Wernerbaurite $\{[Ca(H_2O)_7]_2(H_2O)_2(H_3O)_2\}\{V_{10}O_{28}\}$

Crystal Data: Triclinic. *Point Group*: $\bar{1}$. Crystals tabular on {100}, with stepped faces and square to octagonal outlines, to ~1 mm. Crystals show {100}, {010}, {001}, {$01\bar{1}$}, and {111} and are often aligned roughly ⊥ to the surface on which they grew, subparallel to one another.

Physical Properties: *Cleavage*: Good on {100} and {010}. *Fracture*: Irregular. *Tenacity*: Brittle. *Hardness* = ~ 2 D(meas.) = n.d. D(calc.) = 2.352 Dissolves instantly in cold, dilute HCl and slowly in water.

Optical Properties: Transparent. *Color*: Yellow-orange. *Streak*: Yellow. *Luster*: Subadamantine. *Optical Class*: Biaxial (−). α = 1.745(3) β = 1.780(3) γ = 1.795(3) 2V = 66(2)° *Orientation*: $X \wedge a = 29°$, $Y \wedge c = 44°$, $Z \wedge b = 46°$. *Pleochroism*: $X = Z$ = yellow, Y = orange. *Absorption*: $X = Z < Y$. *Dispersion*: Very strong, $r > v$. Exhibits anomalous red-orange and blue-green interference colors near extinction positions.

Cell Data: *Space Group*: $P\bar{1}$. a = 9.7212(6) b = 10.2598(8) c = 10.5928(8) α = 89.999(6)° β = 77.083(7)° γ = 69.887(8)° Z = 1

X-ray Powder Pattern: St. Jude mine, Slick Rock district, San Miguel County, Colorado, USA. 10.32 (100), 8.88 (95), 9.64 (92), 6.881 (70), 8.10 (58), 6.031 (39), 3.028 (29)

Chemistry:

	(1)	(2)
Na_2O	0.37	
K_2O	0.10	
CaO	8.76	8.22
SrO	0.16	
V_2O_5	75.76	66.68
H_2O	[14.85]	25.10
Total	100.00	100.00

(1) St. Jude mine, San Miguel County, Colorado, USA; average of 12 electron microprobe analyses, H_2O calculated from structure analysis; corresponding to $\{(Ca_{1.88}Na_{0.14}K_{0.03}Sr_{0.02})_{\Sigma=2.07}(H_2O)_{15.95}(H_3O)_{2.05}\}\{V_{10}O_{28}\}$. (2) $\{[Ca(H_2O)_7]_2(H_2O)_2(H_3O)_2\}\{V_{10}O_{28}\}$.

Occurrence: As efflorescences on sandstone in the underground workings of a roll-front type uranium vanadium deposit, from the oxidation of montroseite-corvusite assemblages in a moist environment, possibly controlled by the presence of organic matter and phases such as pyrite.

Association: Calciodelrioite, gypsum, huemulite, hughesite, metarossite, pascoite, rossite.

Distribution: From the St. Jude mine, Slick Rock district, San Miguel County, Colorado, USA.

Name: Honors Professor Werner H. Baur (b. 1931), Geological Sciences Department, University of Illinois, Chicago, for his distinguished career in mineralogical crystallography.

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA. (#64002, 64003, 64004).

References: (1) Kampf, A.R., J.M. Hughes, J. Marty, and B. Nash (2013) Wernerbaurite, $\{[Ca(H_2O)_7]_2(H_2O)_2(H_3O)_2\}\{V_{10}O_{28}\}$, and schindlerite, $\{[Na_2(H_2O)_{10}](H_3O)_4\}\{V_{10}O_{28}\}$, the first hydronium-bearing decavanadate minerals. Can. Mineral., 51(2), 297-312. (2) (2015) Amer. Mineral., 100, 1331-1332 (abs. ref. 1).