**Nelenite**

\[
\text{(Mn}^{2+},\text{Fe}^{2+})_{16}\text{As}^{3+}_{3}\text{Si}_{12}\text{O}_{36}(\text{OH})_{17}
\]

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**Crystal Data:**  Hexagonal.  *Point Group:* \(\overline{3} 2/m\).  Coarse granular, to 4.5 cm; massive.

**Physical Properties:**  
- *Cleavage:* \{0001\}, perfect.  
- *Hardness:* \(\sim 5\)  
- *D(meas.)* = 3.46  
- *D(calc.)* = 3.44–3.45

**Optical Properties:**  
- *Transparent.*  
- *Color:* Light to medium brown; in transmitted light, colorless to light brown.  
- *Streak:* Light brown.  
- *Luster:* Vitreous on cleavages, resinous and duller on fractures.  
- *Optical Class:* Uniaxial (−); may appear biaxial.  
- *Pleochroism:* O = light brown; E = colorless.  
- \(\omega = 1.718(4)\)  
- \(\epsilon = 1.700(4)\)  
- \(2V(\text{meas.}) = 0^\circ\)

**Cell Data:**  
- *Space Group:* \(R\bar{3}m\).  
- \(a = 13.418(5)\)  
- \(c = 85.48(8)\)  
- \(Z = [2]\)

**X-ray Powder Pattern:**  
Franklin, New Jersey, USA.  
2.552 (100), 2.878 (70), 3.55 (60), 1.677 (60), 1.723 (50), 7.10 (40), 2.402 (40)

**Chemistry:**

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{SiO}_2)</td>
<td>31.12</td>
<td>30.8</td>
</tr>
<tr>
<td>(\text{As}_2\text{O}_3)</td>
<td>12.46</td>
<td>13.2</td>
</tr>
<tr>
<td>(\text{FeO})</td>
<td>17.12</td>
<td>17.8</td>
</tr>
<tr>
<td>(\text{MnO})</td>
<td>29.22</td>
<td>28.1</td>
</tr>
<tr>
<td>(\text{ZnO})</td>
<td>3.63</td>
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<tr>
<td>(\text{MgO})</td>
<td>0.12</td>
<td>0.5</td>
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<tr>
<td>(\text{CaO})</td>
<td>0.4</td>
<td></td>
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<tr>
<td>(\text{H}_2\text{O})</td>
<td>6.42</td>
<td>[6.6]</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100.00</td>
<td>[100.0]</td>
</tr>
</tbody>
</table>

(1) Franklin, New Jersey, USA; corresponds to \((\text{Mn}_{9.54}\text{Fe}_{5.51}\text{Zn}_{1.04}\text{Mg}_{0.07})\Sigma=16.16\) \(\text{As}_{2.92}\text{Si}_{12}\text{O}_{36.26}(\text{OH})_{16.52}\).  
(2) Do.; by electron microprobe, \(\text{H}_2\text{O}\) by difference; corresponds to \((\text{Mn}_{9.27}\text{Fe}_{6.80}\text{Zn}_{0.75}\text{Mg}_{0.29}\text{Ca}_{0.17})\Sigma=16.28\) \(\text{As}_{3.12}\text{Si}_{12}\text{O}_{36.39}(\text{OH})_{17.14}\).

**Polymorphism & Series:**  
Dimorphous with schallerite.

**Occurrence:**  In a metamorphosed stratiform zinc deposit, within pegmatitic textured masses, and as calcite-cemented fragments in a breccia probably derived from the pegmatitic material.

**Association:**  Actinolite, calcite, willemite, tirodite, rhodonite, apatite, lennilenapeite, stilpnomelan, microcline, talc.

**Distribution:**  From Franklin, Sussex Co., New Jersey, USA.

**Name:**  In honor of Joseph A. Nelen, chemist at the Smithsonian Institution, Washington, D.C., USA.

**Type Material:**  

**References:**  