Natropalermoite $Na_2SrAl_4(PO_4)_4(OH)_4$

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 (-). α = 1.624(1) β = 1.641(1) γ = 1.643(1) 2V(meas.) = 43(4)° 2V(calc.) = 38° *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_2O_3	28.6
Mn_2O_3	0.36
Fe_2O_3	0.35
Na_2O	7.68
Li_2O	[0.69]
MgO	0.26
CaO	0.16
SrO	14.5
BaO	0.14
P_2O_5	42.28
H_2O	[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, Li_2O and H_2O calculated from structure; corresponds to $(Na_{1.69}Li_{0.31})_{\Sigma=2.00}(Sr_{0.95}Mg_{0.04}Ca_{0.02}Ba_{0.01})_{\Sigma=1.02}(Al_{3.82}Mn_{0.03}Fe_{0.03})_{\Sigma=3.88}(P_{1.01}O_4)_4(OH)_4$.

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 *palermoit*e.

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, $Na_2SrAl_4(PO_4)_4(OH)_4$, 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).