

Rakovanite

Crystal Data: Monoclinic. *Point Group:* 2/m. Multi-faceted crystals are blocky to prismatic along [100], with striations parallel to [100], to 1 mm.

Physical Properties: *Cleavage:* None. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 1 D(meas.) = n.d. D(calc.) = 2.407

Optical Properties: Transparent. *Color:* Orange. *Streak:* Orange-yellow. *Luster:* Subadamantine. *Optical Class:* Biaxial (+). $\alpha = 1.776(5)$ $\beta = 1.803(5)$ $\gamma = 1.910(6)$ $2V = 56(1)^\circ$ *Dispersion:* $r < v$; strong, parallel. *Orientation:* $X = b$; $Z \wedge c = 8^\circ$. *Pleochroism:* $X = \text{light yellow}$; $Y = \text{orange-yellow}$; $Z = \text{yellowish orange}$. *Absorption:* $Z > Y > X$.

Cell Data: *Space Group:* $P2_1/n$. $a = 12.0248(17)$ $b = 17.121(3)$ $c = 18.140(3)$ $\beta = 106.242(8)^\circ$ $Z = 4$

X-ray Powder Pattern: Sunday and West Sunday mines, Colorado, USA. 11.270 (100), 7.696 (81), 8.709 (78), 6.892 (63), 2.935 (42), 2.798 (31), 3.445 (24)

Chemistry:	(1)	(2)
Na ₂ O	8.02	7.15
K ₂ O	0.29	
MgO	0.01	
CaO	0.04	
V ₂ O ₅	81.2	69.97
Al ₂ O ₃	0.04	
<u>H₂O</u>		<u>22.87</u>
Total		100.00

(1) Sunday and West Sunday mines, Colorado, USA; average of 10 electron microprobe analyses of partially dehydrated material, H₂O confirmed by structure analysis, corresponding to $(\text{Na}_{2.90}\text{K}_{0.07}\text{Ca}_{0.01}\text{Al}_{0.01})_{\Sigma=2.99}\{\text{H}_{2.98}[\text{V}_{10}\text{O}_{28}]\} \cdot 15\text{H}_2\text{O}$. (2) $\text{Na}_3\{\text{H}_3[\text{V}_{10}\text{O}_{28}]\} \cdot 15\text{H}_2\text{O}$.

Mineral Group: Pascoite group.

Occurrence: A secondary mineral as crystalline crusts on sandstone fractures in mine walls in the oxidized zone of a montroseite-corvusite assemblage.

Association: Calcite, montroseite, corvusite, hughesite, hewettite, pascoite, munirite, paramontrosite, rosasite, sherwoodite.

Distribution: From the Sunday and West Sunday mines, Slick Rock district, San Miguel County, Colorado, USA.

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Type Material: Mineral Sciences Department, Natural History Museum of Los Angeles County, California, USA (63357, 63358).

References: (1) Kampf, A.R., J.M. Hughes, J. Marty, M.E. Gunter, and B. Nash (2011) Rakovanite, $\text{Na}_3\{\text{H}_3[\text{V}_{10}\text{O}_{28}]\} \cdot 15\text{H}_2\text{O}$, a new member of the pascoite family with a protonated decavanadate polyanion. *Can. Mineral.*, 49(2), 595-604. (2) (2013) *Amer. Mineral.*, 98, 281 (abs. ref. 1).