Niahite $(NH_4)(Mn^{2+},Mg)PO_4 \cdot H_2O$

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Crystal Data: Orthorhombic. *Point Group:* $mm2$. Rarely as individual crystals; in radiating and subparallel aggregates of crystals, to 0.5 mm.

Physical Properties: Hardness = n.d. D(meas.) = 2.39 D(calc.) = 2.437

Optical Properties: Semitransparent. *Color:* Pale orange; colorless in thin section. *Streak:* White.
Optical Class: Biaxial (–). $\alpha = 1.582(2)$ $\beta = 1.604(2)$ $\gamma = 1.609(2)$ 2V(meas.) = 54° 2V(calc.) = 50°

Cell Data: *Space Group:* $Pmn2_1$. $a = 5.68$ $b = 8.78$ $c = 4.88$ Z = 2

X-ray Powder Pattern: Niah Great Cave, Sarawak, Malaysia.
8.82 (10), 2.832 (9), 2.845 (8), 4.267 (6), 4.79 (5), 3.412 (4), 2.300 (4)

Chemistry:

	(1)
P_2O_5	37.83
MnO	27.21
MgO	4.19
CaO	1.99
$(NH_4)_2O$	12.9
H_2O	11.88
Total	96.00

(1) Niah Great Cave, Sarawak, Malaysia; by electron microprobe, total Mn as MnO, N, H, and P by microchemical methods; corresponding to $(NH_4)_{0.93}(Mn_{0.72}Mg_{0.20}Ca_{0.06})_{\Sigma=0.98}P_{1.00}O_{3.95} \cdot 1.23H_2O$.

Occurrence: A rare mineral, derived from the breakdown of bat guano (Niah Great Cave, Sarawak, Malaysia).

Association: Newberyite, collophane, hannayite, struvite, variscite (Niah Great Cave, Sarawak, Malaysia); newberyite, sussexite, pyrochroite (Sterling Hill, New Jersey, USA).

Distribution: From the Niah Great Cave, Sarawak, Malaysia. At Sterling Hill, Ogdensburg, Sussex Co., New Jersey, USA. In the Taguchi mine, Shidara, Aichi Prefecture, Japan.

Name: For the place of its first-noted occurrence, the Niah Great Cave, Malaysia.

Type Material: Malaysian Geological Survey, Kuching (Sarawak), Sarawak, Malaysia; Bureau of Mineral Resources, Canberra; Government Chemical Laboratories, Perth, Australia, MDC5089.

References: (1) Bridge, P.J. and B.W. Robinson (1983) Niahite – a new mineral from Malaysia. Mineral. Mag., 47, 79–80. (2) (1984) Amer. Mineral., 69, 408 (abs. ref. 1). (3) Dunn, P.J. (1995) Franklin and Sterling Hill, New Jersey. No publisher, n.p., 674.

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