Utahite  \[\text{Cu}_5\text{Zn}_3(\text{TeO}_4)_4(\text{OH})_8\cdot7\text{H}_2\text{O}\]

Crystal Data:  Triclinic.  Point Group:  \(\overline{1}\) or 1.  Prismatic to thin tabular to bladed crystals, elongated along [001], showing \{010\} and \{001\}, in parallel to subparallel aggregates, to 0.6 mm, also as sheaves and bow tielike groups.

Physical Properties:  Fracture: Uneven.  Tenacity: Brittle.  Hardness = \(\sim 4-5\)

\(D(\text{meas.}) = \text{n.d.}\)  \(D(\text{calc.}) = 5.33\)


Luster: Vitreous to pearly.

Optical Class:  [Biaxial,]  \(n = [1.83-1.90]\)  \(\alpha = \text{n.d.}\)  \(\beta = \text{n.d.}\)  \(\gamma = \text{n.d.}\)  \(2V(\text{meas.}) = \text{n.d.}\)

Cell Data:  Space Group:  \(P\overline{1}\) or \(P1\).  \(a = 8.794(4)\)  \(b = 9.996(2)\)  \(c = 5.660(2)\)

\(\alpha = 104.10(2)^\circ\)  \(\beta = 90.07(5)^\circ\)  \(\gamma = 96.34(3)^\circ\)  \(Z = 1\)

X-ray Powder Pattern:  Centennial Eureka mine, Utah, USA.

9.638 (100), 4.841 (100), 2.747 (60), 8.736 (50), 2.600 (45), 6.862 (40), 6.172 (40)

Chemistry:

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{TeO}_3)</td>
<td>45.47</td>
<td>45.54</td>
</tr>
<tr>
<td>(\text{CuO})</td>
<td>25.76</td>
<td>25.78</td>
</tr>
<tr>
<td>(\text{ZnO})</td>
<td>15.81</td>
<td>15.83</td>
</tr>
<tr>
<td>(\text{H}_2\text{O})</td>
<td>[12.96]</td>
<td>12.85</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.00</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

(1)  Centennial Eureka mine, Utah, USA; by electron microprobe, average of six analyses, \(\text{H}_2\text{O}\) by difference, total \(\text{Te}\) as \(\text{TeO}_4\), \((\text{OH})^{1-}\) and \(\text{H}_2\text{O}\) confirmed by IR; corresponds to \(\text{Cu}_{4.98}\text{Zn}_{2.99}(\text{TeO}_4)_{3.98}(\text{OH})_8\cdot7\text{H}_2\text{O}\).  (2)  \(\text{Cu}_5\text{Zn}_3(\text{TeO}_4)_4(\text{OH})_8\cdot7\text{H}_2\text{O}\).

Occurrence:  A very rare secondary mineral found on dump material from the oxidized zone of a Cu–Zn–Te-bearing hydrothermal ore deposit.

Association:  Cesbronite, quartz.

Distribution:  From the mine dumps of the Centennial Eureka mine, Tintic district, Juab Co., Utah, USA.

Name:  After the state of Utah, USA, where the mineral was discovered.
