Carraraite  \([\text{Ca}_3\text{Ge(SO}_4\text{)(CO}_3\text{)(OH)}_6\cdot12\text{H}_2\text{O}}\]

(C)2001-2005 Mineral Data Publishing, version 1

**Crystal Data:** Hexagonal.  **Point Group:** 6/m.  Hexagonal crystals, tabular on \{0001\}, to prismatic, elongated along [10\(\overline{1}\)0], to 0.6 mm.

**Physical Properties:** Hardness = [2.5] (by analogy to the ettringite group).  
D(meas.) = n.d.  D(calc.) = 1.979

**Optical Properties:** Transparent to translucent.  **Color:** Milky white.  **Luster:** Vitreous.  **Optical Class:** Uniaxial (−) \(\omega = 1.509(1)\) \(\epsilon = 1.479(1)\)

**Cell Data:**  **Space Group:** \(P6_3/m\).  
\(a = 11.056(3)\) \(c = 10.629(6)\)  \(Z = 2\)

**X-ray Powder Pattern:** Gioia quarry, Italy.  
9.57 (vs), 5.53 (s), 3.83 (s), 3.56 (ms), 2.74 (ms), 3.44 (m), 2.53 (m)

**Chemistry:**

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{SO}_3)</td>
<td>16.19</td>
<td>12.00</td>
</tr>
<tr>
<td>(\text{CO}_2)</td>
<td>6.60</td>
<td></td>
</tr>
<tr>
<td>(\text{GeO}_2)</td>
<td>18.15</td>
<td>15.68</td>
</tr>
<tr>
<td>(\text{CaO})</td>
<td>35.70</td>
<td>25.22</td>
</tr>
<tr>
<td>(\text{H}_2\text{O})</td>
<td>40.50</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.00</strong></td>
<td></td>
</tr>
</tbody>
</table>

(1) Gioia quarry, Italy; by electron microprobe, corresponds to \(\text{Ca}_3\text{Ge(SO}_4\text{)(CO}_3\text{)(OH)}_6\cdot12\text{H}_2\text{O}\).  (2) \(\text{Ca}_3\text{Ge(SO}_4\text{)(CO}_3\text{)(OH)}_6\cdot12\text{H}_2\text{O}\) as confirmed by crystal-structure analysis.

**Mineral Group:** Ettringite group.

**Occurrence:** A rare secondary mineral formed by late-stage hydrothermal alteration of earlier sulfides and sulfosalts.

**Association:** Nordstrandite, dawsonite.

**Distribution:** From the Gioia quarry, Colonnata Valley, northeast of Carrara, Tuscany, Italy.

**Name:** For its occurrence in the Carrara district, Italy.

**Type Material:** Natural History Museum, University of Pisa, Pisa, Italy.