Skorpionite Ca$_3$Zn$_2$(PO$_4$)$_2$CO$_3$(OH)$_2$·H$_2$O

Crystal Data: Monoclinic.  Point Group: 2/m.  As needle-like crystals, to 0.5 mm, elongated parallel to [001] with dominant {100} and {110}; additional forms {111}, {221}, {131}, {1 01}.


D(meas.) = 3.15(3)  D(calc.) = 3.17


Optical Class: Biaxial (-).  a = 1.5884(10)  β = 1.6445 (calc.)  γ = 1.6455(10)  2V = 15.0(5)°

Orientation: Y ∧ c = 26° (in acute β); Z = b.

Cell Data: Space Group: C2/c.  a = 19.045(3)  b = 9.320(2)  c = 6.525(1)  β = 92.73(2)°

Z = 4

X-ray Powder Pattern: Skorpion mine, Lüderitz district, Karas region, south-western Namibia. Intensities corrected to remove effects of preferred orientation.

3.170 (100), 2.788 (67), 3.014 (54), 9.501 (53), 3.063 (42), 5.238 (30), 2.582 (21)

Chemistry:

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CaO</td>
<td>30.89</td>
<td>30.42</td>
</tr>
<tr>
<td>ZnO</td>
<td>28.83</td>
<td>29.43</td>
</tr>
<tr>
<td>P$_2$O$_5$</td>
<td>25.49</td>
<td>25.67</td>
</tr>
<tr>
<td>CO$_2$ (calc)</td>
<td>7.96</td>
<td>7.96</td>
</tr>
<tr>
<td>H$_2$O (calc)</td>
<td>6.52</td>
<td>6.52</td>
</tr>
<tr>
<td>Total</td>
<td>99.69</td>
<td>100.00</td>
</tr>
</tbody>
</table>

1) Skorpion mine, Lüderitz district, Karas region, south-western Namibia; average of 17 electron microprobe analyses, anionic groups confirmed by IR, H$_2$O and CO$_2$ calculated, corresponding to Ca$_{3.05}$Zn$_{1.96}$(PO$_4$)$_{1.96}$(CO$_3$)$_{1.00}$(OH)$_{2.00}$·0.98H$_2$O.  (2) Ca$_3$Zn$_2$(PO$_4$)$_2$CO$_3$(OH)$_2$·H$_2$O.

Occurrence: A secondary mineral in an oxidized non-sulfide zinc deposit formed by weathering of sediment- and volcanic-hosted disseminated sulfide minerals.

Association: Tarbuttite, hydrozincite, gypsum.

Distribution: Skorpion zinc mine, Lüderitz district, Karas region, south-western Namibia.

Name: For the locality that produced the first specimens.

Type Material: Mineralogical Institute, University of Bochum, Germany, IMA 2005-010.