Aktashite

\[ \text{Cu}_6\text{Hg}_3\text{As}_4\text{S}_{12} \]

**Crystal Data:** Hexagonal, pseudocubic.  
**Point Group:** 3.  
Rare crystals resemble trigonal pyramids, to 0.2 mm, which may be zoned with gruzdevite; as xenomorphic grains and granular aggregates.

**Physical Properties:**  
**Fracture:** Irregular to conchoidal.  
**Tenacity:** Brittle.  
**Hardness = \sim 3.5**  
\( VHN = 300-346, 313 \text{ average (50 g load).} \)  
\( D(\text{meas.}) = 5.5 \)  
\( D(\text{calc.}) = 5.420 \)

**Optical Properties:**  
Opaque.  
**Color:** Gray-black; white in reflected light.  
**Streak:** Black.  
**Luster:** Metallic.  
**Anisotropism:** Weak, in shades of blue.

**Cell Data:**  
**Space Group:** \( R3. \)  
\( a = 13.7500(4) \)  
\( c = 9.3600(3) \)  
\( Z = 3 \)

**X-ray Powder Pattern:** Gal-Khaya deposit, Russia.  
3.10 (10), 1.903 (10), 1.621 (10), 2.69 (7), 1.236 (4), 1.345 (3), 4.04 (2)

**Chemistry:**

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cu</td>
<td>23.38</td>
<td>23.2</td>
<td>22.86</td>
</tr>
<tr>
<td>Zn</td>
<td>0.15</td>
<td></td>
<td></td>
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<tr>
<td>Hg</td>
<td>32.54</td>
<td>35.4</td>
<td>36.09</td>
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<tr>
<td>As</td>
<td>18.20</td>
<td>18.9</td>
<td>17.97</td>
</tr>
<tr>
<td>Sb</td>
<td>2.55</td>
<td>0.41</td>
<td></td>
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<tr>
<td>S</td>
<td>23.80</td>
<td>23.6</td>
<td>23.08</td>
</tr>
<tr>
<td>Total</td>
<td>100.47</td>
<td>101.66</td>
<td>100.00</td>
</tr>
</tbody>
</table>

(1) Aktash deposit, Russia; by electron microprobe, average of two analyses. (2) Gal-Khaya deposit, Russia; by electron microprobe. (3) \( \text{Cu}_6\text{Hg}_3\text{As}_4\text{S}_{12} \).

**Polymorphism & Series:** Forms a series with gruzdevite; in the nowackiite isotypic series.

**Occurrence:** Uncommon, of hydrothermal origin in complex polymetallic As-Hg-bearing deposits.

**Association:** Stibnite, chalcostibite, mercurian tetrahedrite, tennantite, luzonite, enargite, cinnabar, chalcopyrite, pyrite, sphalerite, realgar, orpiment, dickite, quartz, calcite.

**Distribution:** In Russia, from the Aktash mercury deposit, Kosh-Agach district, Kurai Range, Altai Mountains [TL]; in the Gal-Khaya deposit, Sakha; at the Lukhumi arsenic deposit, central Caucasus Mountains; from the Vorontsovsokoye gold deposit, Serov district, Northern Ural Mountains. At the Chauvai Sh-Hg deposit, Fergana Valley, Alai Range, southern Kyrgyzstan. In the Moctezuma (Bambolla) mine, 12 km south of Moctezuma, Sonora, Mexico. At the Getchell mine, Potosi district, Humbolt Co., Nevada, USA. In the Hemlo gold deposit, Thunder Bay district, Ontario, Canada. From the Jas Roux deposit, 10 km east of Chapelle-en-Valgaudemar, Hautes-Alpes, France. At the Sant’Olgia level, Monte Arsiccio mine, Apuan Alps, Tuscany, Italy.

**Name:** For its occurrence at the Aktash deposit, Russia.

**Type Material:** Central Siberian Geological Museum, Novosibirsk, Russia, III-14/1; National School of Mines, Paris, France.

**References:**  
(3) Gruzdev, V.S., N.M. Chernitsova, and N.G. Shumakove (1972) Aktashite, \( \text{Cu}_6\text{Hg}_3\text{As}_4\text{S}_{12} \), new data. Doklady Acad. Nauk SSSR, 206, 694-697 (in Russian).  
(4) (1973) Amer. Mineral., 58, 562 (abs. ref. 3).  
(5) Biagioni, C., E. Bonaccorsi, Y. Moëlo, and P. Orlandi (2014) Mercury-arsenic sulfosalts from the Apuan Alps (Tuscany, Italy). III. Aktashite, \( \text{Cu}_6\text{Hg}_3\text{As}_4\text{S}_{12} \), and laffittite, \( \text{AgHgAsS}_3 \), from the Monte Arsiccio mine: occurrence and crystal structure. Periodico di Mineralogia, 83(1), 1-18.  
(6) Vasil’ev, V.I., N.V. Pervukhina, S.V. Borisov, S.A. Magarill, D.Yu. Naumov, and N.V. Kurat’eva (2010) - Aktashite \( \text{Cu}_6\text{Hg}_3\text{As}_4\text{S}_{12} \) from the Aktash deposit, Altai, Russia: refinement and crystal chemical analysis of the structure. Geology of Ore Deposits, 52, 656-661.