**Allantoin**

\[
\text{C}_4\text{H}_6\text{N}_4\text{O}_3
\]

**Crystal Data:** Monoclinic. *Point Group:* 2/m. As elongate blades striated along [010], flattened on {001}, to 0.3 mm, that exhibit {100}, {001}, {102}, {110}, and {012}.

**Physical Properties:** *Cleavage:* Good on {100}. *Tenacity:* Brittle. *Fracture:* Conchoidal. *Hardness:* 1.5. *D(meas.):* 1.72(2) *D(calc.):* 1.715 Slowly soluble in H₂O.

**Optical Properties:** Transparent. *Color:* Colorless. *Streak:* White. *Luster:* Vitreous. *Optical Class:* Biaxial (+). \( \alpha = 1.558(2) \) \( \beta = 1.593(2) \) \( \gamma = 1.715(3) \) 2V(meas.) = 60(1)° 2V(calc.) = 59.8° *Dispersion:* Slight, \( r > v \). *Orientation:* \( Y = b, Z ^ a = 30 \)° in obtuse \( \beta \).

**Cell Data:** *Space Group:* P2₁/c. \( a = 8.0304(9) \) \( b = 5.1596(5) \) \( c = 14.8011(18) \) \( \beta = 93.017(7) \)° \( Z = 4 \)

**X-Ray Diffraction Pattern:** Rowley mine, Maricopa Co., Arizona, USA. 4.197 (100), 3.010 (51), 2.809 (42), 3.604 (40), 4.864 (37), 3.190 (33), 5.567 (31)

**Chemistry:**

<table>
<thead>
<tr>
<th>Element</th>
<th>Formula</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>35.43</td>
<td></td>
</tr>
<tr>
<td>C</td>
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<td></td>
</tr>
<tr>
<td>O</td>
<td>30.36</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>3.82</td>
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</tr>
</tbody>
</table>

Total 100.00 (1) \( \text{C}_4\text{H}_6\text{N}_4\text{O}_3 \).

**Occurrence:** On rock surfaces as the result of evaporation under the conditions prevailing underground (Rowley mine). In a bat-guano deposit related to an active colony of bats (Kahf Kharrat Najem Cave).

**Association:** Natrosulfatourea, aphthitalite, urea (Rowley mine); urea, aphthitalite, alunite, biposphammit-archerite (Kahf Kharrat Najem Cave).

**Distribution:** From the 125-foot level of the Rowley mine, Maricopa Co., Arizona, USA and in Kahf Kharrat Najem Cave, United Arab Emirates.

**Name:** Allantoin is the common name for the organic chemical compound \( \text{C}_4\text{H}_6\text{N}_4\text{O}_3 \) whose equivalence to the natural material is established by Raman spectroscopy, XRD, and structure analysis, despite no quantitative chemical analysis of natural material.

**Type Material:** Natural History Museum of Los Angeles County, Los Angeles, California, USA (74491).