Zimbabweite 

\((\text{Na}_2\text{K})_2\text{PbAs}_{3+}(\text{Ta}_4\text{Nb}_4\text{Ti})_4\text{O}_{18}\)

Crystal Data: Orthorhombic. Point Group: 2/m 2/m 2/m. Crystals euhedral to subhedral, to 2 cm, with \{010\}, \{201\}, also \{100\}, \{111\}.

Physical Properties: Cleavage: \{010\}, perfect. Tenacity: Brittle. Hardness = 5–5.5

Optical Properties:

- Color: Honey-yellow-brown; in transmitted light, pale yellow.
- Streak: White.
- Luster: Adamantine.
- Optical Class: Biaxial (+).
- Pleochroism: Moderate; \(X = \) pale yellow-brown; \(Y = \) light reddish brown; \(Z = \) reddish brown.
- Orientation: \(X = c\); \(Y = b\); \(Z = a\).
- Dispersion: \(r < v\), very strong.

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\(\alpha = 2.10\) \(\beta = 2.10\) \(\gamma = 2.10\) \(2V(\text{meas.}) = 80(4)^\circ\)

\(R_1 - R_2:\) (470) 17.6–17.8, (546) 17.0–17.1, (589) 16.6–16.7, (650) 16.2–16.5

Cell Data:

- Space Group: Ccmm. \(a = 12.245(2)\) \(b = 15.287(4)\) \(c = 8.684(1)\) \(Z = 4\)


3.195 (100), 2.990 (70), 2.882 (70), 3.033 (60), 3.823 (55), 2.548 (50), 1.913 (50)

Chemistry:

<table>
<thead>
<tr>
<th>Element</th>
<th>Formula</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nb(_2)O(_5)</td>
<td>4.8</td>
<td>SrO</td>
</tr>
<tr>
<td>Ta(_2)O(_5)</td>
<td>46.5</td>
<td>BaO</td>
</tr>
<tr>
<td>TiO(_2)</td>
<td>1.4</td>
<td>Na(_2)O</td>
</tr>
<tr>
<td>SnO(_2)</td>
<td>0.1</td>
<td>K(_2)O</td>
</tr>
<tr>
<td>UO(_2)</td>
<td>0.3</td>
<td>F</td>
</tr>
<tr>
<td>As(_2)O(_3)</td>
<td>26.5</td>
<td>H(_2)O(^+)</td>
</tr>
<tr>
<td>Bi(_2)O(_3)</td>
<td>0.2</td>
<td>H(_2)O(^-)</td>
</tr>
<tr>
<td>PbO</td>
<td>15.0</td>
<td>(-\text{O} = \text{F}_2)</td>
</tr>
</tbody>
</table>

Total 100.03

(1) St. Ann’s mine, Zimbabwe; by electron microprobe and a variety of other methods, total As as As\(_2\)O\(_3\), H\(_2\)O by microcoulometry; corresponding to \((\text{Na}_{1.51}\text{K}_{0.48}\text{Ba}_{0.04})_{\Sigma=2.03}\text{Pb}_{1.01}\text{(As}_{4.03}\text{Bi}_{0.01})_{\Sigma=4.04}(\text{Ta}_{3.17}\text{Nb}_{0.55}\text{Ti}_{0.26})_{\Sigma=4.02}\text{Sn}_{0.02})_{\Sigma=4.01}\text{O}_{18}\).

Occurrence: In a hydrothermally altered kaolinized zone of a complex rare-metal and fluorine-rich granite pegmatite.

Association: Kaolinite.

Distribution: From the St. Ann’s mine, southeast of Miami, Karoi district, Zimbabwe.

Name: For Zimbabwe, the country where it was first found.


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