Kunatite  

**Crystal Data:** Monoclinic.  
**Point Group:** 2/m.  
As acicular to lath-like microcrystals forming compact to slightly open spheres, hemispheres, and flattened sprays to ~0.25 mm, with individual fibers to 30 μm.

**Physical Properties:**  
**Cleavage:** One [001], possible.  
**Tenacity:** Brittle.  
**Fracture:** Irregular.  
**Hardness:** 3 (by analogy in the group)  
**D(meas.) = n.d.**  
**D(calc.) = 3.063**

**Optical Properties:**  
**Cleavage:** One || [001], possible.  
**Tenacity:** Brittle.  
**Fracture:** Irregular.  
**Hardness:** 3 (by analogy in the group)  
**D(meas.) = n.d.**  
**D(calc.) = 3.063**

**Optical Class:** Biaxial (-).  
**α = 1.703(3) β = 1.742(4) γ = 1.762(3) 2V(ca1c.) = 70°**

**Orientation:** Z ≈ c.

**Chemistry:**

<table>
<thead>
<tr>
<th>Element</th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CuO</td>
<td>16.08</td>
<td>16.88</td>
</tr>
<tr>
<td>ZnO</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>CaO</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>Fe₂O₃</td>
<td>27.56</td>
<td>33.88</td>
</tr>
<tr>
<td>Al₂O₃</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td>P₂O₅</td>
<td>22.96</td>
<td>30.12</td>
</tr>
<tr>
<td>As₂O₅</td>
<td>5.14</td>
<td></td>
</tr>
<tr>
<td>H₂O</td>
<td>[16.61]</td>
<td>19.12</td>
</tr>
<tr>
<td>Total</td>
<td>88.99</td>
<td>100.00</td>
</tr>
</tbody>
</table>

(1) Near Lake Boga, northern Victoria, Australia; average electron microprobe analysis supplemented by Raman spectroscopy, H₂O calculated for charge balance.  
(2) CuFe₂(PO₄)₂(OH)₂·4H₂O.

**Mineral Group:** Whitmoreite group.

**Occurrence:** Secondary along fractures and in vugs deposited from circulating groundwaters charged with P, U and Cu that were derived from oxidation of primary fluorapatite in granite.

**Association:** Chalcosiderite-turquoise, libethenite, pseudomalachite (Lake Boga); isokite, triplite, chalcosiderite-turquoise, leucophosphite, pharmacosiderite, whitmoreite, earlishannonite, kolbeckite (Huber mine).

**Distribution:** From near Lake Boga, northern Victoria, Australia [TL]. At the Huber mine, near Krasno, Czech Republic.

**Name:** From the Australian aboriginal words kunat kunat, meaning 'cotton weed', a species that grows in the region around Lake Boga where studied samples were collected.

**Type Material:** Museum Victoria, Melbourne, Australia (M40728 and M43772).