Haynesite  \((\text{UO}_2)_3(\text{Se}^{4+}\text{O}_3)_2(\text{OH})_2\cdot 5\text{H}_2\text{O}\)

\(^c^\text{⃝} 2001-2005\) Mineral Data Publishing, version 1

**Crystal Data:** Orthorhombic.  
*Point Group:* \(2/m 2/m 2/m\) or \(mm2\).  
Crystals are bladed, flattened on \{010\} and elongated along \[001\], to 3 mm; as divergent sprays and rosettes.

**Physical Properties:**  
*Cleavage:* On \{010\}, good.  
*Hardness:* \(1.5–2\)  
*D(meas.)* = 4.1  
*D(calc.)* = 4.07  
*Radioactive; fluoresces yellowish green under SW UV.*

**Optical Properties:**  
*Transparent to translucent.*  
*Color:* Amber-yellow; yellow in transmitted light.  
*Luster:* Vitreous.

*Optical Class:* Biaxial (−).  
*Pleochroism:* Strong; bright yellow to pale yellow.  
*Orientation:* \(X = a; Y = b; Z = c\).  
\(\alpha = 1.618(2)\)  
\(\beta = 1.738(3)\)  
\(\gamma = 1.765(5)\)  
\(2V(\text{meas.}) = 45^\circ\)  
\(2V(\text{calc.}) = 48^\circ\)

**Cell Data:**  
*Space Group:* \(Pn\text{cm or } Pn\text{c2}\).  
\(a = 8.025(5)\)  
\(b = 17.43(1)\)  
\(c = 6.935(3)\)  
\(Z = 2\)

**X-ray Powder Pattern:** Repete mine, Utah, USA.

<table>
<thead>
<tr>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{UO}_3)</td>
<td>71.81</td>
</tr>
<tr>
<td>(\text{SeO}_2)</td>
<td>17.91</td>
</tr>
<tr>
<td>(\text{H}_2\text{O})</td>
<td>8.56</td>
</tr>
</tbody>
</table>

Total [98.28] 100.00

(1) Repete mine, Utah, USA; by electron microprobe, average of 12 analyses, C and H by CHN analyzer, recalculated after removal of CaO 0.85% and CO\(_2\) 1.51% as calcite; then corresponds to \((\text{UO}_2)_{3.08}(\text{SeO}_2)_{1.98}(\text{OH})_2\cdot 4.72\text{H}_2\text{O}\).  
(2) \((\text{UO}_2)_3(\text{SeO}_3)_2(\text{OH})_2\cdot 5\text{H}_2\text{O}\).

**Occurrence:** Rare in an oxidized uranium deposit in mudstones and sandstones.

**Association:** Andersonite, boltwoodite, ferroselite, gypsum, barite, calcite.

**Distribution:** From the Repete mine, 34 km southeast of Blanding, San Juan Co., Utah, USA.

**Name:** Honors Patrick Eugene Haynes (1953– ), American geologist, mineral collector and dealer, who found the first specimens.

**Type Material:** Royal Belgian Institute of Natural Sciences, Brussels, Belgium, RC3922.

**References:**  