Fedotovite

\[ \text{K}_2\text{Cu}_3\text{O(SO}_4\text{)}_3 \]

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**Crystal Data:** Monoclinic. *Point Group:* 2/m. As crusts of imperfect pseudohexagonal crystals, flaky to platy on \{100\}, to 5 mm.

**Physical Properties:** *Cleavage:* On \{100\}, perfect. *Hardness:* 2.5  
D(meas.) = 3.205(3)  
D(calc.) = 3.09  
Unstable in air.

**Optical Properties:** Transparent. *Color:* Emerald-green to grass-green.  
*Streak:* Pale grass-green.  
*Luster:* Vitreous to silky.  
*Optical Class:* Biaxial (+).  
*Pleochroism:* X = greenish blue; Y = Z = yellow-green.  
*Orientation:* Z = b; Y \( \wedge \) c \( \approx \) 0°.  
*Absorption:* Z > Y.  
\( \alpha = 1.577 \quad \beta = 1.594 \quad \gamma = 1.633 \)

2V(meas.) = n.d.  
2V(calc.) = 68°

**Cell Data:** *Space Group:* C2/c.  
a = 19.037(6)  
b = 9.479(2)  
c = 14.231(5)  
\( \beta = 111.04(3)^\circ \quad Z = 8 \)

**X-ray Powder Pattern:** Tolbachik volcano, Russia.

8.83 (100), 2.943 (12), 2.844 (5), 6.59 (4), 6.54 (4), 4.405 (3), 4.207 (3)

**Chemistry:**

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SO(_3)</td>
<td>42.00</td>
<td>41.92</td>
</tr>
<tr>
<td>CuO</td>
<td>38.93</td>
<td>41.65</td>
</tr>
<tr>
<td>ZnO</td>
<td>0.37</td>
<td></td>
</tr>
<tr>
<td>PbO</td>
<td>0.70</td>
<td></td>
</tr>
<tr>
<td>Na(_2)O</td>
<td>1.48</td>
<td></td>
</tr>
<tr>
<td>K(_2)O</td>
<td>13.97</td>
<td>16.43</td>
</tr>
<tr>
<td>H(_2)O</td>
<td>trace</td>
<td></td>
</tr>
<tr>
<td>insol.</td>
<td>2.80</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100.25</td>
<td>100.00</td>
</tr>
</tbody>
</table>

(1) Tolbachik volcano, Russia; presence of (SO\(_4\))\(^{2-}\) and absence of (OH)^\(^{-1}\) and H\(_2\)O confirmed by IR; corresponds to (K\(_{1.65}\)Na\(_{0.28}\))\(_{\Sigma=1.93}\)(Cu\(_{2.85}\)Zn\(_{0.02}\)Pb\(_{0.01}\))\(_{\Sigma=2.88}\)O\(_{8.80}\)(SO\(_4\))\(_{3.05}\).

(2) K\(_2\)Cu\(_3\)O(SO\(_4\))\(_3\).

**Occurrence:** As sublimates around volcanic fumaroles.

**Association:** Dolerophanite, chalcocyanite, tolbachite, piypite, melanothallite, tenorite, vergasovaite, euchlorine, alarsite, kluchevskite, lammerite, nabokoite, atlazovite, langbeinite, hematite.

**Distribution:** From the Tolbachik fissure volcano, Kamchatka Peninsula, Russia.

**Name:** Honors Sergei Aleksandrovich Fedotov (1931– ), volcanologist and seismologist, Director of the Institute of Volcanology, Petropavlovsk-Kamchatskii, Russia.

**Type Material:** Mineralogical Museum, St. Petersburg University, St. Petersburg, Russia, 1890/1.


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