Kottenheimite  

**Chemical Formula:** $\text{Ca}_3\text{Si(OH)}_6(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$

**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  
$\text{D(meas.)} = 1.92(2)$  
$\text{D(calc.)} = 1.93$

**Optical Properties:**  
**Translucent.**  
**Color:** Snow-white, colorless in transmitted light.  
**Streak:** n.d.  
**Luster:** Vitreous to silky (aggregates).  
**Optical Class:** Uniaxial (−).  
$\omega = 1.490(2)$  
$\epsilon = 1.477(2)$

**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:**

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
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</thead>
<tbody>
<tr>
<td>$\text{CaO}$</td>
<td>26.04</td>
<td>25.54</td>
</tr>
<tr>
<td>$\text{MgO}$</td>
<td>0.20</td>
<td></td>
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<tr>
<td>$\text{FeO}$</td>
<td>0.19</td>
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<tr>
<td>$\text{Al}_2\text{O}_3$</td>
<td>0.25</td>
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<tr>
<td>$\text{SiO}_2$</td>
<td>8.95</td>
<td>9.12</td>
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<tr>
<td>$\text{SO}_3$</td>
<td>24.26</td>
<td>24.31</td>
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<tr>
<td>$\text{CO}_2$</td>
<td>0.58</td>
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<tr>
<td>$\text{H}_2\text{O}$</td>
<td>41.30</td>
<td>41.03</td>
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</tbody>
</table>

Total 101.77 100.00

(1) Bellerberg, near Kottenheim, Eastern Eifel area, Germany; average of 6 electron microprobe analyses, $\text{Fe}^{3+}$ confirmed by Mössbauer spectroscopy, $\text{H}_2\text{O}$ and $\text{CO}_2$ were determined by gas chromatography, $\text{OH}$, $\text{CO}_3$ and $\text{SO}_4$ confirmed by IR spectroscopy; corresponding to $\text{Ca}_{3.015}\text{Mg}_{0.03}\text{Fe}_{0.02}\text{Al}_{0.03}\text{Si}_{0.97}(\text{OH})_{5.94}(\text{SO}_4)_{1.97}(\text{CO}_3)_{0.09}11.91\text{H}_2\text{O}$.  
(2) $\text{Ca}_3\text{Si(OH)}_6(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$.

**Mineral Group:** Ettringite group.

**Occurrence:** In miarolitic cavities in alkali basalt.

**Association:** Wollastonite, clinohlore, 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:**  