Vonbezingite

\[ \text{Ca}_6\text{Cu}_3(\text{SO}_4)_3(\text{OH})_{12}\cdot2\text{H}_2\text{O} \]


**Crystal Data:** Monoclinic. *Point Group:* 2/m. As crystals, elongated along [001], to 3 cm, showing \{110\}, \{010\}, \{100\} \{111\}, \{101\}. *Twining:* On \{001\}, twinned by merohedry.

**Physical Properties:** *Fracture:* Subconchoidal. *Tenacity:* Brittle. *Hardness = ~4*

D(meas.) = 2.82(2)  D(calc.) = 2.81–2.83


*Optical Class:* Biaxial (−). *Pleochroism:* Strong; X = pale blue; Y = grayish blue; Z = dark blue. *Orientation:* X = b; Y \(\wedge a = 30.2^\circ\); Z \(\wedge c = -11.5^\circ\). *Dispersion:* r \(> v\), moderate.

\(\alpha = 1.590(2)\)  \(\beta = 1.610(3)\)  \(\gamma = 1.619(2)\)

2V(meas.) = 65(5)°  2V(calc.) = 67°

**Cell Data:** *Space Group:* P\(2_1/c\).  a = 15.122(2)  b = 14.358(1)  c = 22.063(4)

\(\beta = 108.68(1)^\circ\)  Z = 8

**X-ray Powder Pattern:** Wessels mine, South Africa.

3.393 (100), 3.120 (85), 3.188 (65), 3.098 (57), 3.368 (55), 3.200 (53), 2.769 (41)

**Chemistry:**

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{SO}_3)</td>
<td>24.0</td>
<td>25.04</td>
</tr>
<tr>
<td>(\text{CuO})</td>
<td>25.5</td>
<td>24.87</td>
</tr>
<tr>
<td>(\text{CaO})</td>
<td>35.4</td>
<td>35.07</td>
</tr>
<tr>
<td>(\text{H}_2\text{O})</td>
<td>15.6</td>
<td>15.02</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100.5</td>
<td>100.00</td>
</tr>
</tbody>
</table>

(1) Wessels mine, South Africa; by electron microprobe, average of six analyses, \(\text{H}_2\text{O}\) by TGA-mass spectrometry; corresponds to \(\text{Ca}_{6.03}\text{Cu}_{3.07}(\text{SO}_4)_{2.87}(\text{OH})_{12.46}\cdot2.06\text{H}_2\text{O}\). (2) \(\text{Ca}_6\text{Cu}_3(\text{SO}_4)_3(\text{OH})_{12}\cdot2\text{H}_2\text{O}\).

**Occurrence:** A very rare mineral formed during a period of evaporation of surface or ground waters at ambient temperature and atmospheric pressure.

**Association:** Barite, azurite, sturmanite, calcite, gypsum, bultfonteinite.

**Distribution:** From the Wessels mine, near Kuruman, Cape Province, South Africa.

**Name:** To honor Karl-Ludwig von Bezing (1945–), Austrian-South African mineral collector, for his contributions to knowledge of mineralogy of the Kalahari manganese field.

**Type Material:** American Museum of Natural History, New York, New York, USA, T100748.

**References:** (1) Dai, Y. and G.E. Harlow (1992) Description and crystal structure of vonbezingite, a new \(\text{Ca}\)–\(\text{Cu}\)–\(\text{SO}_4\)–\(\text{H}_2\text{O}\) mineral from the Kalahari manganese field, South Africa. Amer. Mineral., 77, 1292–1300.