Ahlfeldite NiSe$^{4+}$O$_3$•2H$_2$O

Crystal Data: Monoclinic. Point Group: $2/m$. Rare crystals, to 1 mm, elongated along [001] or flattened parallel {110}, showing {110}, {011}, {032}, {103}, {101}; in crystalline crusts and spherical aggregates.

Physical Properties: Cleavage: On {110} and {103}, fair. Tenacity: Brittle. Hardness = 2–2.5 D(meas.) = 3.37(2) D(calc.) = 3.51


Optical Class: Biaxial (−). Pleochroism: X = pale green; Y = pale pink; Z = pink. Orientation: Y = b, Z ∧ c = −16°. Dispersion: $r < v$, strong. $\alpha = 1.709(1)$ $\beta = 1.752(1)$ $\gamma = 1.787(2)$ 2V(meas.) = 85°

Cell Data: Space Group: $P2_1/n$. $a = 7.53(1)$ $b = 8.76(2)$ $c = 6.43(1)$ $\beta = 99°05'(15)'$ Z = 4

X-ray Powder Pattern: Pacajake mine, Bolivia; close to cobaltomenite. 5.69 (100), 3.426 (80), 2.992 (75), 2.190 (75), 3.772 (60), 2.719 (60), 2.354 (50)

Chemistry:

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SeO$_2$</td>
<td>50.01</td>
<td>50.03</td>
</tr>
<tr>
<td>CoO</td>
<td>3.55</td>
<td>16.89</td>
</tr>
<tr>
<td>NiO</td>
<td>30.24</td>
<td>16.84</td>
</tr>
<tr>
<td>H$_2$O</td>
<td>16.2</td>
<td>16.24</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.00</td>
</tr>
</tbody>
</table>

(1) Pacajake mine, Bolivia; by electron microprobe, H$_2$O by evolved H$_2$O analyzer; corresponds to (Ni$_{0.90}$Co$_{0.10}$)$_{\Sigma=1.00}$Se$_{1.00}$O$_3$•2.00H$_2$O. (2) (Ni, Co)SeO$_3$•2H$_2$O with Ni:Co = 1:1.

Polymorphism & Series: Forms a series with cobaltomenite.

Occurrence: A rare alteration product of nickel-bearing selenides and sulfides.

Association: Penroseite, chalcomenite, olsacherite, cerussite, anglesite (Pacajake mine, Bolivia); chalcomenite, olsacherite, lepidocrocite, goethite (El Dragón mine, Bolivia).

Distribution: In Bolivia, from the Pacajake mine, Hiaco, 24 km east-northeast of Colquechaca, and the El Dragón mine, 30 km southwest of Cerro Rico de Potosí, Potosí.

Name: To honor Friedrich E. Ahlfeld (1892–1982) German–Bolivian mining engineer and mineralogist.


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