Bassetite \(\text{Fe}^{2+}(\text{UO}_2)_2(\text{PO}_4)_2\cdot8\text{H}_2\text{O}\)

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Crystal Data: Monoclinic, pseudotetragonal. \textit{Point Group}: \(2/m\). Crystals, with square or rectangular outline, to 3 mm, are thin tablets, flattened on \(\{010\}\), showing \(\{111\}, \{101\}, \{110\}, \{001\}, \{010\}\); typically in parallel or fanlike groups. \textit{Twinning}: Two or more individuals at \(\sim90^\circ\) with \(\{001\}\) of one individual \(\parallel\{100\}\) of the other; common.

Physical Properties: \textit{Cleavage}: \{010\}, perfect; \{100\} and \{001\}, distinct. Hardness = 2.5 \(\text{D(meas.)} = 3.40-3.63\) \(\text{D(calc.)} = 3.63\) Radioactive.

Optical Properties: Transparent; in transmitted light, seen as sectored due to twinning. \textit{Color}: Olive-green, olive-brown, yellowish brown, bronzy yellow, yellow. \textit{Luster}: Vitreous, bronzy on \{010\}. \textit{Optical Class}: Biaxial (-) (probable). \textit{Pleochroism}: \(X = Y = \text{yellow}; Z = \text{dark olive-brown to brownish black. Orientation:} X = b; Y \wedge c = 18.5^\circ. \text{Dispersion:} r > v, \text{strong.} \alpha = 1.603(2) \beta = 1.610(2) \gamma = 1.617(2) 2\text{V(meas.)} = \sim90^\circ\)

Cell Data: \textit{Space Group}: \(P2_1/m\) (synthetic). \(a = 6.98(4)\) \(b = 17.07(4)\) \(c = 7.01(7)\) \(\beta = 90^\circ32(5)\) \(Z = 2\)

X-ray Powder Pattern: Cornwall, England. 4.89 (10), 3.46 (10), 8.59 (6), 2.20 (6), 4.24 (3), 4.05 (3), 2.96 (3)

Chemistry:

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<tr>
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<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{UO}_3)</td>
<td>61.99</td>
<td>62.71</td>
<td>61.51</td>
<td>14.49</td>
<td>14.20</td>
<td>15.50</td>
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<tr>
<td>(\text{P}_2\text{O}_5)</td>
<td>15.21</td>
<td>15.43</td>
<td>15.26</td>
<td>insol</td>
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<td>0.63</td>
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<tr>
<td>(\text{FeO})</td>
<td>7.60</td>
<td>7.78</td>
<td>7.73</td>
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<tr>
<td>(\text{CuO})</td>
<td>0.28</td>
<td></td>
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<tr>
<td><strong>Total</strong></td>
<td>100.20</td>
<td>100.12</td>
<td>100.00</td>
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</tbody>
</table>

(1) Wheal Basset, Cornwall, England. (2) Arcu su Linnarbu, Italy. (3) \(\text{Fe(UO}_2)_2(\text{PO}_4)_2\cdot8\text{H}_2\text{O}\).

Mineral Group: Meta-autunite group.

Occurrence: A rare secondary mineral in the oxidized zone of some uranium-bearing hydrothermal mineral deposits.

Association: Uranospathite, torbernite, uraninite, pyrite (Basset mines, England); meta-autunite, torbernite (Arcu su Linnarbu, Italy); saléeite, metanovácekite (Sue mine, Arizona, USA).

Distribution: In England, from the Basset group of mines, Illogan, and the South Terras mine, St. Stephen-in-Brannel, Cornwall. At Arcu su Linnarbu, Capoterra, near Cagliari, Sardinia, Italy. From Daverdisse, Belgium. At the Los Ratones and Pedro Alvaro vanadium mines, Salamanca Province, Spain. From the La Crouzille mine, Haute-Vienne, France. In the USA, on Overland Mountain, Jamestown district, Boulder Co., Colorado; in Utah, from the Denise No. 1 mine and in the Fuenroil mine, Temple Mountain, Emery Co., Utah; in Arizona, at the Sue and Red Bluff mines, Sierra Ancha Mountains, and widespread in the Dripping Springs quartzite in the northwestern part of Gila Co.; from the Merry Widow mine, Grant Co., New Mexico.

Name: For the Basset mine group, Cornwall, England, from which it was first described.


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