Orthowalpurgite $Bi_4(UO_2)O_4(AsO_4)_2 \cdot 2H_2O$

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Crystals are tabular on {010}, usually elongated along [100], with {010}, {001}, {104}, {100}, to 0.3 mm; in parallel or fan-shaped aggregates.

Physical Properties: *Cleavage:* Indistinct on {001}. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 4.5 VHN = 330 (25 g load). D(meas.) = n.d. D(calc.) = 6.51 Radioactive.

Optical Properties: Transparent. *Color:* Yellow. *Streak:* Pale yellow. *Luster:* Adamantine. *Optical Class:* Biaxial (–). *Orientation:* $X = c$; $Y = a$; $Z = b$. $\alpha = 1.91(2)$ $\beta = 2.00(2)$ $\gamma = [2.05]$ 2V(meas.) = 70(3)°

Cell Data: *Space Group: Pbcm.* $a = 5.492(1)$ $b = 13.324(2)$ $c = 20.685(3)$ Z = 4

X-ray Powder Pattern: Schmiedestollen, Germany.
3.208 (100), 10.354 (94), 3.088 (76), 3.277 (56), 2.999 (50), 2.852 (46), 5.610 (40)

Chemistry:

	(1)	(2)
UO_3	17.86	19.28
As_2O_5	16.11	15.49
Bi_2O_3	64.21	62.80
H_2O	[2.43]	2.43
Total	[100.61]	100.00

(1) Schmiedestollen, Germany; by electron microprobe, average of eight analyses, H_2O from theory; corresponds to $Bi_{4.06}(UO_2)_{0.92}O_{3.89}(AsO_4)_{2.07} \cdot 1.99H_2O$. (2) $Bi_4(UO_2)O_4(AsO_4)_2 \cdot 2H_2O$.

Polymorphism & Series: Dimorphous with walpurgite.

Occurrence: A very rare mineral, probably formed by weathering of an earlier bismuth-bearing sulfide.

Association: Preisingerite, anatase, quartz.

Distribution: On the dump of the Schmiedestollen, near Wittichen, Black Forest, Germany.

Name: As an *ortho*rhombic dimorph of *walpurgite*.

Type Material: Institute for Mineralogy, Ruhr University, Bochum, Germany.

References: (1) Krause, W., H. Effenberger, and F. Brandstätter (1995) Orthowalpurgite, $(UO_2)Bi_4O_4(AsO_4)_2 \cdot 2H_2O$, a new mineral from the Black Forest, Germany. Eur. J. Mineral., 7, 1313–1324. (2) (1996) Amer. Mineral., 81, 1014 (abs. ref. 1).