

Horákite**(Bi₇O₇OH)[(UO₂)₄(PO₄)₂(AsO₄)₂(OH)₂]·3.5H₂O**

Crystal Data: Monoclinic. *Point Group:* 2/m. As prismatic to bladed crystals elongated along [001] in divergent clusters to 1 mm.

Physical Properties: *Cleavage:* Perfect on {100}. *Fracture:* n.d. *Tenacity:* n.d. *Hardness* = ~2 D(meas.) = n.d. D(calc.) = 6.538

Optical Properties: Transparent to translucent. *Color:* Greenish yellow to pale yellow.

Streak: Light yellow. *Luster:* Vitreous.

Optical Class: Biaxial (+). $\alpha \approx 1.81$ $\beta \approx 1.84$ $\gamma \approx 1.88$ $2V(\text{meas.}) = 78(1)^\circ$ $2V(\text{calc.}) = 83^\circ$

Orientation: $X = b, Z \approx c$.

Cell Data: Space Group: C2/c. $a = 21.374(2)$ $b = 15.451(3)$ $c = 12.168(2)$ $\beta = 122.26(1)^\circ$ $Z = 4$

X-ray Powder Pattern: Jáchymov (St. Joachimsthal), Czech Republic.

11.77 (100), 3.02 (98), 3.54 (61), 3.14 (58), 4.19 (27), 6.21 (23), 5.55 (23)

Chemistry:	(1)	(2)
PbO	0.99	
Bi ₂ O ₃	50.22	50.38
UO ₃	35.58	35.35
SiO ₂	0.85	
P ₂ O ₅	4.47	4.39
As ₂ O ₅	5.21	7.10
H ₂ O	[2.77]	2.78
Total	100.09	100.00

(1) Jáchymov (St. Joachimsthal), Czech Republic; average of 21 electron microprobe analyses supplemented by Raman spectroscopy, H₂O calculated from structure analysis; corresponds to (Bi_{7.01}Pb_{0.14})O₇OH[(U_{1.01}O₂)₄(P_{1.03}O₄)₂(As_{0.74}Si_{0.23}O₄)₂(OH)₂]·3.5H₂O.

(2) (Bi₇O₇OH)[(UO₂)₄(PO₄)₂(AsO₄)₂(OH)₂]·3.5H₂O.

Occurrence: An oxidation zone, secondary mineral in vugs in quartz veinlets with relics of tennantite and uraninite.

Association: Phosphuranylite, metatorbernite-metazeunerite.

Distribution: On an old specimen from Jáchymov (St. Joachimsthal), Czech Republic (most likely from the Geister vein at the Rovnost mine).

Name: Honors mining engineer František Horák (1882-1919), a chief of the radium factory in St. Joachimsthal (Jáchymov) from 1916 to 1918, and his grandson, Vladimír Horák (b. 1964), an amateur mineralogist and authority on the mining history of the Jáchymov ore district.

Type Material: Mineralogical collection, National Museum, Prague, Czech Republic (PIP 17/2017) and the Natural History Museum of Los Angeles County, Los Angeles, California, USA (66575).

References: (1) Plášil, J., A.R. Kampf, J. Sejkora, J. Čejka, R. Škoda, and J. Tvrđý (2018) Horákite, a new hydrated bismuth uranyl-arsenate-phosphate mineral from Jáchymov (Czech Republic) with a unique uranyl-anion topology. *Journal of Geosciences*, 63, 265-276. (2) (2020) *Amer. Mineral.*, 105(8), 1279 (abs. ref. 1).