Biphosphammite  
\((\text{NH}_4, \text{K})\text{H}_2\text{PO}_4\)

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

Physical Properties:  
Hardness = Very soft.  
\(\text{D(meas.)} = 2.04(2)\)  
\(\text{D(calc.)} = [2.02]\) for \(\text{NH}_4:\text{K} = 1:1\).

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:** \(\overline{4}2d\).  
\(a = 7.4935(5)\)  
\(c = 7.340(3)\)  
\(Z = [4]\)

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:

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{SO}_3)</td>
<td>5.59</td>
<td></td>
</tr>
<tr>
<td>(\text{P}_2\text{O}_5)</td>
<td>51.1</td>
<td>56.52</td>
</tr>
<tr>
<td>(\text{Na}_2\text{O})</td>
<td>0.16</td>
<td></td>
</tr>
<tr>
<td>(\text{K}_2\text{O})</td>
<td>14.2</td>
<td>18.76</td>
</tr>
<tr>
<td>((\text{NH}_4)_2\text{O})</td>
<td>12.3</td>
<td>10.37</td>
</tr>
<tr>
<td>(\text{H}_2\text{O})</td>
<td>14.35</td>
<td></td>
</tr>
<tr>
<td>insol.</td>
<td>0.81</td>
<td></td>
</tr>
<tr>
<td>rem.</td>
<td>[16.14]</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>[100.3]</td>
<td>100.00</td>
</tr>
</tbody>
</table>

(1) Murra-el-elevyn Cave, Australia; partial analysis, remainder mostly \(\text{CaO}\) and \(\text{H}_2\text{O}\); stated to correspond to \([\text{NH}_4]_{0.62}\text{K}_{0.38}\)\(\Sigma=1.00\)\(\text{H}_2\text{PO}_4\) 88%, syngenite 11.5%, insolubles in \(\text{H}_2\text{O}\), 0.81%.  
(2) \((\text{NH}_4, \text{K})\text{H}_2\text{PO}_4\) with \(\text{NH}_4:\text{K} = 1:1\).

Occurrence:  
An alteration product of phosphammite in guano, due to loss of \(\text{NH}_4\) (Guañeape Island, Peru); a byproduct of the reaction between the liquid fraction of bat guano and urea (Murra-el-elevyn Cave, Australia).

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

Distribution:  
On Guañeape 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.  