Biphosphammite $(NH_4, K)H_2PO_4$

Crystal Data: Tetragonal. *Point Group:* $\bar{4}2m$. As crystals, to 2 mm, tapering, prismatic, in radiating groups; stalactitic and in crusts; fine granular, powdery.

Physical Properties: Hardness = Very soft. D(meas.) = 2.04(2) D(calc.) = [2.02] for NH_4:K = 1:1.

Optical Properties: Semitransparent. *Color:* White, pale buff, to deep shades of brown; colorless in transmitted light. *Streak:* White to pale buff. *Luster:* Dull, earthy; crystals rarely vitreous.
Optical Class: Uniaxial (–). $\omega = 1.525$ $\epsilon = 1.480$

Cell Data: *Space Group:* $I\bar{4}2d$. $a = 7.4935(5)$ $c = 7.340(3)$ Z = [4]

X-ray Powder Pattern: Murra-el-elevyn Cave, Australia.
3.75 (10), 5.24 (9), 3.02 (9b), 1.993 (8), 2.650 (7), 2.368 (7), 1.593 (6)

Chemistry:

	(1)	(2)
SO_3	5.59	
P_2O_5	51.1	56.52
Na_2O	0.16	
K_2O	14.2	18.76
$(NH_4)_2O$	12.3	10.37
H_2O		14.35
insol.	0.81	
rem.	[16.14]	
Total	[100.3]	100.00

(1) Murra-el-elevyn Cave, Australia; partial analysis, remainder mostly CaO and H_2O; stated to correspond to $[(NH_4)_{0.62}K_{0.38}]_{\Sigma=1.00}H_2PO_4$ 88%, syngenite 11.5%, insolubles in H_2O, 0.81%.
(2) $(NH_4, K)H_2PO_4$ with NH_4:K = 1:1.

Occurrence: An alteration product of phosphammite in guano, due to loss of NH_4 (Guañape Island, Peru); a byproduct of the reaction between the liquid fraction of bat guano and urea (Murra-el-elevyn Cave, Australia).

Association: Phosphammite (Guañape Island, Peru); syngenite (Murra-el-elevyn Cave, Australia).

Distribution: On Guañape Island, south of Trujillo, Peru. In Murra-el-elevyn Cave, Cocklebiddy, and in Petrogale Cave, near Madura, Western Australia. From Gcwihaba Cave, 280 km west of Maun, northwestern Botswana.

Name: As a BIPHOSPHate of AMMonium.

Type Material: Western Australian Museum, Perth, MDC3977.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 807. (2) Pryce, M.W. (1972) Biphosphammite: a second occurrence. Mineral. Mag., 38, 965–967.