Cobaltlotharmeyerite

CaCo$_2$(AsO$_4$)$_2$·2H$_2$O

Crystal Data: Monoclinic.  
Point Group: $2/m$.  As fanlike aggregates to 1 mm of tabular crystals, elongate along [010], to 0.1 mm, with lance-like terminations at ~80°; as lamellar curved crystals and as crusts.

D(meas.) = 4.2  D(calc.) = 4.09-4.13

Optical Class: Biaxial (+).  $a$(calc.) = 1.78  $\beta$ = 1.79(1)  $\gamma$ = 1.85(2)  $2V$(meas.) = 48(5)°  
Dispersion: Distinct, $r$ > $v$.  Orientation: $Z$ parallels [010], $X$ $\wedge$ $c$ = 10° (in obtuse $\beta$).  
Pleochroism: Strong, $X$ = yellow, $Y$ = brown, $Z$ = pale yellow.

Cell Data: Space Group: $C2/m$.  
$a$ = 9.024(1)  $b$ = 6.230(1)  $c$ = 7.421(1)  $\beta$ = 115.15(1)°  $Z$ = 2

X-ray Powder Pattern: Saxony, Germany.  
2.545 (100), 2.828 (88), 2.972 (82), 4.955 (66), 3.398 (54), 3.115 (51)

Chemistry:

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
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</thead>
<tbody>
<tr>
<td>CaO</td>
<td>12.18</td>
<td>12.60</td>
</tr>
<tr>
<td>MgO</td>
<td>0.72</td>
<td></td>
</tr>
<tr>
<td>NiO</td>
<td>5.76</td>
<td>3.36</td>
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<tr>
<td>CoO</td>
<td>15.70</td>
<td>15.94</td>
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<tr>
<td>Fe$_2$O$_3$</td>
<td>11.53</td>
<td>11.97</td>
</tr>
<tr>
<td>As$_2$O$_5$</td>
<td>49.36</td>
<td>49.02</td>
</tr>
<tr>
<td>H$_2$O</td>
<td>[6.39]</td>
<td>[6.39]</td>
</tr>
<tr>
<td>Total</td>
<td>100.92</td>
<td>100.00</td>
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</table>

(1) Saxony, Germany; average electron microprobe analysis, H$_2$O calculated; corresponds to Ca$_{1.01}$(Co$_{0.07}$Fe$_{0.67}$Ni$_{0.30}$)$_{2-2.00}$(AsO$_4$)$_{2-0.00}$(OH)$_{0.66}$(H$_2$O)$_{1.1}$, L$_{2-2.00}$ - (2) Bou Azzer district, Anti-Atlas, Morocco; average electron microprobe analysis, H$_2$O calculated.

Polymorphism & Series: Solid solution among Co, Fe$^{3+}$, and Ni-dominant endmembers is common.

Mineral Group: Tsumcorite-group, lotharmeyerite subgroup.

Occurrence: In the oxidation zone of polymetallic ore deposits.

Association: Alumopharmacosiderite, bariumpharmacosiderite, arseniosiderite, zeunerite, olivenite, rooseveltite (Rappold and Pucher mines); Co- and Ni-bearing mawbyite, cobalttsumarite, galena, arseniosiderite, plumbogummite (Am Roten Berg, Schneeberg-Neustädtel); erythrite, heterogenite (Tazalaght deposit); roselite, roselite-beta, dolomite, quartz (Bou Azzer district).

Distribution: In dump material from the Rappold, Pucher and Am Roten Berg mines, near Scheeberg, Saxony, Germany; at the Tazalaght Cu-As deposit, near Tazalaght, 40 km east of Tafraout city, Bou Azzer district, Anti-Atlas, Morocco.

Name: The prefix, cobalt, indicates the cobalt analog of lotharmeyerite.

Type Material: Bergakademie, Freiberg, Saxony, Germany.

References: (1) Krause, W., H. Effenberger, H.-J. Bernhardt, and M. Martin (1999) Cobaltlotharmeyerite, Ca(Co$_{0.2}$Fe$_{0.8}$Ni$_{0.0}$)$_2$(AsO$_4$)$_2$(OH,H$_2$O)$_2$, a new mineral from Schneeberg, Germany.  