Bassetite $Fe^{2+}(UO_2)_2(PO_4)_2 \cdot 8H_2O$

Crystal Data: Monoclinic, pseudotetragonal. *Point Group:* $2/m$. Crystals, with square or rectangular outline, to 3 mm, are thin tablets, flattened on [010], showing {111}, {101}, {110}, {001}, {010}; typically in parallel or fanlike groups. *Twinning:* Two or more individuals at ∼90° with [001] of one individual ∥ [100] of the other; common.

Physical Properties: *Cleavage:* {010}, perfect; {100} and {001}, distinct. Hardness = 2.5 D(meas.) = 3.40–3.63 D(calc.) = 3.63 Radioactive.

Optical Properties: Transparent; in transmitted light, seen as sectored due to twinning. *Color:* Olive-green, olive-brown, yellowish brown, bronzy yellow, yellow. *Luster:* Vitreous, bronzy on {010}.
Optical Class: Biaxial (–) (probable). *Pleochroism:* $X = Y$ = yellow; Z = dark olive-brown to brownish black. *Orientation:* $X = b$; Y ∧ c = 18.5°. *Dispersion:* $r > v$, strong. $\alpha = 1.603(2)$ $\beta = 1.610(2)$ $\gamma = 1.617(2)$ 2V(meas.) = ∼90°

Cell Data: *Space Group:* $P2_1/m$ (synthetic). $a = 6.98(4)$ $b = 17.07(4)$ $c = 7.01(7)$ $\beta = 90°32(5)'$ Z = 2

X-ray Powder Pattern: Cornwall, England.
4.89 (10), 3.46 (10), 8.59 (6), 2.20 (6), 4.24 (3), 4.05 (3), 2.96 (3)

Chemistry:	(1)	(2)	(3)		(1)	(2)	(3)
UO_3	61.99	62.71	61.51	H_2O	14.49	14.20	15.50
P_2O_5	15.21	15.43	15.26	insol.	0.63		
FeO	7.60	7.78	7.73	Total	100.20	100.12	100.00
CuO	0.28						

(1) Wheal Basset, Cornwall, England. (2) Arcu su Linnarbu, Italy. (3) $Fe(UO_2)_2(PO_4)_2 \cdot 8H_2O$.

Mineral Group: Meta-autunite group.

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

Association: Uranospathite, torbernite, uraninite, pyrite (Basset mines, England); meta-autunite, torbernite (Arcu su Linnarbu, Italy); saléeite, metanováčekite (Sue mine, Arizona, USA).

Distribution: In England, from the Basset group of mines, Illogan, and the South Terras mine, St. Stephen-in-Brannel, Cornwall. At Arcu su Linnarbu, Capoterra, near Cagliari, Sardinia, Italy. From Daverdisse, Belgium. At the Los Ratones and Pedro Alvaro vanadium mines, Salamanca Province, Spain. From the La Crouzille mine, Haute-Vienne, France. In the USA, on Overland Mountain, Jamestown district, Boulder Co., Colorado; in Utah, from the Denise No. 1 mine and in the Fuemrol mine, Temple Mountain, Emery Co., Utah; in Arizona, at the Sue and Red Bluff mines, Sierra Ancha Mountains, and widespread in the Dripping Springs quartzite in the northwestern part of Gila Co.; from the Merry Widow mine, Grant Co., New Mexico.

Name: For the Basset mine group, Cornwall, England, from which it was first described.

Type Material: Mineralogical Museum, Cambridge, 1297; [Museum of Practical Geology, Ludlam collection L1936, L1941, L1946] now in The Natural History Museum, London, England; National School of Mines, Paris, France; Harvard University, Cambridge, Massachusetts, USA.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 994–995. (2) Frondel, C. (1958) Systematic mineralogy of uranium and thorium. U.S. Geol. Sur. Bull. 1064, 200–204. (3) Vochten, R., E. De Grave, and J. Pelsmaekers (1984) Mineralogical study of bassetite in relation to its oxidation. Amer. Mineral., 69, 967–978. (4) Vochten, R. and G. Brizzi (1987) Bassetite and other uranium minerals from Arcu su Linnarbu, Capoterra, Cagliari, Sardinia. Mineral. Record, 18, 181–184.