Wheatleyite  \( \text{Na}_2\text{Cu(C}_2\text{O}_4\text{)}_2\cdot2\text{H}_2\text{O} \)

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Crystal Data:  Triclinic.  \( \text{Point Group: } \text{T} \).  Thin acicular crystals, to 2 mm, in aggregates. Twinning:  Observed on an undetermined law.

Physical Properties:  Cleavage:  Perfect on \{100\}; two additionally observed optically.  Tenacity:  Very brittle.  Hardness = 1–2  \( D(\text{meas.}) = 2.27(4) \quad D(\text{calc.}) = 2.250 \)  Soluble in \( \text{H}_2\text{O} \).

Optical Properties:  Semitransparent.  Color:  Bright blue.  Streak:  Pale blue.  Luster:  Vitreous.  Optical Class:  Biaxial (+).  Pleochroism:  X = colorless;  Y = very pale blue;  Z = intense dark blue.  Dispersion:  \( r < v \), moderate.  Absorption:  \( Z > Y > X \).  \( \alpha = 1.400(4) \quad \beta = 1.499(2) \quad \gamma = 1.667(2) \quad 2V(\text{meas.}) = 83(5)^\circ \)

Cell Data:  \( \text{Space Group: } \text{P}1 \).  \( a = 7.559(3) \quad b = 9.665(4) \quad c = 3.589(1) \quad \alpha = 76.65(2)^\circ \quad \beta = 103.67(2)^\circ \quad \gamma = 109.10(2)^\circ \quad Z = 1 \)

X-ray Powder Pattern:  Wheatley mine, Pennsylvania, USA.
6.539 (10), 3.169 (9), 7.04 (100), 3.655 (5), 2.799 (4), 2.538 (3), 2.497 (3)

Chemistry:

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
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</thead>
<tbody>
<tr>
<td>( \text{C}_2\text{O}_3 )</td>
<td>44.79</td>
<td></td>
</tr>
<tr>
<td>( \text{CuO} )</td>
<td>27.00</td>
<td>24.73</td>
</tr>
<tr>
<td>( \text{Na}_2\text{O} )</td>
<td>20.00</td>
<td>19.27</td>
</tr>
<tr>
<td>( \text{H}_2\text{O} )</td>
<td>11.21</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100.00</td>
<td></td>
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</tbody>
</table>

(1) Wheatley mine, Pennsylvania, USA: partial analysis by electron microprobe, presence of C, H, and O confirmed by ion microprobe, \( \text{(C}_2\text{O}_4\text{)}^2^- \) confirmed by qualitative testing.
(2) \( \text{Na}_2\text{Cu(C}_2\text{O}_4\text{)}_2\cdot2\text{H}_2\text{O} \).

Occurrence:  Very rare, on a specimen found on the mine dumps of a Pb–Zn vein deposit.

Association:  Sphalerite, galena, cerussite, quartz.

Distribution:  From the Wheatley mine, near Phoenixville, Chester Co., Pennsylvania, USA.

Name:  For the type locality, the Wheatley mine, Pennsylvania, USA.
