Orthowalpurgite  

\[ \text{Bi}_4(\text{UO}_2)\text{O}_4(\text{AsO}_4)_2 \cdot 2\text{H}_2\text{O} \]

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Crystal Data:  
Orthorhombic.  
Point Group: 2/m 2/m 2/m.  
Crystals are tabular on {010}, usually elongated along [100], with {010}, {001}, {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:  
\[ X = c; \ Y = a; \ Z = b. \]  
\[ \alpha = 1.91(2) \quad \beta = 2.00(2) \gamma = 2.05 \]  
\[ 2V(\text{meas.}) = 70(3)° \]

Cell Data:  
Space Group: Pbcn.  
\[ a = 5.492(1) \quad b = 13.324(2) \quad c = 20.685(3) \quad Z = 4 \]

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:  
\begin{align*}  
\text{UO}_3 & \quad 17.86 & \quad 19.28 \\
\text{As}_2\text{O}_5 & \quad 16.11 & \quad 15.49 \\
\text{Bi}_2\text{O}_3 & \quad 64.21 & \quad 62.80 \\
\text{H}_2\text{O} & \quad [2.43] & \quad 2.43 \\
\hline
\text{Total} & \quad [100.61] & \quad 100.00
\end{align*}

(1) Schmiedestollen, Germany; by electron microprobe, average of eight analyses, H$_2$O from theory; corresponds to Bi$_{4.06}$(UO$_2$)$_{0.92}$O$_{3.85}$(AsO$_4$)$_{2.67}$$\cdot$1.99H$_2$O.  
(2) Bi$_4$(UO$_2$)$_4$(AsO$_4$)$_2$$\cdot$2H$_2$O.

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 orthorhombic 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$_4$O$_4$(AsO$_4$)$_2$$\cdot$2H$_2$O, a new mineral from the Black Forest, Germany.  