

## Uranospathite



**Crystal Data:** Orthorhombic. *Point Group:*  $mm2$ . Rectangular platy crystals, to 1 mm, flattened on {001}, showing {100}, {010}, in fanlike groups. *Twining:* May be twinned on {110}, forming cruciform groupings.

**Physical Properties:** *Cleavage:* On {001}, perfect; on {100} and {010}, good. Hardness = 2-2.5  $D(\text{meas.}) = 2.50$   $D(\text{calc.}) = 2.54$  Radioactive. Yellowish green fluorescence under UV. Readily dehydrates to sabugalite.

**Optical Properties:** Translucent. *Color:* Yellow to pale green.

*Optical Class:* Biaxial (-), anomalous.  $\alpha = [\sim 1.49]$   $\beta = 1.510$   $\gamma = 1.521$   $2V(\text{meas.}) = 69^\circ$   
*Pleochroism:*  $X = \text{pale yellow}$ ;  $Y = Z = \text{deep yellow}$ . *Orientation:*  $X = c$ ;  $Y = a$ ;  $Z = b$ .

**Cell Data:** *Space Group:*  $Pnn2$ .  $a = 30.020(4)$   $b = 7.0084(9)$   $c = 7.0492(9)$   $Z = 2$

**X-ray Powder Pattern:** Basset mines, Cornwall, England.

15.22 (10), 7.60 (10), 4.93 (10), 3.50 (8), 4.48 (6b), 2.21 (6), 4.08 (4)

**Chemistry:** (1) Basset mines, Cornwall, England; Al confirmed by electron microprobe, P and U confirmed by microchemical and spectrochemical techniques, formula established by analogy to the torbernite group and crystal structure analysis. Presence of F confirmed by wavelength-dispersion spectrometry.

**Mineral Group:** Autunite group.

**Occurrence:** A rare secondary mineral in the oxidized zone of uranium-bearing hydrothermal mineral deposits.

**Association:** Bassetite.

**Distribution:** From the Basset group of mines, Illogan, Cornwall, England. In France, at the La Crouzille and Sagnes mines, Haute-Vienne. From the Pedro Alvaro vanadium mine, Salamanca Province, and at El Padregal, Badajoz Province, Spain. In the Weisser Hirsch mine, Neustädtel-Schneeberg, Saxony, and at Menzenschwand, Black Forest, Germany. On Radium Hill, Olary, South Australia.

**Name:** For its content of uranium and the Greek for a "broad blade", an allusion to the bladed character of its crystals.

**Type Material:** [Museum of Practical Geology, Ludlam collection, L1941] now in The Natural History Museum, London, England.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 990. (2) Walenta, K. (1978) Uranospathite and arsenuranospathite. *Mineral. Mag.*, 42, 117-128. (3) Locock, A.J., W.S. Kinman, and P.C. Burns (2005) The structure and composition of uranospathite,  $\text{Al}_{1-x}\text{x}[(\text{UO}_2)(\text{PO}_4)]_2(\text{H}_2\text{O})_{20+3x}\text{F}_{1-3x}$ ,  $x = 0-0.33$ , a non-centrosymmetric fluorine-bearing mineral of the autunite group, and of a related synthetic lower hydrate,  $\text{Al}_{0.67}\text{0.33}[(\text{UO}_2)(\text{PO}_4)]_2(\text{H}_2\text{O})_{15.5}$ . *Can. Mineral.*, 43, 989-1003. (4) (2006) *Amer. Mineral.*, 91(1), 224 (abs. ref. 3).