Hotsonite \[ \text{Al}_5(\text{PO}_4)(\text{SO}_4)(\text{OH})_{10} \cdot 8\text{H}_2\text{O} \]

**Crystal Data:** Triclinic.  
*Point Group:* \(\overline{1}\) or \(1\).  
Crystals are lathlike or acicular, to 15 \(\mu\)m; as cryptocrystalline chalklike incrustations and veins.

**Physical Properties:**  
*Fracture:* Earthy.  
*Hardness:* = 2.5 in aggregates.  
*D(meas.)* = 2.060–2.068  
*D(calc.)* = 2.06

**Optical Properties:**  
*Translucent.*  
*Color:* White; colorless in transmitted light.  
*Luster:* Silky to dull, earthy.

**Optical Class:** Biaxial.  
*Orientation:* Length-fast.  
\[\alpha = 1.519 \quad \beta = \text{n.d.} \quad \gamma = 1.521\]

**Cell Data:**  
*Space Group:* \(P\overline{1}\) or \(P1\).  
\[a = 11.288(59) \quad b = 11.658(60) \quad c = 10.550(67)\]

\[\alpha = 112^\circ 32'(3) \quad \beta = 107^\circ 31'(3) \quad \gamma = 64^\circ 27'(3) \quad Z = 1\]

**X-ray Powder Pattern:** Koenabib, South Africa.  
10.05 (100), 8.45 (40), 4.63 (20), 5.20 (10), 5.01 (10), 4.43 (10), 3.67 (10)

**Chemistry:**

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
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<th>(3)</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
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<tbody>
<tr>
<td>SO(_3)</td>
<td>16.80</td>
<td>13.73</td>
<td>12.51</td>
<td>CaO</td>
<td>0.24</td>
<td>0.89</td>
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<tr>
<td>P(_2)O(_5)</td>
<td>9.85</td>
<td>9.06</td>
<td>11.09</td>
<td>Na(_2)O</td>
<td>0.21</td>
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<tr>
<td>SiO(_2)</td>
<td>0.35</td>
<td>0.16</td>
<td></td>
<td>K(_2)O</td>
<td>0.0</td>
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<tr>
<td>TiO(_2)</td>
<td>0.01</td>
<td></td>
<td></td>
<td>H(_2)O(^+)</td>
<td>31.29</td>
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<tr>
<td>Al(_2)O(_3)</td>
<td>39.15</td>
<td>39.60</td>
<td>39.82</td>
<td>H(_2)O(^-)</td>
<td>4.28</td>
<td>36.58</td>
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<tr>
<td>Fe(_2)O(_3)</td>
<td>0.03</td>
<td>0.18</td>
<td></td>
<td>H(_2)O</td>
<td>33.30</td>
<td>0.33</td>
</tr>
<tr>
<td>MgO</td>
<td>0.28</td>
<td>0.41</td>
<td></td>
<td>insol.</td>
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</tbody>
</table>

Total 100.21 99.94 100.00

(1) Koenabib, South Africa; by X-ray fluorescence, average of four analyses, H\(_2\)O by a modified Penfield method, P\(_2\)O\(_5\) and SO\(_3\) by wet chemical methods.  
(2) Blyavinski mine, Russia.  
(3) \(\text{Al}_5(\text{PO}_4)(\text{SO}_4)(\text{OH})_{10} \cdot 8\text{H}_2\text{O}\).

**Occurrence:** A weathering product derived from natroalunite and zaherite in an arid climate (Koenabib, South Africa).

**Association:** Zaherite, natroalunite, sillimanite (Koenabib, South Africa).

**Distribution:** Found in the Hotson 6 quarry, Koenabib, 65 km west of Pofadder, Cape Province, South Africa. From the Blyavinski mine, Ural Mountains, Russia.

**Name:** For Hotson 42, the farm in South Africa on which the first specimens were collected.

**Type Material:** National Museum, Bloemfontein, South Africa, K2359; National Museum of Natural History, Washington, D.C., USA, 162230.

**References:**  