

Ferroalluaudite**NaCaFe²⁺(Fe³⁺, Mn²⁺, Fe²⁺)₂(PO₄)₃**

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Crystal Data: Monoclinic. *Point Group:* 2/*m*. Very fine-grained, massive.**Physical Properties:** Hardness = [5] D(meas.) = n.d. D(calc.) = [3.67]**Optical Properties:** Semitransparent. *Color:* Blue-green.*Optical Class:* Biaxial (+). *Pleochroism:* Strong; *X* = dull green to pale blue; *Y* = *Z* = bright green with a bluish tinge. *Dispersion:* *r* < *v*, strong. *n* = 1.775(5) 2*V*(meas.) = Large.**Cell Data:** *Space Group:* [C2/*c*] (by analogy to alluaudite). *a* = 11.898(2) *b* = 12.541(2) *c* = 6.434(1) β = 114°6(1)' *Z* = 4**X-ray Powder Pattern:** Helen Beryl mine, Custer, South Dakota, USA. (ICDD 39-377). 2.718 (100), 6.28 (68), 3.075 (31), 3.489 (28), 2.525 (25), 5.454 (24), 8.22 (16)

Chemistry:	(1)	(2)	(1)	(2)
P ₂ O ₅	[43.1]	43.75	CaO	1.59
Al ₂ O ₃	0.01	0.13	Li ₂ O	0.04
Fe ₂ O ₃	28.15	22.43	Na ₂ O	6.90
FeO	9.12	13.93	K ₂ O	0.00
MnO	7.25	5.04	H ₂ O ⁺	0.64
ZnO	0.06		insol.	1.19
MgO	1.98	3.25	Total	[100.0] [100.00]

(1) Pleasant Valley pegmatite, South Dakota, USA; P₂O₅ by difference; corresponds to Na_{0.24}(Na_{0.83}Ca_{0.13}Mn_{0.04}²⁺)_{Σ=1.00}(Fe_{0.54}²⁺Mn_{0.46}²⁺)_{Σ=1.00}(Fe_{1.69}³⁺Mg_{0.24}Fe_{0.06}²⁺Li_{0.01})_{Σ=2.00}(PO₄)₃.(2) Angarf-Sud pegmatite, Morocco; recalculated after deduction of barbosolite 10%; corresponds to Na_{0.52}(Na_{0.51}Ca_{0.43}Mn_{0.06}²⁺)_{Σ=1.00}(Fe_{0.72}²⁺Mn_{0.28}²⁺)_{Σ=1.00}(Fe_{1.37}³⁺Mg_{0.39}Fe_{0.23}²⁺Al_{0.01})_{Σ=2.00}(PO₄)₃.**Polymorphism & Series:** Forms a series with alluaudite.**Mineral Group:** Alluaudite group.**Occurrence:** From zoned granite pegmatites; in phosphatic nodules.**Association:** Triphylite, barbosolite, ferrisicklerite, apatite.**Distribution:** From the Pleasant Valley pegmatite and the Helen Beryl mine, near Custer, Custer Co., South Dakota, USA. At Rapid Creek, Yukon Territory, Canada. In the Angarf-Sud pegmatite, Tazenakht Plain, Anti-Atlas Mountains, Morocco. From the Norrö pegmatite, on Rånö Island, Sweden. At Kiluli, Rwanda.**Name:** For its dominant content of *ferrous* iron and relation to *alluaudite*.**Type Material:** National Museum of Natural History, Washington, D.C., USA, 162558.**References:** (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 669–670 [varulite, part]. (2) Moore, P.B. and J. Ito (1979) Alluaudites, wyllieites, arrojadites: crystal chemistry and nomenclature. Mineral. Mag., 43, 227–235. (3) Fransolet, A.-M., K. Abraham, and J.-M. Speetjens (1985) Evolution génétique et signification des associations de phosphates de la pegmatite d'Angarf-Sud, plaine de Tazenakht, Anti-Atlas, Maroc. Bull. Minéral., 108, 551–574 (in French with English abs.).