Freibergite \( (\text{Ag, Cu, Fe, Zn})_{12}(\text{Sb, As})_{4}S_{13} \)

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Crystal Data: Cubic. Point Group: \( \overline{4}3m \). Tetrahedral crystals, to 3.5 cm; massive and as inclusions in other sulfides.

Physical Properties: Hardness = n.d. VHN = 263–340 (100 g load). D\( (\text{meas.}) = \text{n.d.} \) D\( (\text{calc.}) = [5.41] \)


Cell Data: Space Group: \( \overline{4}3m \). \( a = 10.474–10.560 \) Z = 2

X-ray Powder Pattern: n.d.

Chemistry:

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ag</td>
<td>36.0</td>
<td>48.9</td>
<td>Sb</td>
<td>25.1</td>
<td>21.0</td>
</tr>
<tr>
<td>Cu</td>
<td>12.4</td>
<td>3.2</td>
<td>As</td>
<td>0.5</td>
<td>0.6</td>
</tr>
<tr>
<td>Fe</td>
<td>4.1</td>
<td>0.2</td>
<td>Bi</td>
<td>0.1</td>
<td></td>
</tr>
<tr>
<td>Zn</td>
<td>0.6</td>
<td>6.1</td>
<td>S</td>
<td>21.8</td>
<td>19.9</td>
</tr>
<tr>
<td>Hg</td>
<td>0.1</td>
<td></td>
<td>Total</td>
<td>100.5</td>
<td>100.1</td>
</tr>
</tbody>
</table>

(1) Mt. Isa, Australia; by electron microprobe, corresponding to \( (\text{Ag}_{6.37}\text{Cu}_{3.72}\text{Fe}_{1.41}\text{Zn}_{0.18})\Sigma=11.68 \) \( (\text{Sb}_{3.95}\text{As}_{0.13})\Sigma=4.08\)\( S_{13.00} \). (2) Knappenstube mine, Austria; by electron microprobe, average of analyses on 14 samples; corresponding to \( (\text{Ag}_{9.50}\text{Zn}_{1.95}\text{Cu}_{1.06}\text{Fe}_{0.08}\text{Hg}_{0.01})\Sigma=12.60(\text{Sb}_{3.61}\text{As}_{0.17} \) \( \text{Bi}_{0.01})\Sigma=3.79\)\( S_{13.00} \).

Polymorphism & Series: Forms a series with tetrahedrite and argentotennantite.

Mineral Group: Tetrahedrite group.

Occurrence: In hydrothermal deposits.

Association: A wide variety of sulfides and sulfosalts, as for tetrahedrite.

Distribution: In Germany, in Saxony, from the Freiberg district [TL], as in the Himmelsfürst mine, Erbsdorf, near Freiberg. From Kutná Hora and the Zlate Horá district, Czech Republic. In Austria, from the Knappenstube mine, Hochtur, Salzburg. From Yukhondzha, Sakha, Russia. At Sladekár and in the Vena mines, near Askersund, Örebro, Sweden. From the Bleikvassli Zn–Pb–Cu deposit, Nordland, Norway. In Scotland, at Tyndrum, Perthshire. In the Hi-Ho mine, Cobalt–Gowganda region, Ontario; and the Keno Hill-Galena Hill area, Yukon Territory, Canada. Large crystals from the San José mine, Oruro, Bolivia. In Japan, in the Inakuraishi, Koryu, and Sanru mines, Hokkaido. In Australia, at Mt. Isa and the Cannington Ag–Pb–Zn deposit, Queensland; and in the Meerschaum mine, north of Omeo, Victoria. Additional localities are known.

Name: For the long-known occurrence of silver-rich tetrahedrite at Freiberg, Germany.


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