ABSTRACT

The crystal structures of \([\text{Cu(MeCN)}_4]_2[\text{Pn}_3\text{X}_{11}]\) with \(\text{Pn} = \text{As, Sb}; \text{X} = \text{Br, I}\)

Christoph Vitzthumecker,[a] Arno Pfitzner*[a]

* Prof. Dr. A. Pfitzner
E-Mail: Arno.Pfitzner@chemie.uni-regensburg.de

[a] Institut für Anorganische Chemie
Universität Regensburg
Universitätsstraße 31
93040 Regensburg, Germany

Keywords: Pnicogen halide; Tetrakis(acetonitrile)copper(I)

\([\text{Cu(MeCN)}_4]_2[\text{Pn}_3\text{X}_{11}]\) was synthesized via a solvothermal reaction of copper(I)halide with the respective pnicogen(III)halide in acetonitrile with \(\text{Pn} = \text{As, Sb, and X} = \text{Br, I}\). The compounds were obtained from solvothermal syntheses at 140 °C for 5 days. All four compounds crystallize in the space group \(P\overline{3}c\overline{1}\) (no. 165) with the unit cell dimensions given in Table 1.

**Table 1. Lattice parameters**

<table>
<thead>
<tr>
<th>Anion</th>
<th>(a/\text{Å})</th>
<th>(c/\text{Å})</th>
<th>(V/\text{Å}^3)</th>
<th>(Z)</th>
</tr>
</thead>
<tbody>
<tr>
<td>As(_3)Br(_3)(_2^+)</td>
<td>11.4751(2)</td>
<td>18.2466(5)</td>
<td>2080.78(8)</td>
<td>2</td>
</tr>
<tr>
<td>As(_3)I(_3)(_2^+)</td>
<td>11.7082(1)</td>
<td>19.5975(2)</td>
<td>2326.54(4)</td>
<td>2</td>
</tr>
<tr>
<td>Sb(_3)Br(_3)(_2^+)</td>
<td>11.6569(1)</td>
<td>18.5269(3)</td>
<td>2180.22(4)</td>
<td>2</td>
</tr>
<tr>
<td>Sb(_3)I(_3)(_2^+)</td>
<td>11.8512(1)</td>
<td>19.8591(2)</td>
<td>2415.54(4)</td>
<td>2</td>
</tr>
</tbody>
</table>

\([\text{Cu(MeCN)}_4]_2[\text{Sb}_3\text{I}_{11}]\) was already reported in literature,[1] and all four compounds are isotypic. They show clusters of three condensed pnicogen halide octahedra, and tetrakis(acetonitrile)copper tetrahedra, see Figure 1.

---


---

Figure 1. Condensed, octahedral units \([\text{As}_3\text{I}_{11}]^{2+}\) in \([\text{Cu(MeCN)}_4]_2[\text{As}_3\text{I}_{11}]\).