Vonbezingite $Ca_6Cu_3(SO_4)_3(OH)_{12}\cdot 2H_2O$

Crystal Data: Monoclinic. *Point Group:* $2/m$. As crystals, elongated along [001], to 3 cm, showing {110}, {010}, {100} {111}, {101}. *Twinning:* 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 Properties: Semitransparent. *Color:* Dark blue. *Streak:* Pale blue. *Luster:* Vitreous on fractures, subvitreous on crystal faces.
Optical Class: Biaxial (–). *Pleochroism:* Strong; X = pale blue; Y = grayish blue; Z = dark blue. *Orientation:* $X = b$; $Y \wedge a = 30.2°$; $Z \wedge c = -11.5°$. *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:* $P2_1/c$. $a = 15.122(2)$ $b = 14.358(1)$ $c = 22.063(4)$
$\beta = 108.68(1)°$ 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:

	(1)	(2)
SO_3	24.0	25.04
CuO	25.5	24.87
CaO	35.4	35.07
H_2O	15.6	15.02
Total	100.5	100.00

(1) Wessels mine, South Africa; by electron microprobe, average of six analyses, H_2O by TGA-mass spectrometry; corresponds to $Ca_{6.03}Cu_{3.07}(SO_4)_{2.87}(OH)_{12.46}\cdot 2.06H_2O$. (2) $Ca_6Cu_3(SO_4)_3(OH)_{12}\cdot 2H_2O$.

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) Descripton and crystal structure of vonbezingite, a new Ca−Cu−SO_4−H_2O mineral from the Kalahari manganese field, South Africa. Amer. Mineral., 77, 1292–1300.