Trögerite  

$\text{(UO}_2\text{)}_3\text{(AsO}_4\text{)}_2\cdot12\text{H}_2\text{O(?)}}$

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Crystal Data: Tetragonal or monoclinic.  \(\text{Point Group}: 4/m 2/m 2/m \) or \(2/m\).  As thin crystals, tabular on \{001\}, to 1 mm.

Physical Properties: Cleavage: On \{001\}, perfect; on \{100\}, good; on \{011\}, probable.  Hardness = 2–3  \(D(\text{meas.}) = 3.3\)  \(D(\text{calc.}) = [5.13]\)  Reversible \(\text{H}_2\text{O content. May fluoresce lemon-yellow under UV. Radioactive.}\)

Optical Properties: Transparent.  Color: Lemon-yellow.  Luster: Vitreous, pearly on \{001\} cleavage.  Optical Class: Uniaxial (−) or biaxial (−), probably anomalous, zoned due to differences in \(\text{H}_2\text{O}\) content.  Dispersion: \(r>v\), moderate.  \(\omega = 1.624–1.627\)  \(\epsilon = 1.580–1.582\)  \(\alpha = 1.584–1.600\)  \(\beta = 1.620–1.630\)  \(\gamma = 1.623–1.630\)  \(2V(\text{meas.}) = 0°–40°\)

Cell Data: \(\text{Space Group}: \) n.d.  \(a = 6.99\)  \(c = 8.48\)  \(Z = 8\), or \(\text{Space Group}: \) n.d.  \(a = 7.15\)  \(b = 6.98\)  \(c = 11.2\)  \(\beta = \sim 95°\)  \(Z = 1\)

X-ray Powder Pattern: Synthetic.  
8.59 (10), 3.79 (9), 3.30 (8), 5.50 (7), 4.35 (7), 2.70 (7), 2.19 (7)

Chemistry:  
(1) (2) (3)
\[
\begin{array}{llll}
\text{UO}_3 & 63.76 & 65.17 & 65.80 \\
\text{P}_2\text{O}_5 & 1.20 & & \\
\text{As}_2\text{O}_5 & 19.64 & 22.08 & 17.62 \\
\text{Bi}_2\text{O}_3 & 8.79 & & \\
\text{PbO} & 1.56 & & \\
\text{MgO} & 0.25 & & \\
\text{CaO} & 0.65 & & \\
\text{H}_2\text{O} & 14.81 & 16.58 & \\
\hline
\text{Total} & 98.21 & 99.70 & 100.00
\end{array}
\]

(1) Weisser Hirsch mine, Germany.  (2) Do.; by electron microprobe, after drying at 210 °C; corresponds to \((\text{UO}_2\text{)}_{2.72}\text{Bi}_{0.18}\text{Ca}_{0.11}\text{Pb}_{0.07}\text{Mg}_{0.06}[(\text{AsO}_4\text{)}_{1.84}(\text{PO}_4\text{)}_{0.16}]\Sigma=2.00\cdot\)

(3) \((\text{UO}_2\text{)}_{3}\text{(AsO}_4\text{)}_2\cdot12\text{H}_2\text{O}\).

Mineral Group: Autunite group.

Occurrence: A rare mineral formed in the oxidation zone of some uranium deposits.

Association: Walpurgite, uranospinite, uranosphathite, asselbornite, zeunerite, uranospaherite, erythrite, cobaltian wad (Weisser Hirsch mine, Germany); realgar, orpiment, scorodite, mansfieldite, sodium uranospinite, arseniosiderite, metatorbernite, metazeunerite, uranophane, arsenopyrite, pyrite, galena (Bota-Burum deposit, Kazakhstan).

Distribution: From the Walpurgis vein, in the Weisser Hirsch mine, and at the Daniel mine, Neustädter-Schneeberg, Saxony, Germany. From Marbrue, near Dalbeattie, Kirkcudbrightshire, Scotland. In the Rabéjac, Rivière, and Mas-d’Alary uranium deposits, near Lodève, Hérault, France. At the Bota-Burum uranium deposit, 15 km southwest of Alakol Lake, Chu-Ili Mountains, southwestern Balkhash district, Kazakhstan. From the Bald Mountain district, Lawrence Co., South Dakota, USA.

Name: To honor Mining Foreman R. Tröger, Schneeberg, Germany, who found the first specimens.

Type Material: Mining Academy, Freiberg, Germany, 21800; Harvard University, Cambridge, Massachusetts, USA, 106035.

References:  

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