

Crystal Data: Monoclinic. *Point Group:* 2/m. As anhedral inclusions in holtedahlite to 150 μm, as veinlets a few tens of micrometers wide in althausite crystals, and in fibrous coronae on heneuite.

Physical Properties: *Cleavage:* None. *Tenacity:* n.d. *Fracture:* n.d. *Hardness* = n.d. D(meas.) = n.d. D(calc.) = 2.806

Optical Properties: Transparent. *Color:* Colorless. *Streak:* White. *Luster:* Pearly. *Optical Class:* Biaxial (-). $\alpha = 1.5945(5)$ $\beta = 1.6069(5)$ $\gamma = 1.6088(5)$ $2V(\text{meas.}) = 45.6(1)^\circ$ $2V(\text{calc.}) = 43^\circ$ *Dispersion:* Strong, $r > v$. *Orientation:* $Y = b$.

Cell Data: *Space Group:* $P2_1/n$. $a = 5.250(1)$ $b = 11.647(2)$ $c = 9.655(2)$ $\beta = 95.94(1)^\circ$ $Z = 2$

X-ray Powder Pattern: Tingelstadjern, Modum district, southern Norway. 2.905 (100), 3.521 (80), 2.199 (80), 2.794 (75), 4.436 (75), 3.145 (70), 3.087 (70)

Chemistry:	(1)
MgO	55.35
FeO	0.25
MnO	0.30
CaO	0.02
P ₂ O ₅	28.23
As ₂ O ₅	0.40
SO ₃	0.05
SiO ₂	0.05
H ₂ O	[14.34]
Total	98.99

(1) Tingelstadjern, Modum district, southern Norway; average electron microprobe analysis supplemented by IR spectroscopy, H₂O calculated; corresponds to (Mg_{6.78}Fe_{0.02}Mn_{0.02})_{Σ=6.82}(P_{1.96}As_{0.02})_{Σ=1.98}H_{8.42}O₁₆.

Occurrence: Late metamorphic, under relatively low pressure and temperature, in nodules rich in apatite and Mg phosphates within a serpentinite body.

Association: Apatite, althausite, magnesite, holtedahlite, phosphoellenbergerite.

Distribution: Near Tingelstadjern, Modum district, southern Norway.

Name: Honors Dr. Gunnar Raade, Curator of Minerals, Natural History Museum, Oslo, Norway for his contribution to the mineralogy of Mg-phosphates.

Type Material: Natural History Museum, Paris, France (MNHN 201-1) and the Institute for Mineralogy, Ruhr University Bochum, Germany.

References: (1) Chopin, C., G. Ferraris, M. Prencipe, F. Brunet, and O. Medenbach (2001) Raadeite, Mg₇(PO₄)₂(OH)₈: a new dense-packed phosphate from Modum (Norway). *Eur. J. Mineral.*, 13, 319-327. (2) (2001) *Amer. Mineral.*, 86, 1536 (abs. ref. 1).