

Caseyite $[(V^{5+}O_2)Al_{7.5}(OH)_{15}(H_2O)_{13}]_2[H_2V^{4+}V^{5+}_9O_{28}][V^{5+}_{10}O_{28}]_2 \cdot 90H_2O$

Crystal Data: Monoclinic. *Point Group:* 2/m. As tapering needles or blades, elongated on [100], to 0.25 mm; in divergent sprays.

Physical Properties: *Cleavage:* None. *Fracture:* Curved. *Tenacity:* Brittle. Hardness = 2-3
D(meas.) = n.d. D(calc.) = 2.151
Dissolves in dilute HCl. Susceptible to dehydration at low relative humidity.

Optical Properties: Translucent. *Color:* Yellow. *Streak:* Pale yellow. *Luster:* Vitreous.
Optical Class: Biaxial (+). $\alpha = 1.659(3)$ $\beta = 1.670(3)$ $\gamma = 1.720(3)$ $2V(\text{calc.}) = 51.5^\circ$
Dispersion: Strong, $r < v$. *Orientation:* $Z \approx a$. *Pleochroism:* None.

Cell Data: Space Group: $P2_1/n$. $a = 14.123(8)$ $b = 30.998(15)$ $c = 21.949(11)$ $\beta = 97.961(8)^\circ$
 $Z = 2$

X-ray Powder Pattern: Calculated pattern.
15.499 (100), 17.798 (92), 8.899 (43), 12.62 (33), 12.749 (26), 10.869 (16), 9.016 (14)

Chemistry:	(1)	(2)
Na ₂ O	0.52	0.41
K ₂ O	0.27	0.21
CaO	0.41	0.32
Al ₂ O ₃	18.74	14.78
VO ₂	[1.71]	1.35
V ₂ O ₅	[58.00]	45.73
SO ₃	2.19	1.73
<u>H₂O</u>		<u>[35.47]</u>
Total		100.00

(1) Packrat mine, near Gateway, Mesa County, Colorado, USA; average of 7 electron microprobe analyses, H₂O calculated from structure, VO₂ and V₂O₅ allocated from total V as V₂O₅ = 59.87 and structure analysis; corresponds to $[(V^{5+}O_2)Al_{8.94}(OH)_{17.88}(H_2O)_{15.88}]_2[H_2V^{4+}V^{5+}_9O_{28}][V^{5+}_{10}O_{28}]_2[(Na_{0.82}Ca_{0.35}K_{0.27})_{\Sigma=1.44}(SO_4)_{1.33} \cdot 70.24H_2O](+0.94 H)$. (2) Do., Normalized.

Occurrence: A secondary mineral formed by oxidation in a moist, low-temperature, post-mining environment from montroseite-corvusite and/or asphaltum assemblages on sandstone in a Colorado Plateau type, roll-front uranium/vanadium deposit.

Association: Gypsum, barite (West Sunday mine), huemulite (Packrat mine), postite (Burro mine), montroseite, corvusite.

Distribution: From the, Packrat mine (near Gateway, Mesa County), Burro and West Sunday mines (Slick Rock district, San Miguel County), Uravan Mineral Belt, Colorado, USA.

Name: Honors the American geochemist William H. Casey (b. 1955), Distinguished Professor in the Departments of Chemistry and Earth & Planetary Sciences, University of California, Davis, USA, for his contributions in aqueous solution chemistry of natural waters, mineral surface chemistry, and reaction kinetics.

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA (73526, 73527, 73528, 73529, 73530, and 73531).

References: (1) Kampf, A.R., M.A. Cooper, J.M. Hughes, B.P. Nash, F.C. Hawthorne, and J. Marty (2020) Caseyite, a new mineral containing a variant of the flat-Al₁₃ polyoxometalate cation. *Amer. Mineral.*, 105(1), 123-131.