Billwiseite

\[ \text{Sb}^{3+}_{5} (\text{Nb}, \text{Ta})_{3} \text{WO}_{18} \]

**Crystal Data**: Monoclinic. Point Group: 2/m. As blocky crystals displaying \{100\}, \{011\} and \{410\}, to 0.50 mm. Twinning: Common on (100).


**Optical Properties**: Transparent. Color: Pale yellow with a hint of green, colorless in transmitted light. Streak: Colorless to very pale yellow. Luster: Vitreous. Optical Class: Biaxial. \( n(\text{calc.}) = 2.3 \) 2\( V(\text{meas.}) = 76(2)^\circ \) Orientation: \( X \parallel b, Y^\parallel c = 72.8^\circ \) (in \( \beta \) acute).

**Cell Data**: Space Group: \( \text{C}2/c \). 
- \( a = 5.5482(5) \)
- \( b = 4.9143(5) \)
- \( c = 5.5482(5) \)
- \( \beta = 90.425(2)^\circ \)
- \( Z = 4 \)

**X-ray Powder Pattern**: Stak Nala, Karakoram Mountains, 70 km east of Gilgit, Pakistan. 3.147 (100), 3.500 (53), 1.662 (53), 3.017 (48), 1.906 (47), 1.735 (30), 1.762 (25)

**Chemistry**: (1)

<table>
<thead>
<tr>
<th>Compound</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{Nb}_2\text{O}_5 )</td>
<td>12.03</td>
</tr>
<tr>
<td>( \text{Ta}_2\text{O}_5 )</td>
<td>19.31</td>
</tr>
<tr>
<td>( \text{Sb}_2\text{O}_3 )</td>
<td>48.34</td>
</tr>
<tr>
<td>( \text{TiO}_2 )</td>
<td>0.99</td>
</tr>
<tr>
<td>( \text{WO}_3 )</td>
<td>19.96</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.63</strong></td>
</tr>
</tbody>
</table>

(1) Stak Nala, Karakoram Mountains, 70 km east of Gilgit, Pakistan; average of 8 electron microprobe analyses, absence of OH and H\(_2\)O confirmed by IR spectroscopy, valence state of Sb determined by crystal structure analysis; corresponding to \( \text{Sb}^{3+}_{1.87}(\text{Nb}_{1.33}\text{Ta}_{1.28}\text{Ti}_{0.18}\text{W}_{1.26})\text{O}_{18-4.05} \).

**Occurrence**: In a complex zoned granitic pegmatite of the LCT (Li–Cs–Ta) type.

**Association**: Lepidolite, B-rich muscovite.

**Distribution**: At Stak Nala, Karakoram Mountains, 70 km east of Gilgit, Pakistan.

**Name**: Honors William Stewart Wise (b. 1933), Professor of Geology Emeritus, University of California at Santa Barbara, USA, for his contributions to mineralogy and his inspiration and mentoring of mineralogy students.

**Type Material**: Department of Natural History, Royal Ontario Museum, Toronto, Canada (M55951).