**Angarfite**

**NaFe^{3+}_5(PO_4)_4(OH)_4\cdot 4H_2O**

**Crystal Data:** Orthorhombic. *Point Group:* 222. Crystals prismatic to needle-like, elongate on [001], with poorly formed chisel-like terminations, to 2 mm.

**Physical Properties:**
- **Cleavage:** Poor on {010}.
- **Fracture:** Splintery.
- **Tenacity:** Brittle, slightly flexible splinters.
- **Hardness:** 2.5
- **D (meas.):** 2.76(3)
- **D (calc.):** 2.771

**Optical Properties:**
- **Color:** Orange-brown to red-brown.
- **Streak:** Pale brown.
- **Luster:** Vitreous.
- **Optical Class:** Biaxial (+).
- **α = 1.688(1)**
- **β = 1.696(1)**
- **γ = 1.708(2)**
- **2V (meas.) = 80(3)°**
- **Orientation:** X = b, Y = c, Z = a.
- **Absorption:** X < Y < Z.
- **Dispersion:** Strong, r > v.

**Cell Data:**
- **Space Group:** C222₁.
- **a = 12.788(3)**
- **b = 17.894(4)**
- **c = 8.195(2)**
- **Z = 4**

**X-ray Powder Pattern:** Angarf-Sud pegmatite, Tazenakht, Souss-Massa-Draâ region, Morocco. 9.016 (100), 3.355 (51), 10.463 (43), 6.459 (42), 1.463 (36), 1.926 (33), 3.026 (29)

**Chemistry:**

<table>
<thead>
<tr>
<th>Element</th>
<th>Formula</th>
<th>Content (% by weight)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Na_2O</td>
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<td>2.69</td>
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<tr>
<td>MgO</td>
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<tr>
<td>Mn_2O_3</td>
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<tr>
<td>Fe_2O_3</td>
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<td>37.36</td>
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<tr>
<td>P_2O_5</td>
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<tr>
<td>H_2O</td>
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<td>[14.63]</td>
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<tr>
<td>Total</td>
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<td>95.91</td>
</tr>
</tbody>
</table>

(1) Angarf-Sud pegmatite, Tazenakht, Souss-Massa-Draâ region, Morocco; average of 5 electron microprobe analyses, H_2O calculated from structure analysis; corresponding to Na_{0.71}(Fe^{3+}_{3.83}Mg_{0.97}Mn^{2+}_{0.19})_{2-4.99}(P_{1.00}O_5)_4(OH)_2\cdot (H_2O)_{1.29}\cdot 4H_2O.

**Occurrence:** Occurs in phosphate nodules in the intermediate zone of a granitic pegmatite by the reaction of Na-bearing hydrothermal solutions with primary triphylite.

**Association:** Triphylite, lipscombite–barbosalite, jahnsite-(NaFeMg), bederite.

**Distribution:** Angarf-Sud pegmatite, Tazenakht, Ouarzazate Province, Souss-Massa-Draâ region, Morocco.

**Name:** For the pegmatite body from which the first specimens were collected.

**Type Material:** Natural History Museum of Los Angeles County, California, USA (63428 and 63429).

**References:**