Letovicite

H(NH$_4$)$_3$(SO$_4$)$_2$

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**Crystal Data:** Triclinic, pseudohexagonal.  
**Point Group:** $\overline{1}$ or 1.  
Crystals are platy, pseudohexagonal, flattened on {001}, corroded or skeletal, to 0.05 mm; typically granular.  
**Twinning:** Common, lamellar.

**Physical Properties:**  
**Cleavage:** {001}, distinct.  
**Fracture:** Uneven.  
**Hardness:** n.d.  
D(meas.) = 1.83 (synthetic).  
D(calc.) = 1.82  
Soluble in H$_2$O.

**Optical Properties:**  
** Transparent.  
**Color:** Colorless, white.  
**Optical Class:** Biaxial (−).  
**Orientation:** $Z = b; X \wedge c = 78^\circ$.  
$\alpha = 1.501 \quad \beta = 1.516 \quad \gamma = 1.525$  
2$V$(meas.) = 75°

**Cell Data:**  
**Space Group:** $P\overline{1}$ or $P1$ (synthetic).  
$a = 5.87(1) \quad b = 10.17(3) \quad c = 8.27(1)$  
$\alpha = 101.1(4)^\circ \quad \beta = 111.1(1)^\circ \quad \gamma = 89.9(2)^\circ \quad Z = 2$

**X-ray Powder Pattern:**  
Synthetic.  
4.95 (100), 4.98 (85), 3.77 (80), 3.39 (75), 2.932 (50), 3.36 (45), 4.65 (35)

**Chemistry:**

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO$_3$</td>
<td>63.92</td>
<td>64.76</td>
</tr>
<tr>
<td>(NH$_4$)$_2$O</td>
<td>20.19</td>
<td>20.67</td>
</tr>
<tr>
<td>H$_2$O</td>
<td>[15.89]</td>
<td>14.57</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>[100.00]</strong></td>
<td><strong>100.00</strong></td>
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</tbody>
</table>

(1) Kladno, Czech Republic.  (2) H(NH$_4$)$_3$(SO$_4$)$_2$.

**Occurrence:** A rare secondary mineral, formed from burning coal (Czech Republic); deposited from hot springs (The Geysers, California, USA).

**Association:** Sulfur (Letovice, Czech Republic); mascagnite, boussingaultite (The Geysers, California, USA).

**Distribution:** In the Czech Republic, from Píšecná, near Letovice; at Libušín, near Kladno; and from Radvanice. At Ormosbánya, Hungary. Found at The Geysers, Sonoma Co., California, USA.

**Name:** For Letovice, Czech Republic, the locality first noted for the mineral.

**Type Material:** Moravian Museum, Brno, Czech Republic, A6110.

**References:**  

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