Uranosphaerite $Bi(UO_2)O_2(OH)$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. In concentric, radiated to spherulitic aggregates, to 0.5 mm, of crystals elongated along [001].

Physical Properties: *Cleavage*: {100}. Hardness = 2-3 D(meas.) = 6.36; 6.89 D(calc.) = 7.731 Radioactive.

Optical Properties: Semitransparent. *Color*: Yellow-orange, golden to reddish orange, brick-red. *Streak*: Yellow. *Luster*: Greasy.
Optical Class: Biaxial (+). *Orientation*: $X = a$; $Y = b$; $Z = c$. *Dispersion*: $r < v$, strong.
α = 1.955-1.959 β = 1.981-1.985 γ = 2.05-2.060 2V(meas.) = Large. 2V(calc.) = 56°

Cell Data: *Space Group*: $P2_1/n$. a = 7.559(2) b = 7.811(2) c = 7.693(2) β = 92.88(3)° Z = 4

X-ray Powder Pattern: Schneeberg, Germany.
3.16 (10), 1.83 (8), 3.87 (7), 5.25 (6), 3.47 (6), 1.90 (5), 4.37 (4)

Chemistry:

	(1)	(2)	(3)
UO_3	50.88	52.62	52.38
Bi_2O_3	44.34	43.46	42.67
H_2O	4.75	3.59	4.95
Total	99.97	99.67	100.00

(1-2) Schneeberg, Germany. (3) $Bi_2U_2O_9 \cdot 3H_2O$.

Occurrence: An oxidation product of uraninite in a Co-Ni-Bi-bearing hydrothermal vein (Schneeberg, Germany).

Association: Walpurgite, uranospinite, uranospathite, asselbornite, trögerite, zeunerite, erythrite, cobaltian wad (Schneeberg, Germany); uraninite, wölsendorfite, renardite (Kersegalec, France).

Distribution: From the Walpurgis vein, Weisser Hirsch mine, Neustädtl, near Schneeberg, Saxony and from the Clara mine, Black Forest, Germany. At Kersegalec, near Lignol, Morbihan, France.

Name: For URANium in the composition, and the Greek for *sphere*, for the typical habit.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 631. (2) Frondel, C. (1958) Systematic mineralogy of uranium and thorium. U.S. Geol. Sur. Bull. 1064, 98-99. (3) Protas, J. (1959) Contribution à l'étude des oxydes d'uranium hydratés. Bull. Soc. fr. Minéral., 82, 239-272, esp. 265-268. (4) Hughes, K.-A., P.C. Burns, and U. Kolitsch (2003) The crystal structure and crystal chemistry of uranosphaerite, $Bi(UO_2)O_2OH$. Can. Mineral., 41, 677-685. (5) (2004) Amer. Mineral., 89(1), 252 (abs. ref. 4). (6) Colmenero, F., J. Plášil, and I. Němec (2020) Uranosphaerite: Crystal structure, hydrogen bonding, mechanics, infrared and Raman spectroscopy and thermodynamics. J. Physics and Chem. Solids, 141, 109400.