Tyuyamunite $Ca(UO_2)_2(V_2O_8)\cdot 5–8H_2O$

Crystal Data: Orthorhombic. *Point Group:* n.d. Elongated, platy crystals, flattened on {001}, elongated along [010], with {010}, {110}, several other forms, may be curved or scaly, to 2 mm. As fanlike or radial aggregates; in thin films, coatings, and massive impregnations.

Physical Properties: *Cleavage:* On {001}, perfect, micaceous; on {100}, {010}, distinct. Hardness = ∼2 D(meas.) = 3.57–4.35 D(calc.) = [3.59] Radioactive; may exhibit weak yellow-green fluorescence under UV.

Optical Properties: Translucent to opaque. *Color:* Canary-yellow, lemon-yellow, greenish yellow on exposure to sunlight; colorless to pale yellow in transmitted light. *Luster:* Adamantine, pearly on {001}, may be dull to waxy if massive.
Optical Class: Biaxial (–). *Pleochroism:* Faint; X = nearly colorless; Y = pale canary-yellow; Z = canary-yellow. *Orientation:* $X = c$; $Y = a$; $Z = b$. *Dispersion:* $r < v$ weak to strong.
$\alpha = 1.675$ $\beta = 1.860–1.870$ $\gamma = 1.885–1.895$ 2V(meas.) = 30°–45°

Cell Data: *Space Group:* n.d. $a = 10.63$ $b = 8.36$ $c = 20.40$ Z = n.d.

X-ray Powder Pattern: Hudspeth Co., Texas, USA.
10.18 (10), 5.02 (9), 3.20 (5), 2.04 (4), 6.62 (3), 3.37 (3), 3.12 (3)

Chemistry:

	(1)	(2)
UO_3	57.29	59.96
V_2O_5	18.49	19.06
CO_2	0.91	
PbO	0.14	
MgO	0.08	
CaO	6.75	5.88
H_2O	15.37	15.10
insol.	0.20	
Total	99.23	100.00

(1) Tyuya-Muyun Cave, Kyrgyzstan; the H_2O content varies zeolitically as a function of relative humidity, reversibly altering to metatyuyamunite. (2) $Ca(UO_2)_2(V_2O_8)\cdot 8H_2O$.

Occurrence: An uncommon mineral in the oxidized zone of U–V deposits, especially those of the Colorado Plateau-type.

Association: Metatyuyamunite, carnotite, corvusite, uranophane, volborthite, gypsum.

Distribution: From Tyuya-Muyun Cave, Fergana Valley, Alai Range, Kyrgyzstan. At West Wheal Owles, St. Just, Cornwall, England. In the USA, an ore mineral at the Jackpile mine, Laguna district, Cibola Co., and at a number of mines in the Grants district, New Mexico; in Colorado, from Paradox Valley, Montrose Co., Calamity Creek, Mesa Co., and elsewhere; at many mines in Utah, as Richardson and Thompsons, Grand Co. In Arizona, at the Monument No. 2 mine, Monument Valley, Apache Co., in the Ridenaur breccia pipe, Coconino Co., and many other places; from the Gold Quarry mine, near Carlin, Eureka Co., Nevada; at Warren and the Dandy mine, Pryor Mountains, Carbon Co., Montana. From Santa Eulalia, Chihuahua, Mexico. In the Malargüe district, Mendoza Province, and at the Urcal deposit, La Rioja Province, Argentina. In the Hatrurim Formation, Israel. A number of additional minor localities are known.

Name: For the Tyuya-Muyun Cave, Kyrgyzstan, its original locality.

Type Material: A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, 3575–3577.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 1045–1047. (2) Frondel, C. (1958) Systematic mineralogy of uranium and thorium. U.S. Geol. Sur. Bull. 1064, 248–253. (3) Pekov, I.V. (1998) Minerals first discovered on the territory of the former Soviet Union, 220–221.