Pseudograndreefite Pb$_6$(SO$_4$)$_4$F$_{10}$

Crystal Data: Orthorhombic, pseudotetragonal. Point Group: 222. Crystals are square, tabular on {010}, showing {010}, {100}, {001}, {210}, {012}, in subparallel aggregation, to 4 mm.

D(meas.) = 7.0(1) D(calc.) = 7.08 Soluble in H$_2$O.

Luster: Subadamantine.
Optical Class: Biaxial (+). Orientation: X = c; Y = a; Z = b. Dispersion: r > v, strong.
α = 1.864(5) β = 1.865(5) γ = 1.873(5) 2V(meas.) = 30(3)° 2V(calc.) = 39°

Cell Data: Space Group: F222. a = 8.5182(5) b = 19.5736(11) c = 8.4926(5) Z = 4

X-ray Powder Pattern: Grand Reef mine, Arizona, USA.
3.204 (100), 1.779 (70b), 2.999 (30), 2.212 (25), 1.364 (25b), 3.89 (20), 2.123 (20)

Chemistry:

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO$_3$</td>
<td>4.7</td>
<td>5.24</td>
</tr>
<tr>
<td>PbO</td>
<td>84.9</td>
<td>87.57</td>
</tr>
<tr>
<td>F</td>
<td>13.1</td>
<td>12.42</td>
</tr>
<tr>
<td>−O = F$_2$</td>
<td>5.5</td>
<td>5.23</td>
</tr>
<tr>
<td>Total</td>
<td>97.2</td>
<td>100.00</td>
</tr>
</tbody>
</table>

(1) Grand Reef mine, Arizona, USA; by electron microprobe, H$_2$O shown absent by IR; corresponding to Pb$_{5.91}$(SO$_{3.29}$)F$_{10.71}$. (2) Pb$_6$(SO$_4$)$_4$F$_{10}$.

Occurrence: In a vug isolated from acidic sulfate-rich solutions in the oxidized zone of a low-temperature Pb–Cu–Ag deposit.

Association: Grandreefite, laurelite, aravaipaite, galena, fluorite, anglesite, linarite, caledonite, quartz.

Distribution: From the Grand Reef mine, about six km northeast of Klondyke, Aravaipa district, Graham Co., Arizona, USA.

Name: From the Greek for false, and its relation to grandreefite.

Type Material: Natural History Museum, Los Angeles, California, 33608; National Museum of Natural History, Washington, D.C., USA, 166056.