

Natropalermoite**Na₂SrAl₄(PO₄)₄(OH)₄**

Crystal Data: Orthorhombic. *Point Group:* 2/m 2/m 2/m. As prismatic crystals, to 200 μm, elongated and striated along [100].

Physical Properties: *Cleavage:* Perfect on {001}; fair on {100}. *Tenacity:* Brittle.
Fracture: Subconchoidal to fibrous. Hardness = 5.5 [by analogy to palermoite] D(calc.) = 3.502

Optical Properties: Transparent. *Color:* Colorless. *Streak:* White. *Luster:* Vitreous.
Optical Class: Biaxial (-). $\alpha = 1.624(1)$ $\beta = 1.641(1)$ $\gamma = 1.643(1)$ $2V(\text{meas.}) = 43(4)^\circ$
 $2V(\text{calc.}) = 38^\circ$ *Dispersion:* $v > r$, medium to weak.
Visually indistinguishable from palermoite.

Cell Data: *Space Group:* *Imcb*. $a = 11.4849(6)$ $b = 16.2490(7)$ $c = 7.2927(4)$ $Z = 4$

X-ray Powder Pattern: Calculated pattern.
3.128 (100), 4.907 (68), 3.327 (48), 4.689 (45), 3.078 (45), 2.453 (38), 2.636 (35)

Chemistry:	(1)
Al ₂ O ₃	28.6
Mn ₂ O ₃	0.36
Fe ₂ O ₃	0.35
Na ₂ O	7.68
Li ₂ O	[0.69]
MgO	0.26
CaO	0.16
SrO	14.5
BaO	0.14
P ₂ O ₅	42.28
H ₂ O	[5.29]
Total	100.29

(1) Palermo No. 1 mine, Groton, Grafton County, New Hampshire, USA; average of 10 electron microprobe analyses supplemented by Raman spectroscopy, Li₂O and H₂O calculated from structure; corresponds to (Na_{1.69}Li_{0.31}) $\Sigma=2.00$ (Sr_{0.95}Mg_{0.04}Ca_{0.02}Ba_{0.01}) $\Sigma=1.02$ (Al_{3.82}Mn_{0.03}Fe_{0.03}) $\Sigma=3.88$ (P_{1.01}O₄)₄(OH)₄.

Occurrence: In a complex, phosphate-bearing granitic pegmatite, formed by hydrothermal alteration of primary triphylite pods in the core-margin zone of the pegmatite.

Association: Palermoite, eosphorite, childrenite, lefontite, quartz.

Distribution: Found at the Palermo No. 1 mine, Groton, Grafton County, New Hampshire, USA.

Name: Reflects the presence of sodium (natrium) and the structural isomorphism to *palermoite*.

Type Material: Mineral Museum, University of Arizona, Tucson, Arizona, USA (19735) and the RRUFF Project (R130092).

References: (1) Schumer, B.N., Hexiong Yang, and R.T. Downs (2017) Natropalermoite, Na₂SrAl₄(PO₄)₄(OH)₄, a new mineral isostructural with palermoite, from the Palermo No. 1 mine, Groton, New Hampshire, USA. *Mineral. Mag.*, 81(4), 833-840. 2) (2017) *Amer. Mineral.*, 102, 2345 (abs. ref. 1).