Liebigite

\[ \text{Ca}_2(\text{UO}_2)(\text{CO}_3)_3 \cdot 11\text{H}_2\text{O} \]

Crystal Data: Orthorhombic. Point Group: \( mm2 \). Crystals are rare, short prismatic along [001], or equant, rounded with convex or vicinal faces, to 5 mm; scaly or granular, in aggregates, crusts, and films.

Physical Properties: Cleavage: On \( \{100\} \). Hardness = 2–3 D(meas.) = 2.41 D(calc.) = 2.41 Radioactive; strong green to blue-green fluorescence under SW and LW UV.


Optical Class: Biaxial (+). Pleochroism: \( X = \) nearly colorless; \( Y = Z = \) pale yellowish green. Orientation: \( X = a \). Dispersion: \( r > v \), moderate. \( \alpha = 1.494–1.501 \) \( \beta = 1.498–1.505 \) \( \gamma = 1.535–1.542 \) \( 2V(\text{meas.}) = 37°–42° \)

Cell Data: Space Group: \( Bba2 \). \( a = 16.699(3) \) \( b = 17.557(3) \) \( c = 13.697(2) \) \( Z = 8 \)

X-ray Powder Pattern: Jáchymov, Czech Republic. 6.81 (10), 8.68 (9), 5.40 (9), 4.55 (6), 3.10 (6), 3.33 (5), 3.31 (5)

Chemistry:

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<tr>
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<th>(1)</th>
<th>(2)</th>
<th>(1)</th>
<th>(2)</th>
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<tbody>
<tr>
<td>( \text{CO}_2 )</td>
<td>23.87</td>
<td>18.12</td>
<td>15.56</td>
<td>15.40</td>
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<td>( \text{UO}_2 )</td>
<td>37.11</td>
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<tr>
<td>( \text{H}_2\text{O} )</td>
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<td>23.35</td>
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<tr>
<td>( \text{UO}_3 )</td>
<td>39.27</td>
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<tr>
<td>Total</td>
<td>99.89</td>
<td>100.00</td>
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(1) Jáchymov, Czech Republic. (2) \( \text{Ca}_2(\text{UO}_2)(\text{CO}_3)_3 \cdot 11\text{H}_2\text{O} \).

Occurrence: An uncommon secondary mineral typically formed as an alteration product of uraninite in alkaline carbonate solutions.

Association: Uraninite, schröckingerite, uranophane-beta, tyuyamunite, autunite, uranophane, bayleyite, carnitite, gypsum, calcite.

Distribution: From Edirne (Adrianople) Province, Turkey. Abundant in a number of mines around Jáchymov (Joachimsthal), Czech Republic. In Germany, from Schneeberg, Saxony; at Eisleben and Hasserode, Saxony-Anhalt; and from Müllerbach, near Baden-Baden, Black Forest. At Schmiedeberg, Poland. From Wheal Bassett, Redruth, Cornwall, England. At Tyndrum, Perthshire, Scotland. From the Mas-d’Alary uranium deposit, three km south-southeast of Lodève, Hérault, France. In the USA, at the Midnite mine, Wellpinit, Stevens Co., Washington; in the Schwartzwalder mine, near Golden, Jefferson Co., Colorado; in Wyoming, in the Pumpkin Buttes area, Powder River basin, and at the Silver Cliffs mine, Lusk, Niobrara Co., and in the Lucky Mc mine, Wind River basin, Fremont Co.; from the Black Ape mine, Thompsons district, Grand Co., and in the Mi Vida mine, Big Indian district, San Juan Co., Utah; at Ambrosia Lake and Westwater Canyon, Grants district, McKinley Co., New Mexico; from Mt. Piskah, Jim Thorpe, Carbon Co., Pennsylvania. At Rabbit Lake, Saskatchewan, Canada. In the Tono mine, Gifu Prefecture, Japan. From Shinkolobwe, Katanga Province, Congo (Shaba Province, Zaire).

Name: To honor Professor Justus von Liebig (1803–1873), German chemist, University of Munich, Munich, Germany.

Type Material: American Museum of Natural History, New York, New York, USA, 16847.

References: