

Rowleyite

Crystal Data: Cubic. *Point Group:* $4/m\bar{3}2/m$. As truncated octahedra to ~ 50 μm exhibiting {100} and {111}.

Physical Properties: *Cleavage:* None. *Tenacity:* Brittle. *Fracture:* Irregular. Hardness = ~ 2
D(meas.) = 2.23(2) D(calc.) = 2.28 (for 32 H₂O pfu) Dissolves slowly in dilute HCl.

Optical Properties: Transparent on thin edges. *Color:* Dark brownish green (appearing black); red-brown with olive-green rims in transmitted light. *Streak:* Brownish green. *Luster:* Vitreous.
Optical Class: Isotropic. $n = 1.715(5)$

Cell Data: Space Group: $Fd\bar{3}m$. $a = 31.704(14)$ $Z = 16$

X-ray Powder Pattern: Rowley mine, Maricopa County, Arizona, USA.
2.811 (100), 11.3 (70), 3.216 (65), 7.97 (63), 2.1112 (34), 1.9319 (34), 9.6 (31)

Chemistry:	(1)	(2)	(3)
(NH ₄) ₂ O	9.47	9.37	8.38
Na ₂ O	4.53	4.48	4.01
K ₂ O	5.00	4.96	4.44
P ₂ O ₅	19.28	15.30	13.69
V ₂ O ₅	42.23	34.75	31.09
VO ₂		8.94	8.00
As ₂ O ₅	4.07	3.38	3.02
Cl	8.32	9.11	8.15
H ₂ O		11.77	21.06
<u>-O = Cl₂</u>		<u>2.06</u>	<u>1.84</u>
Total	92.90	100.00	100.00

(1) Rowley mine, Maricopa County, Arizona, USA.; average of 5 electron microprobe analyses, low analytical total ascribed to damage under electron beam. (2) Rowley mine, Maricopa County, Arizona, USA.; electron microprobe and structural analyses, 16 H₂O pfu in channels; corresponds to [(NH₄)_{8.81}Na_{3.54}K_{2.58}] _{$\Sigma=14.93$} Cl_{6.29}(H₂O)₁₆[(V⁵⁺_{9.36}V⁴⁺_{2.64}) _{$\Sigma=12$} (P_{5.28}As⁵⁺_{0.72}) _{$\Sigma=6$} O₄₈]. (3) Rowley mine, Maricopa County, Arizona, USA.; electron microprobe and structural analyses, 32 H₂O pfu in channels; corresponds to [(NH₄)_{8.81}Na_{3.54}K_{2.58}] _{$\Sigma=14.93$} Cl_{6.29}(H₂O)₃₂[(V⁵⁺_{9.36}V⁴⁺_{2.64}) _{$\Sigma=12$} (P_{5.28}As⁵⁺_{0.72}) _{$\Sigma=6$} O₄₈].

Occurrence: A low-temperature, post-mining secondary mineral in a hot humid tunnel encrusted nearby with bat guano.

Association: Antipinite, fluorite, mimetite, mottramite, quartz, salammoniac, struvite, vanadinite, willemite, wulfenite.

Distribution: From the Rowley mine, near Theba, Painted Rock district, Maricopa County, Arizona, USA.

Name: For the mine that produced the first specimens.

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA (66268-66272).

References: (1) Kampf, A.R., M.A. Cooper, B.P. Nash, T.E. Cerling, J. Marty, D.R. Hummer, A.J. Celestian, T.P. Rose, and T.J. Trebisky (2017) Rowleyite, [Na(NH₄,K)₉Cl₄][V₂^{5+,4+}(P,As)O₈]₆·n[H₂O,Na,NH₄,K,Cl], a new mineral with a microporous framework structure. *Amer. Mineral.*, 102, 1037-1044.