

**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 H<sub>2</sub>O.

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

**Cell Data:** *Space Group:* P2<sub>1</sub>/c.  $a = 8.0304(9)$   $b = 5.1596(5)$   $c = 14.8011(18)$   $\beta = 93.017(7)^\circ$   $Z = 4$

**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:	(1)
N	35.43
C	30.39
O	30.36
<u>H</u>	<u>3.82</u>
Total	100.00

(1) C<sub>4</sub>H<sub>6</sub>N<sub>4</sub>O<sub>3</sub>.

**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, biphosphammite-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 C<sub>4</sub>H<sub>6</sub>N<sub>4</sub>O<sub>3</sub> 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).

**References:** (1) Kampf, A.R., A.J. Celestian, B.P. Nash, and J. Marty (2021) Allantoin and natrosulfatourea, two new bat-guano minerals from the Rowley mine, Maricopa County, Arizona, USA. Can. Mineral., 59(3), 603-616.