Ferrostalderite  \( \text{CuFe}_2\text{TiAs}_2\text{S}_6 \)

**Crystal Data:** Tetragonal.  \( \text{Point Group}: \begin{array}{c} \dagger \text{2m} \end{array} \)  As equant to prismatic crystals to 50 \( \mu \text{m} \) displaying \{110\} and \{101\}.

**Physical Properties:**  \( \text{Cleavage}: \) n.d.  \( \text{Tenacity}: \) Brittle.  \( \text{Fracture}: \) Irregular.  \( \text{Hardness} = \) n.d.  \( \text{D(meas.)} = \) n.d.  \( \text{D(calc.)} = 4.528 \)

**Optical Properties:** Opaque.  \( \text{Color}: \) Black, dark gray in reflected light.  \( \text{Streak}: \) Black.  \( \text{Luster}: \) Metallic.  \( \text{Optical Class}: \)  \( \text{Anisotropism}: \) Weak, yellowish to bluish.  Very weak internal reflections.

\[ \text{R}_1 - \text{R}_2: (471.1) 24.2 - 25.4, (548.3) 23.7 - 24.7, (586.6) 22.9 - 23.8, (652.3) 21.0 - 22.0 \]

**Cell Data:**  \( \text{Space Group}: \begin{array}{c} \dagger \text{2m} \end{array} \)  \( a = 9.8786(5) \)  \( c = 10.8489(8) \)  \( Z = 4 \)

**X-ray Powder Pattern:** Lengenbach quarry, Binn Valley, Wallis, Switzerland.

\( 2.937 \) (100), \( 4.092 \) (70), \( 3.396 \) (35), \( 2.435 \) (33), \( 3.493 \) (23), \( 2.656 \) (19), \( 2.470 \) (19)

**Chemistry:**

<table>
<thead>
<tr>
<th>Element</th>
<th>Cu</th>
<th>Ag</th>
<th>Fe</th>
<th>Zn</th>
<th>Hg</th>
<th>Tl</th>
<th>As</th>
<th>Sb</th>
<th>S</th>
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</thead>
<tbody>
<tr>
<td>Amount</td>
<td>6.24</td>
<td>4.18</td>
<td>9.95</td>
<td>4.46</td>
<td>1.22</td>
<td>26.86</td>
<td>19.05</td>
<td>0.63</td>
<td>25.39</td>
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<tr>
<td>Total</td>
<td>97.98</td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

(1) Lengenbach quarry, Binn Valley, Wallis, Switzerland; average electron microprobe analysis; corresponds to \( \text{Cu}_{0.75}\text{Ag}_{0.30}\text{Fe}_{1.36}\text{Zn}_{0.52}\text{Hg}_{0.05}\text{Tl}_{0.00}[\text{As}_{1.94}\text{Sb}_{0.04}]_2\text{S}_6.04 \).

**Mineral Group:** Routhierite isotypic series.

**Occurrence:** Formed as massive to interstitial sulfosalt accumulations in dolostone by late stage Tl-As-Cu-Fe-rich hydrothermal fluids during upper greenschist to lower amphibolite metamorphism.

**Association:** Dolomite, realgar, baumhauerite(?), pyrite.

**Distribution:** From the Lengenbach quarry, Binn Valley, Wallis, Switzerland.

**Name:** The prefix, \( \text{ferro} \), indicates the iron isotype of \( \text{stalderite} \).

**Type Material:** National History Museum, University of Florence, Italy (3148/I).

**References:** (1) Biagioni, C., L. Bindi, F. Nestola, R. Cannon, P. Roth, and T. Raber (2016) Ferrostalderite, \( \text{CuFe}_2\text{TiAs}_2\text{S}_6 \), a new mineral from Lengenbach, Switzerland: occurrence, crystal structure, and emphasis on the role of iron in sulfosalts. Mineral. Mag., 80, 175-186.