Phosphammite $(NH_4)_2HPO_4$

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Crystal Data: Monoclinic (synthetic). *Point Group:* 2/m. As crystals, to 0.5 mm; typically in crusts.

Physical Properties: Hardness = n.d. D(meas.) = 1.61 D(calc.) = 1.61

Optical Properties: Transparent. Color: Colorless. Optical Class: Biaxial (+). Orientation: Z = b; $X \wedge a = 43.5^{\circ}$. $\alpha = 1.508$ $\beta = 1.518$ $\gamma = 1.530$ $2V(\text{meas.}) = 80^{\circ} - 85^{\circ}$ $2V(\text{calc.}) = 85^{\circ}$

Cell Data: Space Group: $P2_1/a$ (synthetic). a=8.03 b=6.68 c=11.02 $\beta=113^{\circ}38'$ Z=4

X-ray Powder Pattern: Synthetic. (ICDD 29-111). 5.05 (100), 5.57 (75), 4.94 (65), 3.22 (65), 3.78 (50), 3.14 (45), 3.06 (45)

Chemistry: (1) Identification depends on the coincidence of the X-ray powder pattern and optical data with that of synthetic material.

Occurrence: Probably a crystallization product of the liquid fraction of guano.

Association: Ammonian aphthitalite, urea, weddellite (Toppin Hill Cave, Western Australia); biphosphammite (Guañape Island, Peru).

Distribution: On Guañape Island, south of Trujillo, Peru. In Toppin Hill Cave, about 320 km northeast of Kalgoorlie, Western Australia. At San Pedro, Martin Island, Mexico.

Name: As a PHOSPHate of AMMonium.

Type Material: Western Australian Museum, Perth, Australia, S4688.

References: (1) Dana, E.S. (1892) Dana's system of mineralogy, (6th edition), 807. (2) Bridge, P.J. (1973) Urea, a new mineral, and neotype phosphammite from Western Australia. Mineral. Mag., 39, 346–348. (3) Smith, J.P., L.R. Lehr, and W.E. Brown (1957) Crystallographic properties of diammonium phosphate, (NH₄)₂HPO₄. Acta Cryst., 10, 709.