

Heneuite

CaMg₅(PO₄)₃(CO₃)(OH)

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Crystal Data: Triclinic. *Point Group:* $\bar{1}$. As cleavable nodular masses, to several cm.

Physical Properties: *Cleavage:* Good on {001}. Hardness = 5.5 D(meas.) = 3.016(7)
D(calc.) = 3.016

Optical Properties: Transparent to translucent. *Color:* Pale blue-green. *Streak:* White.
Luster: Vitreous.

Optical Class: Biaxial (-). $\alpha = 1.586(2)$ $\beta = 1.620(2)$ $\gamma = 1.630(2)$ $2V(\text{meas.}) = \sim 50^\circ$
 $2V(\text{calc.}) = 56^\circ$

Cell Data: *Space Group:* $P\bar{1}$. $a = 6.311(1)$ $b = 10.843(1)$ $c = 8.676(1)$ $\alpha = 95.01(1)^\circ$
 $\beta = 93.41(1)^\circ$ $\gamma = 101.04(1)^\circ$ $Z = 2$

X-ray Powder Pattern: Tingelstad tjern, Norway.

2.70 (100), 2.87 (90), 2.79 (80), 2.836 (42), 3.67 (40), 2.845 (40), 2.60 (37)

Chemistry:

	(1)	(2)
P ₂ O ₅	38.6	40.67
As ₂ O ₅	1.05	
CO ₂	8.23	8.41
FeO	0.39	
MgO	37.9	38.49
CaO	10.9	10.71
Na ₂ O	0.16	
H ₂ O ⁺	2.54	1.72
H ₂ O ⁻	0.05	
Total	99.82	100.00

(1) Tingelstad tjern, Norway; after adjusting H₂O⁺ to 1.8%, corresponds to (Ca_{1.04}Na_{0.03})_{Σ=1.07}(Mg_{5.02}Fe_{0.03})_{Σ=5.05}[(PO₄)_{2.90}(AsO₄)_{0.05}]_{Σ=2.95}(CO₃)_{1.00}(OH)_{1.07}. (2) CaMg₅(PO₄)₃(CO₃)(OH).

Occurrence: In a serpentine–magnesite deposit developed in a regional metamorphic terrain.

Association: Althausite, apatite, magnesite, serpentine.

Distribution: From the Tingelstad tjern quarry, Modum, Norway.

Name: Honors Professor Henrich Neumann (1914–1983), Mineralogical-Geological Museum, University of Oslo, Oslo, Norway.

Type Material: Mineralogical-Geological Museum, University of Oslo, Oslo, Norway; National Museum of Natural History, Washington, D.C., USA, 164471.

References: (1) Raade, G., M.H. Mladeck, and V.K. Din (1986) Heneuite, CaMg₅(CO₃)(PO₄)₃(OH), a new mineral from Modum, Norway. *Neues Jahrb. Mineral., Monatsh.*, 343–350. (2) (1988) *Amer. Mineral.*, 73, 440 (abs. ref. 1). (3) Rømming, C. and G. Raade (1986) The crystal structure of heneuite, CaMg₅(CO₃)(PO₄)₃(OH). *Neues Jahrb. Mineral., Monatsh.*, 351–359.