

Ardennite-(V)**Mn₄[Al₄(Al, Mg)][Si₅As]O₂₂(OH)₆**

Crystal Data: Orthorhombic. *Point Group:* 2/m 2/m 2/m. As acicular crystals; tabular, elongated along [010], to 1 mm; also as parallel aggregates.

Physical Properties: *Cleavage:* None observed. *Fracture:* n.d. *Tenacity:* Brittle.
Hardness = 6-7 D(meas.) = n.d. D(calc.) = 3.55

Optical Properties: Transparent. *Color:* Yellow. *Streak:* White. *Luster:* Vitreous.
Optical Class: Biaxial. $\alpha > 1.765(5)$ $\beta < 1.775(5)$ $\gamma = 1.775(5)$ *Orientation:* Z = b.
Pleochroism: Very weak; X = Y = pale yellow; Z = yellowish.

Cell Data: *Space Group:* Pnmm. $a = 8.760(3)$ $b = 5.838(2)$ $c = 18.56(2)$ Z = 2

X-ray Powder Pattern: Sparone, Piedmont, Italy.
2.609 (100), 2.948 (90), 1.585 (75), 2.033 (55), 1.477 (45), 1.525 (39), 2.329 (38)

Chemistry:	(1)
P ₂ O ₅	0.38
As ₂ O ₅	0.37
V ₂ O ₅	4.60
SiO ₂	31.21
TiO ₂	0.21
Al ₂ O ₃	22.60
Fe ₂ O ₃	1.64
Cr ₂ O ₃	0.34
MgO	4.44
MnO _{total}	23.28
CaO	4.24
Na ₂ O	0.02
F	0.17
H ₂ O _{calc}	5.70
O = -F	0.07
Total	99.20

(1) Sparone, Piedmont, Italy; electron microprobe analysis, Mn calculated to fill appropriate structural sites, H₂O calculated for charge balance; corresponding to [Mn²⁺_{3.221}Ca_{0.774}Na_{0.006}]_{Σ=4.001} [Al_{4.456}Mg_{1.127}Fe³⁺_{0.210}Mn³⁺_{0.137}Cr_{0.046}Ti_{0.027}]_{Σ=6.003} [Si_{5.000}][V_{0.518}Si_{0.315}Al_{0.080}P_{0.055}As_{0.033}]_{Σ=1.001} O_{21.433}(OH)_{6.475}F_{0.092}.

Occurrence: In a quartz veinlet in piemontite-bearing mica schist.

Association: Quartz, piemontite, hematite, muscovite.

Distribution: At Sparone, Locana Valley (TO), Piedmont, Italy.

Name: As the vanadium analog of *ardennite*, first described from Salmchâteau, Ardennes Mountains, Belgium.

Type Material: Museum of Natural History, University of Pisa, Italy (15525), and Regional Museum of Natural History, Turin, Italy (M/U 15544).

References: (1) Barresi, A.A., P. Orlandi, M. Pasero (2007) History of ardennite and the new mineral ardennite-(V). *Eur. J. Mineral.*, 19, 581-587. (2) (2008) *Amer. Mineral.*, 93, 702 (abs. ref. 1).