Natrophilite $NaMn^{2+}PO_4$

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. Rarely as crystals; granular, cleavable massive.

Physical Properties: *Cleavage:* {001}, good; {100}, indistinct; {210}, interrupted. *Fracture:* Conchoidal. Hardness = 4.5–5 D(meas.) = 3.41 D(calc.) = 3.47

Optical Properties: Transparent to translucent. *Color:* Deep wine-yellow. *Luster:* Bright resinous to nearly adamantine, somewhat pearly on the {001} cleavage.
Optical Class: Biaxial (+). *Orientation:* $X = b$; $Y = c$; $Z = a$. *Dispersion:* $r < v$, strong.
$\alpha = 1.671(3)$ $\beta = 1.674(3)$ $\gamma = 1.684(3)$ 2V(meas.) = 75(5)°

Cell Data: *Space Group: Pnam.* $a = 10.523(5)$ $b = 4.987(2)$ $c = 6.312(3)$ Z = 4

X-ray Powder Pattern: Branchville, Connecticut, USA.
2.604 (10), 2.583 (10), 2.863 (8), 1.831 (7), 4.498 (6), 4.045 (6), 3.656 (5)

Chemistry:

	(1)	(2)
P_2O_5	41.03	41.05
FeO	3.06	
MnO	38.19	41.03
Li_2O	0.19	
Na_2O	16.79	17.92
H_2O	0.43	
insol.	0.81	
Total	100.50	100.00

(1) Branchville, Connecticut, USA. (2) $NaMnPO_4$.

Occurrence: A rare mineral, replacing lithiophilite, in a complex granite pegmatite.

Association: Lithiophilite, triploidite, eosphorite, huréaulite, fairfieldite, dickinsonite.

Distribution: From Branchville, Fairfield Co., Connecticut, USA.

Name: For its content of sodium, *natrium*, and from the Greek for *a friend*.

Type Material: Yale University, New Haven, Connecticut, 3.2362–3.2364; Harvard University, Cambridge, Massachusetts, USA, 95263.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 670–671. (2) Moore, P.B. (1972) Natrophilite, $NaMn(PO_4)$, has ordered cations. Amer. Mineral., 57, 1333–1344.