

Yingjiangite

 $\text{K}_2\text{Ca}(\text{UO}_2)_7(\text{PO}_4)_4(\text{OH})_6 \cdot 6\text{H}_2\text{O}$

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Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$ or $mm2$. Granular massive, to 0.015 mm.

Physical Properties: Hardness = 3–4 $D(\text{meas.}) = 4.15; 4.54$ $D(\text{calc.}) = 4.17; 4.60$
Radioactive; weak yellowish green fluorescence under UV.

Optical Properties: Transparent to translucent. *Color:* Golden yellow to yellow.

Luster: Subadamantine to resinous.

Optical Class: Biaxial (-). *Pleochroism:* $X =$ almost colorless; $Y =$ pale yellow; $Z =$ yellow. *Orientation:* Length-slow. $\alpha = 1.666\text{--}1.669$ $\beta = 1.692\text{--}1.703$ $\gamma = 1.707\text{--}1.710$
 $2V(\text{meas.}) = 36^\circ\text{--}38^\circ$ $2V(\text{calc.}) = 36^\circ$

Cell Data: *Space Group:* $[C222_1]$ (by analogy to phosphuranylite). $a = 13.73(1)$
 $b = 15.99(1)$ $c = 17.33(2)$ $Z = 8$, or *Space Group:* $Bmmb$. $a = 15.707(3)$ $b = 17.424(3)$
 $c = 13.692(2)$ $Z = 4$

X-ray Powder Pattern: Tongbiguan village, China.

8.03 (100), 3.99 (90), 3.17 (70), 3.10 (70), 2.886 (60), 5.90 (40), 3.88 (40)

Chemistry:	(1)	(2)	(3)	(1)	(2)	(3)
UO_3	76.54	75.42	77.05	MnO	0.03	
P_2O_5	11.10	10.50	10.92	MgO	0.10	
ThO_2	0.51			CaO	1.57	2.16
SiO_2		1.20		Na_2O	0.15	
TiO_2		0.09		K_2O	2.46	3.63
Ce_2O_3	0.34			H_2O^+	6.19	
Y_2O_3	0.11			H_2O^-	0.25	
Fe_2O_3		0.31		H_2O	7.37	6.24
				Total	100.00	99.61
						100.00

(1) Tongbiguan village, China; by electron microprobe, average of four analyses, H_2O may be by difference; then corresponds to $(\text{K}_{1.26}\text{RE}_{0.06}\text{Th}_{0.04})_{\Sigma=1.36}\text{Ca}_{0.68}(\text{UO}_2)_{6.42}(\text{PO}_4)_{3.76}(\text{OH})_4 \cdot 8\text{H}_2\text{O}$.

(2) Xiazhuang uranium deposit, China; corresponds to $(\text{K}_{1.90}\text{Na}_{0.12})_{\Sigma=2.02}\text{Ca}_{0.95}(\text{UO}_2)_{7.02}(\text{PO}_4)_{3.93}(\text{OH})_{6.16} \cdot 6.07\text{H}_2\text{O}$. (3) $\text{K}_2\text{Ca}(\text{UO}_2)_7(\text{PO}_4)_4(\text{OH})_6 \cdot 6\text{H}_2\text{O}$.

Occurrence: A secondary mineral in an oxidized zone of a uranium deposit (Tongbiguan village, China).

Association: Studtite, calcurmolite, tengchongite, autunite (Tongbiguan village, China).

Distribution: From Tongbiguan village, Yingjiang Co., Yunnan Province, and in the Xiazhuang uranium deposit, Guangdong Province, China.

Name: For Yingjiang Co., China, within which it was first noted.

Type Material: National Geological Museum, Beijing, China.

References: (1) Zhangru Chen, Zuzhu Huang, and Xiaofa Gu (1990) A new uranium mineral – yingjiangite. *Acta Mineral. Sinica*, 10(2), 102–105 (in Chinese with English abstract). (2) (1991) *Amer. Mineral.*, 76, 1731–1732 (abs. ref. 1). (3) Jingyi Zhang, Anwa Wan, and Wenshu Gong (1992) New data on yingjiangite. *Acta Petrologica Mineralogica*, 11(2), 178–184 (in Chinese with English abs.). (4) (1994) *Amer. Mineral.*, 79, 1214 (abs. ref. 3).