Artsmithite

\[
\text{Hg}^{1+4}\text{Al(PO}_4\text{)}\text{[1.74(OH)}1.78
\]

**Crystal Data:** Monoclinic. *Point Group:* 2/m. As matted nests of randomly scattered fibers, elongate along [001] to 1 mm, with length:width >100:1.


**Optical Properties:** *Transparency:* Transparent. *Color:* Colorless to white. *Streak:* White to cream. *Luster:* Vitreous. *Optical Class:* Biaxial (+). \(n > 1.80\) \(2V\) (meas.) = \(\sim 60^\circ\) Parallel extinction, length slow. *Orientation:* \(Z \approx c\). *Dispersion:* Distinct, \(r < v\).

**Cell Data:** *Space Group:* C2/c. \(a = 17.007(7)\) \(b = 9.070(4)\) \(c = 7.013(5)\) \(\beta = 101.30(5)^\circ\) \(Z = 4\)

**X-ray Powder Pattern:** Funderburk prospect, Pike County, Arkansas, USA. 8.326 (100), 2.979 (80), 2.784 (80), 2.660 (75), 4.739 (50), 2.952 (50), 1.755 (50)

**Chemistry:**

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
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</thead>
<tbody>
<tr>
<td>Hg(_2)O</td>
<td>78.28</td>
<td>81.41</td>
</tr>
<tr>
<td>Al(_2)O(_3)</td>
<td>5.02</td>
<td>4.97</td>
</tr>
<tr>
<td>P(_2)O(_5)</td>
<td>11.39</td>
<td>12.05</td>
</tr>
<tr>
<td>H(_2)O</td>
<td>[1.63]</td>
<td>1.56</td>
</tr>
<tr>
<td>Total</td>
<td>96.32</td>
<td>99.99</td>
</tr>
</tbody>
</table>

(1) Funderburk prospect, Pike County, Arkansas, USA; average electron microprobe analysis supplemented by FTIR spectroscopy, H\(_2\)O calculated from structure; corresponds to Hg\(^{1+}\)\(_{4.60}\)Al\(_{1.05}\)P\(_{1.71}\)O\(_{8.74}\)H\(_{1.78}\). (2) Hg\(^{1+}\)\(_{4.00}\)Al\(_{1.74}\)(PO\(_4\))\(_{1.74}\)(OH)\(_{1.78}\).

**Occurrence:** A weathering product filling fractures in a cinnabar and fluorapatite-bearing sandstone.

**Association:** Quartz, goethite, dickite, cinnabar.

**Distribution:** From dumps at the Funderburk prospect, on a ridge north of Cowhide Cove road, in the Cowhide Cove Recreation area, \(\sim 13\) km north of Murfreesboro, Pike County, Arkansas, USA.

**Name:** Honors Arthur Edward Smith (1935-2009) of Houston, Texas, petroleum geologist, mineral collector, micromounter and expert on the mineral localities of Texas and Arkansas, who collected the holotype specimen.

**Type Material:** National Mineral Collection, Geological Survey of Canada, Ottawa, Ontario (NMCC68092).