

# Metatyuyamunite

# Ca(UO<sub>2</sub>)<sub>2</sub>(V<sub>2</sub>O<sub>8</sub>)•3H<sub>2</sub>O

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**Crystal Data:** Orthorhombic. *Point Group:* 2/m 2/m 2/m. As bladed crystals, elongated along [010], to 3 mm; typically pulverulent, massive; always pseudomorphous after tyuyamunite.

**Physical Properties:** *Cleavage:* Perfect on {001}; indistinct on {010} and {100}.  
Hardness = ~2 D(meas.) = 3.81–3.93 D(calc.) = 3.85 Radioactive.

**Optical Properties:** Transparent to translucent. *Color:* Canary-yellow to greenish yellow, darkening on exposure to air; colorless to pale yellow in transmitted light. *Luster:* Adamantine, waxy if massive.

*Optical Class:* Biaxial (–). *Pleochroism:* Weak; X = colorless; Y = very pale canary-yellow; Z = pale canary-yellow. *Orientation:* X = c; Y = a; Z = b. *Dispersion:*  $r < v$ , weak.  
 $\alpha = [1.62\text{--}1.68]$   $\beta = 1.835\text{--}1.842$   $\gamma = 1.865\text{--}1.899$  2V(meas.) = 44°–48°

**Cell Data:** *Space Group:* Pnam.  $a = 10.63$   $b = 8.36$   $c = 16.96$   $Z = 4$

**X-ray Powder Pattern:** Small Spot mine, Colorado, USA.  
8.51 (vs), 4.22 (s), 3.26 (mb), 3.05 (mb), 5.22 (w), 3.77 (w), 2.58 (w)

## Chemistry:

|                               | (1)    | (2)    |
|-------------------------------|--------|--------|
| UO <sub>3</sub>               | 66.80  | 66.21  |
| V <sub>2</sub> O <sub>5</sub> | 18.27  | 21.05  |
| V <sub>2</sub> O <sub>4</sub> | 2.25   |        |
| CaO                           | 6.22   | 6.49   |
| H <sub>2</sub> O              | 6.57   | 6.25   |
| Total                         | 100.11 | 100.00 |

(1) Small Spot mine, Colorado, USA. (2) Ca(UO<sub>2</sub>)<sub>2</sub>(V<sub>2</sub>O<sub>8</sub>)•3H<sub>2</sub>O.

**Occurrence:** A common dehydration product of tyuyamunite in Colorado Plateau-type U–V deposits.

**Association:** Tyuyamunite, carnotite, volborthite, vésigniéite, autunite, malachite, gypsum.

**Distribution:** Occurs at all localities for tyuyamunite (q.v.). First fully characterized from the Jo Dandy mine, Montrose Co., and the Small Spot and May Day mines, Calamity Mesa, Mesa Co., Colorado, USA.

**Name:** The prefix *meta* indicates the dehydration product of *tyuyamunite*.

**Type Material:** n.d.

**References:** (1) Weeks, A.D. and M.E. Thompson (1954) Identification and occurrence of uranium and vanadium minerals from the Colorado Plateaus. U.S. Geol. Surv. Bull. 1009-B, 37–38. (2) (1954) Amer. Mineral., 39, 1037 (abs. ref. 1). (3) Stern, T.W., L.R. Stieff, M.N. Girhard, and R. Meyrowitz (1956) The occurrence and properties of metatyuyamunite, Ca(UO<sub>2</sub>)<sub>2</sub>(VO<sub>4</sub>)<sub>2</sub>•3–5H<sub>2</sub>O. Amer. Mineral., 41, 187–201. (4) Frondel, C. (1958) Systematic mineralogy of uranium and thorium. U.S. Geol. Surv. Bull. 1064, 254–257.