

Polyphite

Na₁₇Ca₃Mg(Ti, Mn)₄(Si₂O₇)₂(PO₄)₆O₃F₅

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Crystal Data: Triclinic. *Point Group:* 1. As flakes, flattened on {001}, to 3 mm, some epitaxially overgrown on lomonosovite and sobolovite.

Physical Properties: *Cleavage:* {001}, perfect; {110} and {100}, less perfect.
Fracture: Steplike. *Tenacity:* Brittle. Hardness = 5 D(meas.) = 3.07 D(calc.) = 3.00

Optical Properties: Translucent to transparent. *Color:* Light brown. *Luster:* Vitreous, resinous on fractures, pearly to adamantine on cleavages. *Streak:* White.
Optical Class: Biaxial (-). *Pleochroism:* X = colorless; Y = Z = yellowish. *Dispersion:* r < v, strong. *Absorption:* Z ≥ Y > X. α = 1.600 β = 1.658 γ = 1.676 2V(meas.) = 56°

Cell Data: *Space Group:* P1. a = 5.412(2) b = 7.079(3) c = 26.56(1) α = 95.21(4)°
β = 93.51(2)° γ = 90.10(3)° Z = 1

X-ray Powder Pattern: Lovozero massif, Russia.
2.937 (10), 2.702 (9), 2.659 (8), 2.048 (8b), 1.771 (5b), 1.730 (5), 4.37 (4)

Chemistry:	(1)		(1)	
	SiO ₂	13.2	CaO	8.3
	TiO ₂	12.0	SrO	0.3
	ZrO ₂	1.6	BaO	0.9
	Nb ₂ O ₅	2.7	Na ₂ O	28.0
	FeO	0.2	F	5.1
	MnO	5.6	P ₂ O ₅	23.3
	MgO	1.3	-O = (F, Cl) ₂	2.1
			Total	100.4

(1) Lovozero massif, Russia; by electron microprobe, average of three analyses; corresponds to (Na_{16.45}Mn_{0.43})_{Σ=16.88}(Ca_{2.70}Ba_{0.11}Sr_{0.05})_{Σ=2.86}(Mg_{0.59}Mn_{0.36}Fe_{0.05})_{Σ=1.00}(Ti_{2.71}Mn_{0.65}Nb_{0.37}Zr_{0.24})_{Σ=3.97}(Si₂O₇)₂(P_{1.00}O₄)₆O_{2.58}F_{4.89}.

Occurrence: In ultra-alkalic pegmatites in a differentiated alkalic massif.

Association: Nepheline, sodalite, analcime, potassic feldspar, albite, arfvedsonite, aegirine, cancrisilite, ussingite, makatite, villiaumite, quadruphite, lomonosovite, sobolovite, additional minor minerals.

Distribution: On Mt. Alluaiv, Lovozero massif, Kola Peninsula, Russia.

Name: From the Greek *poly*, for *many*, and PHosphorus, for the multiple phosphate anions in the chemical formula.

Type Material: A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia, r545/4.

References: (1) Khomyakov, A.P., G.N. Nechelyustov, E.A. Sokolova, and G.I. Dorokhova (1992) Quadruphite Na₁₄CaMgTi₄[Si₂O₇]₂[PO₄]₄O₄F₂ and polyphite Na₁₇Ca₃Mg(Ti, Mn)₄[Si₂O₇]₂[PO₄]₆O₂F₆ - new minerals of the lomonosovite group. Zap. Vses. Mineral. Obsch., 121(1), 105-112 (in Russian). (2) (1993) Amer. Mineral., 78, 1316-1317 (abs. ref. 1). (3) (1994) Mineral. Abs., 45, 240 (abs. ref. 1).