

**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)

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

(1) Packrat mine, near Gateway, Mesa County, Colorado, USA; average of 7 electron microprobe analyses, H<sub>2</sub>O calculated from structure, VO<sub>2</sub> and V<sub>2</sub>O<sub>5</sub> allocated from total V as V<sub>2</sub>O<sub>5</sub> = 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-Al<sub>13</sub> polyoxometalate cation. *Amer. Mineral.*, 105(1), 123-131.