## Steigerite $AlVO_4 \cdot 3H_2O$



**Crystal Data:** Monoclinic. *Point Group:* $2/m$ or 2. Cryptocrystalline fibrous, may be flat platy {010}, to $< 1$ $\mu$m; gumlike to compact massive, typically as coatings.

**Physical Properties:** *Cleavage:* Perfect on {010}; fair on {100} and {100}.
*Tenacity:* Pulverulent. Hardness = 2.5–3 D(meas.) = 2.52–2.58 D(calc.) = 2.58

**Optical Properties:** Semitransparent. *Color:* Canary-yellow, greenish yellow, olive-green.
*Luster:* Waxy in compact aggregates.
*Optical Class:* Biaxial (+). $\alpha$ = 1.720–1.730 $\beta$ = 1.730–1.734 $\gamma$ = 1.748–1.752
2V(meas.) = n.d.

**Cell Data:** *Space Group:* $P2_1/m$ or $P2_1$. $a = 11.840$ $b = 25.00$ $c = 11.040$
$\beta = 111°10'$ Z = 24

**X-ray Powder Pattern:** Kara-Tau Mountains, Kazakhstan.
2.93 (10), 12.52 (5), 2.18 (5), 1.897 (5), 1.758 (5), 3.09 (4), 2.21 (4)

**Chemistry:**

| | (1) | (2) | (3) |
|---|---|---|---|
| $SO_3$ | | 0.66 | |
| $P_2O_5$ | | 4.91 | |
| $V_2O_5$ | 44.44 | 39.00 | 46.41 |
| $SiO_2$ | | 0.28 | |
| $Al_2O_3$ | 25.14 | 26.00 | 26.01 |
| $Fe_2O_3$ | 1.50 | 0.90 | |
| $Cr_2O_3$ | | 0.95 | |
| CaO | | 1.20 | |
| $H_2O^+$ | 21.04 | 19.30 | |
| $H_2O^-$ | 8.08 | 6.90 | |
| $H_2O$ | | | 27.58 |
| Total | 100.20 | 100.10 | 100.00 |

(1) Gypsum Valley, Colorado, USA. (2) Kara-Tau Mountains, Kazakhstan. (3) $Al(VO_4) \cdot 3H_2O$.

**Occurrence:** In U–V deposits impregnating sandstone (Gypsum Valley, Colorado, USA); a weathering product in vanadium-rich schists (Kara-Tau Mountains, Kazakhstan).

**Association:** Fervanite, corvusite, gypsum (Gypsum Valley, Colorado, USA); navajoite, tyuyamunite, rauvite, hewettite (Monument No. 2 mine, Arizona, USA); vanalite, hewettite, delvauxite, satpaevite, gypsum, vashegyite, variscite, halloysite, alunite (Kara-Tau Mountains, Kazakhstan).

**Distribution:** In the USA, from the Sullivan Brothers and adjacent Ponto No. 3 claims, Gypsum Valley, San Miguel Co.; in the Fox mine, Atkinson Mesa, Uravan district, Montrose Co., Colorado; on the Cactus Rat claims, Thompsons district, Grand Co., Utah; at the Monument No. 2 mine, Monument Valley, Apache Co., Arizona. In several mines of the Kurumsak and Balasauskandyk districts, northwestern Kara-Tau Mountains, Kazakhstan.

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**Type Material:** National Museum of Natural History, Washington, D.C., USA, C5108.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 1049–1050. (2) Ankinovich, E.A., F.A. Kurmakaeva, and I.S. Zazubina (1987) Steigerite and vanalite from carbonaceous-siliceous vanadium-bearing formations of northwestern Kara-Tau (southern Kazakhstan). Zap. Vses. Mineral. Obshch., 116, 100–113 (in Russian with English abs.).