Fulbrightite $Ca(VO)_2(AsO_4)_2 \cdot 4H_2O$

Crystal Data: Triclinic. *Point Group*: 1. As rosettes of roughly square (pseudotetragonal) plates to 0.5 mm, flattened on (001).

Physical Properties: Cleavage: Perfect on (001), excellent on (100) and (010), fair on ($\bar{1}$ 10) and (110). *Tenacity*: Brittle, slightly flexible. *Fracture*: Stepped, irregular, and curved. Hardness = ~2.5 D(meas.) = 3.12(2) D(calc.) = 3.272 Nonfluorescent.

Optical Properties: Transparent. *Color*: Shades of light green and brown. *Streak*: Colorless to pale green. *Luster*: Vitreous to pearly.
Optical Class: Biaxial (-). $\alpha = 1.675(3)$ $\beta = 1.718(3)$ $\gamma = 1.718(3)$ $2V \approx 5°$ *Orientation*: $X \approx c$. *Pleochroism*: X = colorless, Y and Z = pale green. *Absorption*: $X < Y = Z$.
Turbostratic nature visible under crossed polars if plates are viewed on edge (? [001]).

Cell Data: *Space Group*: $P\bar{1}$. $a = 6.434(8)$ $b = 6.480(8)$ $c = 6.718(8)$ $\alpha = 107.90(6)°$ $\beta = 94.06(4)°$ $\gamma = 90.06(3)°$ $Z = 1$

X-ray Powder Pattern: Packrat mine, near Gateway, Mesa Co., Colorado, USA.
3.221 (100), 6.51 (52), 2.277 (23), 1.450 (21), 1.619 (20), 3.085 (16), 2.893 (15)

Chemistry:

	(1)	(2)	(3)
CaO	10.19	10.52	10.71
BaO		0.25	
FeO		0.17	
VO_2	31.13	30.06	31.66
VO_2	[30.52]		
V_2O_5	[0.67]		
As_2O_5	41.57	42.03	43.87
P_2O_5		0.27	
H_2O	[13.32]	[13.45]	13.76
Total	96.27	96.75	100.00

(1) Packrat mine, Colorado, USA; average electron microprobe, and IR and Raman spectroscopic analyses, total V apportioned between VO_2 and V_2O_5, H_2O calculated from structure; corresponds to $Ca_{0.99}(V^{4+}_{1.00}O)_2[(As^{5+}_{0.98}V^{5+}_{0.02})O_4]_{24}(H_{2.005}O)$. (2) Rovnost mine, Jáchymov, Czech Republic; average electron microprobe, and IR and Raman spectroscopic analyses, H_2O calculated from structure; corresponds to $(Ca_{1.02}Fe_{0.01}Ba_{0.01})_{\Sigma=1.04}(V^{4+}O)_{1.96}[(As^{5+}_{0.99}P_{0.01})O_4]_{24.04}H_2O$.
(3) $Ca(VO)_2(AsO_4)_2 \cdot 4H_2O$.

Occurrence: A low-temperature secondary phase on montroseite- and corvusite-bearing sandstone.

Association: Pascoite, pharmacolite, gatewayite, morrisonite, packratite, vanarsite (Packrat); kottigite, zeunerite, babánekite, hloušekite, tyuyamunite/metatyuyamunite (Rovnost).

Distribution: From the Packrat mine, near Gateway, Mesa Co., Colorado, USA [TL]. On the 3rd Geister level, Rovnost I shaft, Rovnost mine, Jáchymov, Czech Republic.

Name: Honors Jess W. *Fulbright*, Jr., of Nucla, Colorado (b. 1958), Safety Director for Energy Fuels Inc., a company involved in the acquisition, exploration, development, and mining of uranium properties in the Uravan Mineral Belt of the western USA.

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA (64513, 65555, and 65559 Packrat; 74542 Rovnost).

References: (1) Kampf, A.R., M.A. Cooper, B.P. Nash, J. Marty, P.M. Adams, J. Plásil, and J. Sejkora (2020) Fulbrightite, the arsenate analog of sincosite. Can. Mineral., 58, 663-671.