Kottenheimite $Ca_3Si(OH)_6(SO_4)_2 \cdot 12H_2O$

Crystal Data: Hexagonal. *Point Group*: 6/*m*. As radiated and sub-parallel clusters of curved and split hair-like crystals, to 0.2 mm.

Physical Properties: *Cleavage*: None. *Fracture*: Uneven. *Tenacity*: Brittle. Hardness = 2-2.5 D(meas.) = 1.92(2) D(calc.) = 1.93

Optical Properties: Translucent. *Color*: Snow-white, colorless in transmitted light. *Streak*: n.d. *Luster*: Vitreous to silky (aggregates).
Optical Class: Uniaxial (–). ω = 1.490(2) ε = 1.477(2)

Cell Data: *Space Group*: $P6_3/m$. a = 11.1548(3) c = 10.5702(3) Z = 2

X-ray Powder Pattern: Bellerberg, near Kottenheim, Eastern Eifel area, Germany.
9.72 (100), 5.590 (60), 3.840 (54), 2.751 (34), 2.185 (30), 2.536 (27), 4.645 (26)

Chemistry:

	(1)	(2)
CaO	26.04	25.54
MgO	0.20	
FeO	0.19	
Al_2O_3	0.25	
SiO_2	8.95	9.12
SO_3	24.26	24.31
CO_2	0.58	
H_2O	41.30	41.03
Total	101.77	100.00

(1) Bellerberg, near Kottenheim, Eastern Eifel area, Germany; average of 6 electron microprobe analyses, Fe^{+3} confirmed by Mössbauer spectroscopy, H_2O and CO_2 were determined by gas chromatography, OH, CO_3 and SO_4 confirmed by IR spectroscopy; corresponding to $Ca_{3.015}Mg_{0.03}Fe_{0.02}Al_{0.03}Si_{0.97}(OH)_{5.94}(SO_4)_{1.97}(CO_3)_{0.09} \cdot 11.91H_2O$. (2) $Ca_3Si(OH)_6(SO_4)_2 \cdot 12H_2O$.

Mineral Group: Ettringite group.

Occurrence: In miarolitic cavities in alkali basalt.

Association: Wollastonite, clinochlore, ellestadite, melilite, cuspidine, and earlier-formed sanidine, clinopyroxene, magnetite.

Distribution: At Bellerberg, near Kottenheim, Eastern Eifel area, Rhineland-Palatinate (Rheinland-Pfalz), Germany.

Name: For the town near the locality that produced the first specimens.

Type Material: A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia (4102/1).

References: (1) Chukanov, N.V., S.N. Britvin, K.V. Van, S. Möckel, and A.E. Zadov (2012) Kottenheimite, $Ca_3Si(OH)_6(SO_4)_2 \cdot 12H_2O$, a new member of the ettringite group from the Eifel area, Germany. Can. Mineral., 50, 55-63. (2) (2014) Amer. Mineral., 99, 1515 (abs. ref. 1).