Apachite  

\[ \text{Cu}_9\text{Si}_{10}\text{O}_{29}\cdot11\text{H}_2\text{O} \]

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**Crystal Data:** Monoclinic, probable.  
**Point Group:** n.d.  
As minute, twisted or curved beaded spherules of radial fibers, composed of crystals; in seams, exhibiting a silky, fibrous structure on broken surfaces.

**Physical Properties:**  
Hardness = 2  
\( D(\text{meas.}) = 2.80(2) \)  
\( D(\text{calc.}) = 3.26 \)

**Optical Properties:**  
Transparent to translucent.  
**Color:** Faïence-blue; in thin section, rich blue.  
**Luster:** Nonmetallic, silky.  
**Optical Class:** Biaxial (−).  
**Orientation:** \( Y \sim \) length.  
\( \alpha = 1.610 \)  
\( \beta = 1.650 \)  
\( \gamma = 1.650 \)  
\( 2V(\text{meas.}) = \text{Small} \)

**Cell Data:**  
**Space Group:** n.d.  
\( a = 12.89 \)  
\( b = 6.055 \)  
\( c = 19.11 \)  
\( \beta = 90.42^\circ \)  
\( Z = [2] \)

**X-ray Powder Pattern:**  
Christmas, Arizona, USA.  
12.89 (100), 3.168 (70), 7.663 (50), 10.62 (40), 9.556 (40), 4.491 (40), 4.174 (40)

**Chemistry:**

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{SiO}_2 )</td>
<td>40.8</td>
<td>39.66</td>
</tr>
<tr>
<td>FeO</td>
<td>0.3</td>
<td></td>
</tr>
<tr>
<td>CuO</td>
<td>43.6</td>
<td>47.26</td>
</tr>
<tr>
<td>MgO</td>
<td>1.7</td>
<td></td>
</tr>
<tr>
<td>CaO</td>
<td>1.8</td>
<td></td>
</tr>
<tr>
<td>( \text{H}_2\text{O} )</td>
<td>13.8</td>
<td>13.08</td>
</tr>
<tr>
<td>Total</td>
<td>102.0</td>
<td>100.00</td>
</tr>
</tbody>
</table>

(1) Christmas, Arizona, USA; average of two analyses; after recalibration to 100%, corresponds to \( (\text{Cu}_{7.87}\text{Mg}_{0.61}\text{Ca}_{0.46}\text{Fe}_{0.06})\Sigma=9.96\text{Si}_{9.75}\text{O}_{28.5}\cdot11\text{H}_2\text{O} \).  
(2) \( \text{Cu}_9\text{Si}_{10}\text{O}_{29}\cdot11\text{H}_2\text{O} \).

**Occurrence:** A retrograde metamorphic or mesogene mineral, formed at the expense of a prograde calc-silicate and sulfide assemblage in tactites; typically in fractures or crackled zones cutting garnet-diopside rock, replacing both these silicates and calcite.

**Association:** Kinoite, gilalite, stringhamite, junitoite, clinohedrite, xonotlite, apophyllite, calcite, tobermorite.

**Distribution:** In the Christmas copper mine, Gila Co., Arizona, USA.

**Name:** For the Apache Indians who inhabit the region in Arizona, USA, where it occurs.


**References:**  