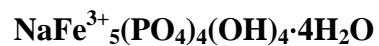


**Angarfite**

**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:** Transparent. *Color:* Orange-brown to red-brown. *Streak:* Pale brown.

*Luster:* Vitreous.

*Optical Class:* Biaxial (+).  $\alpha = 1.688(1)$   $\beta = 1.696(1)$   $\gamma = 1.708(2)$   $2V(\text{meas.}) = 80(3)^\circ$   $2V(\text{calc.}) = 79^\circ$  *Orientation:*  $X = b$ ,  $Y = c$ ,  $Z = a$ . *Pleochroism:*  $X = \text{tan}$ ,  $Y = \text{medium red-brown}$ ,  $Z = \text{dark red-brown}$ . *Absorption:*  $X < Y < Z$ . *Dispersion:* Strong,  $r > v$ .

**Cell Data:** *Space Group:* C222<sub>1</sub>.  $a = 12.788(3)$   $b = 17.894(4)$   $c = 8.195(2)$   $Z = 4$

**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:**

	(1)
Na <sub>2</sub> O	2.69
MgO	4.76
Mn <sub>2</sub> O <sub>3</sub>	1.79
Fe <sub>2</sub> O <sub>3</sub>	37.36
P <sub>2</sub> O <sub>5</sub>	34.68
H <sub>2</sub> O	[14.63]
Total	95.91

(1) Angarf-Sud pegmatite, Tazenakht, Souss-Massa-Draâ region, Morocco; average of 5 electron microprobe analyses, H<sub>2</sub>O calculated from structure analysis; corresponding to Na<sub>0.71</sub>(Fe<sup>3+</sup><sub>3.83</sub>Mg<sub>0.97</sub>Mn<sup>3+</sup><sub>0.19</sub>)<sub>Σ=4.99</sub>(P<sub>1.00</sub>O<sub>4</sub>)<sub>4</sub>(OH)<sub>2.71</sub>(H<sub>2</sub>O)<sub>1.29</sub>·4H<sub>2</sub>O.

**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:** (1) Kampf, A.R., S.J. Mills, R.M. Housley, G. Favreau, J.-C. Boulliard, and V. Bourgois (2012) Angarfite, NaFe<sub>5</sub><sup>3+</sup>(PO<sub>4</sub>)<sub>4</sub>(OH)<sub>4</sub>·4H<sub>2</sub>O, a new mineral species from the Angarf-Sud Pegmatite, Morocco: Description and crystal structure. Can. Mineral., 50, 781–791. (2) (2014) Amer. Mineral., 99, 1511 (abs. ref. 1).