

**Alwilkinsite-(Y)** **$Y(H_2O)_7[(UO_2)_3(SO_4)_2O(OH)_3] \cdot 7H_2O$** 

**Crystal Data:** Orthorhombic. *Point Group:* 222. Acicular crystals display {102}, {124}, {301}, are elongated along [010], and possess domatic terminations, to 0.5 mm.

**Physical Properties:** *Cleavage:* Perfect || [010], probably on {102}. *Fracture:* Splintery. *Tenacity:* Slightly flexible; brittle. Hardness = 2-2.5 D(meas.) = n.d. D(calc.) = 3.371 Easily soluble in dilute HCl. Fluoresces greenish grey under a 405 nm laser.

**Optical Properties:** Transparent. *Color:* Yellowish green. *Streak:* Pale yellow-green. *Luster:* Vitreous.

*Optical Class:* Biaxial (+).  $\alpha = 1.573(1)$   $\beta = 1.581(1)$   $\gamma = 1.601(1)$   $2V(\text{meas.}) = 65.3(1)^\circ$   $2V(\text{calc.}) = 65.3^\circ$  *Orientation:*  $Y = a, X = c, Z = b$ . *Dispersion:* Weak,  $r > v$ .

**Cell Data:** *Space Group:*  $P2_12_12_1$ .  $a = 11.6194(5)$   $b = 12.4250(6)$   $c = 19.4495(14)$   $Z = 4$

**X-ray Powder Pattern:** Blue Lizard mine, Red Canyon, San Juan County, Utah, USA. 9.88 (100), 3.322 (46), 4.483 (18), 5.621 (17), 3.145 (16), 3.886 (14), 7.47 (13)

<b>Chemistry:</b>	(1)	(2)
CaO	0.01	
Y <sub>2</sub> O <sub>3</sub>	5.49	8.01
Ce <sub>2</sub> O <sub>3</sub>	0.15	
Nd <sub>2</sub> O <sub>3</sub>	0.38	
Sm <sub>2</sub> O <sub>3</sub>	0.29	
Gd <sub>2</sub> O <sub>3</sub>	0.76	
Dy <sub>2</sub> O <sub>3</sub>	1.11	
Er <sub>2</sub> O <sub>3</sub>	0.67	
Yb <sub>2</sub> O <sub>3</sub>	0.37	
SO <sub>3</sub>	11.97	11.35
UO <sub>3</sub>	63.25	60.84
H <sub>2</sub> O	[20.59]	19.80
Total	105.04	100.00

(1) Blue Lizard mine, Red Canyon, San Juan County, Utah, USA; average of 7 electron microprobe analyses supplemented by Raman spectroscopy, H<sub>2</sub>O calculated from by stoichiometry; corresponds to  $(Y_{0.66}Dy_{0.08}Gd_{0.06}Er_{0.05}Nd_{0.03}Yb_{0.03}Sm_{0.02}Ce_{0.01})_{\Sigma=0.94}(H_2O)_7[(UO_2)_3(S_{1.01}O_4)_2O(OH)_3] \cdot 7H_2O$ .  
 (2)  $Y(H_2O)_7[(UO_2)_3(SO_4)_2O(OH)_3] \cdot 7H_2O$ .

**Occurrence:** A secondary phase formed at ambient temperature by evaporative processes at moderately high relative humidity at the surface of a rock with high relative porosity and in an environment that was relatively oxidizing and generally acidic.

**Association:** Calcite, dickite, gypsum, johannite, natrozippeite, zinczippeite.

**Distribution:** From the Blue Lizard mine, Red Canyon, White Canyon district, San Juan County, Utah, USA.

**Name:** Honors Alan (Al) J. Wilkins, MD (b. 1955), of Coto de Caza, California, for discovering the mineral.

**Type Material:** Natural History Museum of Los Angeles County, Los Angeles, California, USA (65629).

**References:** (1) Kampf, A.R., J. Plášil, J. Čejka, J. Marty, R. Škoda, and L. Lapčák (2017) Alwilkinsite-(Y), a new rare-earth uranyl sulfate mineral from the Blue Lizard mine, San Juan County, Utah, USA. *Mineral. Mag.*, 81(4), 895-907. (2) (2017) *Amer. Mineral.*, 102, 2341 (abs. ref. 1).