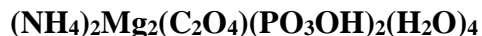


**Phoxite**

**Crystal Data:** Monoclinic. *Point Group:* 2/m. As blades to 0.4 mm, elongated and striated along [001], flattened on {100}, and exhibiting {100}, {120}, {110}, {011}, and  $\{11\bar{1}\}$ ; commonly in composite intergrowths.

**Physical Properties:** *Cleavage:* Fair on (100). *Fracture:* Irregular. *Tenacity:* Brittle. Hardness = 2.5 D(meas.) = 1.98(2) D(calc.) = 1.965

**Optical Properties:** Transparent. *Color:* Colorless (light brown to beige from inclusions). *Streak:* White. *Luster:* Vitreous to oily. *Optical Class:* Biaxial (-).  $\alpha = 1.499(1)$   $\beta = 1.541(1)$   $\gamma = 1.542(1)$   $2V(\text{meas.}) = 16(1)^\circ$   $2V(\text{calc.}) = 17.2^\circ$  *Dispersion:* Slight,  $r < v$ . *Orientation:*  $Y = b$ ,  $X \wedge a \approx 9^\circ$  in obtuse  $\beta$ . *Pleochroism:* None.

**Cell Data:** Space Group:  $P2_1/c$ .  $a = 7.2962(3)$   $b = 13.5993(4)$   $c = 7.8334(6)$   $\beta = 108.271(8)^\circ$   $Z = 2$

**X-ray Powder Pattern:** Calculated pattern.

6.17 (100), 5.57 (85), 2.914 (72), 2.275 (63), 3.799 (60), 3.377 (59), 2.425 (37)

<b>Chemistry:</b>	(1)	(2)	(3)
(NH <sub>4</sub> ) <sub>2</sub> O		[10.44]	11.92
K <sub>2</sub> O	2.74	2.45	
MgO	20.43	18.25	18.46
P <sub>2</sub> O <sub>5</sub>	35.98	32.15	32.50
C <sub>2</sub> O <sub>3</sub>		[16.31]	16.49
H <sub>2</sub> O		[20.40]	20.63
Total		100.00	100.00

(1) Rowley mine, Painted Rock district, Maricopa County, Arizona, USA; average of 7 electron microprobe analyses supplemented by Raman spectroscopy and CHN analysis, (NH<sub>4</sub>)<sub>2</sub>O, C<sub>2</sub>O<sub>3</sub>, and H<sub>2</sub>O calculated from structure; corresponds to [(NH<sub>4</sub>)<sub>1.77</sub>K<sub>0.23</sub>] $_{\Sigma=2.00}$ Mg<sub>2.00</sub>(C<sub>2</sub>O<sub>4</sub>)(PO<sub>3</sub>OH)<sub>2</sub>(H<sub>2</sub>O)<sub>4</sub>. (2) Do., Normalized. (3) (NH<sub>4</sub>)<sub>2</sub>Mg<sub>2</sub>(C<sub>2</sub>O<sub>4</sub>)(PO<sub>3</sub>OH)<sub>2</sub>(H<sub>2</sub>O)<sub>4</sub>.

**Occurrence:** In a hot and humid area of an abandoned Cu-Pb-Au-Ag-Mo-V-barite-fluorspar mine in an unusual bat-guano-related, post-mining assemblage in portions of the interiors and rims of circular masses, presumably related to relatively recent/fresh bat excrement.

**Association:** Antipinite, apthitalite, bassanite, struvite, thenardite, weddellite.

**Distribution:** From depth (125 feet) in the Rowley mine, near Theba, Painted Rock district, Maricopa County, Arizona, USA.

**Name:** Reflects the fact that the mineral contains essential phosphate (*ph*) and oxalate (*ox*) groups.

**Type Material:** Natural History Museum of Los Angeles County, Los Angeles, California, USA (66697, 66698, 66699, and 66700).

**References:** (1) Kampf, A.R., A. J. Celestian, B.P. Nash, and J. Marty (2019) Phoxite, (NH<sub>4</sub>)<sub>2</sub>Mg<sub>2</sub>(C<sub>2</sub>O<sub>4</sub>)(PO<sub>3</sub>OH)<sub>2</sub>(H<sub>2</sub>O)<sub>4</sub>, the first phosphate-oxalate mineral. *Amer. Mineral.*, 104(7), 973-979.