Liebauite $Ca_3Cu_5Si_9O_{26}$

Crystal Data: Monoclinic. *Point Group:* $2/m$. As crystals, to < 0.03 mm.

Physical Properties: Hardness = 5–6 D(meas.) = n.d. D(calc.) = 3.62

Optical Properties: Transparent. *Color:* Bluish green. *Luster:* Vitreous.
Optical Class: Biaxial (+). $\alpha = 1.722(1)$ $\beta = 1.723(1)$ $\gamma = 1.734(1)$ 2V(meas.) = 72.8°

Cell Data: *Space Group:* $C2/c$. $a = 10.160(1)$ $b = 10.001(1)$ $c = 19.973(2)$
$\beta = 91.56(1)°$ Z = 4

X-ray Powder Pattern: Sattelberg volcano, Germany.
3.00 (100), 3.12 (90), 6.70 (70), 2.41 (70), 7.13 (60), 2.45 (60), 1.78 (50)

Chemistry:

	(1)
SiO_2	48.5
CuO	34.9
CaO	15.0
Total	98.4

(1) Sattelberg volcano, Germany; by electron microprobe, average of six analyses; corresponding to $Ca_{2.99}Cu_{4.91}Si_{9.05}O_{26}$.

Occurrence: In cavities in argillaceous sedimentary xenoliths subjected to very high-grade thermal metamorphism.

Association: Cuprorivaite, tenorite, volborthite, calciovolborthite.

Distribution: In Germany, at the Sattelberg and Nickenicher Sattel volcanos and the Emmelberg cone, near Kruft, Eifel district.

Name: For Dr. Friedrich Liebau, Kiel, Germany, prominent worker on silicate minerals.

Type Material: University of Würzburg, Würzburg; and University of Kiel, Kiel, Germany.

References: (1) Zöller, M.H., E. Tillmanns, and G. Hentschel (1992) Liebauite, $Ca_3Cu_5Si_9O_{26}$: a new silicate mineral with 14er single chain. Zeits. Krist., 200, 115–126. (2) (1993) Amer. Mineral., 78, 673 (abs. ref. 1).