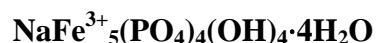


Angarfite

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:* $C222_1$. $a = 12.788(3)$ $b = 17.894(4)$ $c = 8.195(2)$ $Z = 4$

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 ₂ O	2.69
MgO	4.76
Mn ₂ O ₃	1.79
Fe ₂ O ₃	37.36
P ₂ O ₅	34.68
H ₂ O	[14.63]
Total	95.91

(1) Angarf-Sud pegmatite, Tazenakht, Souss-Massa-Draâ region, Morocco; average of 5 electron microprobe analyses, H₂O calculated from structure analysis; corresponding to $\text{Na}_{0.71}(\text{Fe}^{3+}_{3.83}\text{Mg}_{0.97}\text{Mn}^{3+}_{0.19})_{\Sigma=4.99}(\text{P}_{1.00}\text{O}_4)_4(\text{OH})_{2.71}(\text{H}_2\text{O})_{1.29} \cdot 4\text{H}_2\text{O}$.

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. Bourgoïn (2012) Angarfite, $\text{NaFe}_5^{3+}(\text{PO}_4)_4(\text{OH})_4 \cdot 4\text{H}_2\text{O}$, 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).