Gauthierite $KPb[(UO_2)_7O_5(OH)_7]\cdot 8H_2O$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. Crystals display {100}, {101}, {20$\bar{1}$}, {310}, {210}, {120}, and {010}. As striated, prismatic, bladed crystals with pyramidal terminations to 1 mm, elongated along [001].

Physical Properties: *Cleavage*: Perfect on {010}. *Tenacity*: Brittle. *Fracture*: Uneven. Hardness = 3-4 D(meas.) = n.d. D(calc.) = 5.437

Optical Properties: Transparent. *Color*: Yellowish orange. *Streak*: Light orange. *Luster*: Vitreous.
Optical Class: Biaxial (–). α = 1.780(5) β = 1.815(5) γ = 1.825(5) 2V(meas.) = 58(1)° 2V(calc.) = 55.4° *Orientation*: $X = b$, $Y \approx a^*$, $Z \approx c$ (or $X = b$, $Y \wedge a = 14°$ in obtuse β). *Dispersion*: Extreme, $r >> v$. *Pleochroism*: X = very pale yellow, $Y = Z$ = orange-yellow. *Absorption*: $X << Y \approx Z$.

Cell Data: *Space Group*: $P2_1/c$. a = 29.844(2) b = 14.5368(8) c = 14.0406(7) β = 103.708(6)° Z = 8

X-ray Powder Pattern: Shinkolobwe Mine, Democratic Republic of Congo, Africa.
3.192 (100), 3.566 (67), 7.28 (49), 2.001 (23), 2.541 (18), 1.783 (17), 2.043 (14)

Chemistry:	(1)	(2)
K_2O	1.29	1.90
PbO	7.17	9.00
UO_3	82.10	80.74
H_2O	[8.78]	8.35
Total	99.34	100.00

(1) Shinkolobwe Mine, Democratic Republic of Congo, Africa; average of 9 electron microprobe analyses supplemented by FTIR and Raman spectroscopy, H_2O from structure analysis; corresponds to $K_{0.67}Pb_{0.78}U_7O_{34}H_{23.77}$. (2) $KPb[(UO_2)_7O_5(OH)_7]\cdot 8H_2O$.

Occurrence: A product of the oxidation-hydration weathering of uraninite and presumably formed by the combination of radiogenic lead and uranium from altered uraninite with potassium leached from gangue minerals.

Association: Uraninite, quartz, soddyite, a metazeunerite-metatorbernite series mineral.

Distribution: Found at the Shinkolobwe Mine, Democratic Republic of Congo, Africa.

Name: Honors Gilbert Joseph Gauthier (1924-2006), a Belgian geologist, mineralogist and connoisseur of Katanga minerals. He found the mineral and provided it for study.

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA (65644).

References: (1) Olds, T.A., J. Plášil, A.R. Kampf, R. Škoda, P.C. Burns, J. Čejka, V. Bourgoin, and J.-C. Boulliard (2017) Gauthierite, $KPb[(UO_2)_7O_5(OH)_7]\cdot 8H_2O$, a new uranyl-oxide hydroxy-hydrate mineral from Shinkolobwe with a novel uranyl-anion sheet-topology. Eur. J. Mineral., 29, 129-141. (2) (2018) Amer. Mineral., 103, 2526 (abs. ref. 1).