence.

**Optical Properties:** Translucent. *Color:* Orange-yellow. *Streak:* Light yellow. *Luster:* Vitreous. *Optical Class:* Biaxial (-).  $\alpha = 1.691(2)$   $\beta = 1.752(2)$   $\gamma = 1.768(2)$   $2V(\text{meas.}) = 53(1)^\circ$   $2V(\text{calc.}) = 52.7^\circ$  *Dispersion:* Strong,  $r > v$ . *Pleochroism:* X = colorless, Y = yellow, Z = yellow. *Absorption:* X < Y ≈ Z. *Orientation:* X = a, Y = c, Z = b.

**Cell Data:** Space Group: *Pbca*.  $a = 14.781(7)$   $b = 14.095(6)$   $c = 16.719(7)$   $Z = 4$

**X-ray Powder Pattern:** Svornost mine, Jáchymov, Czech Republic.

7.407 (100), 3.224 (78), 3.602 (59), 2.0348 (21), 2.572 (16), 1.9777 (11), 1.7984 (10)

Chemistry:	(1)	(2)	(3)
Na <sub>2</sub> O	0.08	0.08	
K <sub>2</sub> O	2.14	2.25	1.73
CaO	0.10	0.10	
PbO	1.84	1.93	4.11
CuO	0.41	0.43	
CoO	0.05	0.05	
Al <sub>2</sub> O <sub>3</sub>	0.02	0.02	
Bi <sub>2</sub> O <sub>3</sub>	0.25	0.26	
UO <sub>3</sub>	80.67	84.64	84.21
SO <sub>3</sub>	0.11	0.12	
H <sub>2</sub> O	[9.65]	10.12	9.95
Total	95.23	100.00	100.00

(1) Svornost mine, Jáchymov, Czech Republic; average of 6 electron microprobe analyses supplemented by Raman spectroscopy, H<sub>2</sub>O calculated from structure, low analytical total ascribed to an uneven surface and the porosity of the polished section; corresponds to

(K<sub>1.28</sub>Na<sub>0.07</sub>)<sub>Σ=1.35</sub>(Pb<sub>0.23</sub>Cu<sub>0.14</sub>Ca<sub>0.05</sub>Bi<sub>0.03</sub>Co<sub>0.02</sub>Al<sub>0.01</sub>)<sub>Σ=0.48</sub>[(UO<sub>2</sub>)<sub>7.90</sub>(SO<sub>4</sub>)<sub>0.04</sub>O<sub>4.04</sub>(OH)<sub>10.00</sub>]·10H<sub>2</sub>O.

(2) Do., Normalized. (3) KPb<sub>0.5</sub>[(UO<sub>2</sub>)<sub>8</sub>O<sub>4</sub>(OH)<sub>10</sub>]·10H<sub>2</sub>O.

**Occurrence:** Of supergene origin by oxidation-hydration alteration of uraninite.

**Association:** Fourmarierite, Na-rich metaschoepite, uranopilite, liebigite, ewingite, gypsum.

**Distribution:** From the Jan Evangelista vein, Daniel level, Svornost mine, Jáchymov, Western Bohemia, Czech Republic.

**Name:** Honors mining engineer Gustav Kroupa (1857-1935), who as head of the mining district, approved shipment of 10 tons of leachate from processing pitchblende ore to Marie Curie Skłodowska and Pierre Curie in 1898. They isolated three grams of the new substance radium chloride from this material and subsequently the new element radium.

**Type Material:** National Museum, Prague, Czech Republic (PIP 16/2017) and the Natural History Museum of Los Angeles County, Los Angeles, California, USA (66572).

**References:** (1) Plášil, J., A.R. Kampf, T.A. Olds, J. Sejkora, R. Škoda, P.C. Burns, and J. Čejka (2020) The new K, Pb-bearing uranyl-oxide mineral kroupaite: Crystal-chemical implications for the structures of uranyl-oxide hydroxy-hydrates. *Amer. Mineral.*, 105(4), 561-568.