**Mounanaite**

\[
\text{PbFe}^{2+}_{2}(\text{VO}_{4})_{2}(\text{OH})_{2}
\]

**Crystal Data:** Monoclinic. \(\text{Point Group: } 2/m\). Crystals elongated along [001], flattened on \{010\}, to 0.3 mm; equant crystals appear pseudohexagonal; crystals are dominated by \{010\}, with \{100\}, \{110\}, \{011\}, \{11\overline{1}\}, \{12\overline{1}\}, \{02\overline{1}\}, \{01\overline{1}\}, \{021\}; as microcrystalline crusts.

**Twinning:** Common as simple twins of two types, by rotation around [001] or on \(\{11\overline{1}\}\).

**Physical Properties:**

- **Cleavage:** On \{001\}, good. Hardness = 4.5 \(D(\text{meas.}) = 4.85\) \(D(\text{calc.}) = 4.88-4.89\)
- **Optical Properties:**
  - Translucent to transparent.
  - Color: Reddish brown.
  - Optical Class: Biaxial (-).
  - Pleochroism: Strong; \(X = Z = \) pale yellow; \(Y = \) brown.
  - Orientation: \(Y = b\); \(X \wedge c = \sim 20^\circ\).
  - Dispersion: \(r > v\), strong. \(\alpha = [2.19]\) \(\beta = 2.25(2)\) \(\gamma = [2.27]\)
  - 2\(V(\text{meas.}) = 50(10)^\circ\)

**Cell Data:** Space Group: \(C2/m\). \(a = 9.294\) \(b = 6.164-6.166\) \(c = 7.703-7.713\) \(\beta = 115.54^\circ-115.57^\circ\) \(Z = 2\)

**X-ray Powder Pattern:** Mounana mine, Gabon.

- 4.64 (100), 3.055 (96), 3.264 (92), 7.766 (72), 2.816 (60), 2.320 (59), 4.562 (49)

**Chemistry:**

<table>
<thead>
<tr>
<th>Element</th>
<th>Formula</th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\text{P}_2\text{O}_5)</td>
<td>0.81</td>
<td></td>
<td></td>
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<tr>
<td>(\text{As}_2\text{O}_5)</td>
<td>0.18</td>
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<tr>
<td>(\text{V}_2\text{O}_5)</td>
<td>29.28</td>
<td>31.21</td>
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<tr>
<td>(\text{Al}_2\text{O}_3)</td>
<td>0.32</td>
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<tr>
<td>(\text{Fe}_2\text{O}_3)</td>
<td>26.01</td>
<td>27.40</td>
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<tr>
<td>(\text{CuO})</td>
<td>0.87</td>
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<tr>
<td>(\text{PbO})</td>
<td>38.47</td>
<td>38.30</td>
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<tr>
<td>(\text{H}_2\text{O})</td>
<td>[3.21]</td>
<td>3.09</td>
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<tr>
<td>Total</td>
<td>[99.15]</td>
<td>100.00</td>
<td></td>
</tr>
</tbody>
</table>

(1) Mounana mine, Gabon; by electron microprobe, total Fe as \(\text{Fe}_2\text{O}_3\), confirmed by IR and Mössbauer spectroscopy, \((\text{OH})^{1-}\) calculated for charge balance; corresponds to \(\text{Pb}_{1.02}\text{Fe}_{1.92}\text{Al}_{0.04}\text{Cu}_{0.06}\Sigma_{2.02}[(\text{VO}_{4})_{1.92}(\text{PO}_{4})_{0.07}(\text{AsO}_{4})_{0.01}]_{\Sigma=2.00}(\text{OH})_{2.04}\) (2) \(\text{PbFe}_2(\text{VO}_4)_2(\text{OH})_2\).

**Mineral Group:** Tsumcorite group.

**Occurrence:** A rare mineral in the oxidized zone of a sediment-hosted U-V deposit.

**Association:** Francevillite, curienite, vanuralite, goethite.

**Distribution:** From the Mounana uranium mine, Franceville, Gabon.

**Name:** For the Mounana mine, Gabon, the locality that produced the first specimens.

**Type Material:** University of Pierre and Marie Curie, Paris, 11647; National School of Mines, Paris, France.

**References:**


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