

Kannanite

Crystal Data: Orthorhombic. *Point Group:* 2/m 2/m 2/m. As incomplete tabular and columnar anhedral grains to 15 μm .

Physical Properties: *Cleavage:* None observed. [Expected to be perfect on {010} by analogy with ardennite.] *Fracture:* n.d. *Tenacity:* n.d. *Hardness:* = 6 *D(meas.):* = n.d. *D(calc.):* = 3.43

Optical Properties: Translucent. *Color:* Brownish orange to orange. *Streak:* n.d.

Luster: Vitreous.

Optical Class: [Biaxial.] *n(calc.):* = 1.788 *Pleochroism:* Weak, orange to brownish orange.

Cell Data: Space Group: *Pnmm*. *a* = 8.8802(14) *b* = 5.9919(13) *c* = 18.882(3) [*Z* = 2]

X-ray Powder Pattern: Kannan Mountain, Ozu district, Ehime Prefecture, Japan.

3.001 (100), 2.658 (67), 2.715 (66), 2.531 (47), 3.234 (37), 2.306 (37), 2.809 (35)

Chemistry:	(1)	(2)
V ₂ O ₃	6.04	7.45
As ₂ O ₃	1.52	
SiO ₂	29.73	29.89
Al ₂ O ₃	14.40	15.21
Fe ₂ O ₃	5.18	3.97
MnO	[3.89]	
Mn ₂ O ₃	[9.74]	11.78
CaO	19.02	22.31
MgO	2.70	4.01
CuO	0.34	
NiO	0.40	
H ₂ O	[5.22]	5.39
Total	97.83	100.00

(1) Kannan Mountain, Ozu district, Ehime Prefecture, Japan; average of 12 electron microprobe analyses supplemented by Raman spectroscopy, MnO/Mn₂O₃ apportioned from total Mn as MnO = 12.65 and H₂O calculated from stoichiometry; corresponds to (Ca_{3.60}Mn_{2+0.40}) $\Sigma=4$ (Al_{3.00}Mn³⁺_{1.31}Fe³⁺_{0.69}Mg_{0.71}Mn²⁺_{0.19}Ni_{0.06}Cu_{0.05}) $\Sigma=6$ [(V⁵⁺_{0.70}Si_{0.16}As_{0.14}) $\Sigma=1$ O_{3.84}(OH)_{0.16}](SiO₄)₂(Si₃O₁₀)(OH)₆.
 (2) Ca₄[(Al₃Mn³⁺_{1.5}Fe³⁺_{0.5})Mg](VO₄)(SiO₄)₂(Si₃O₁₀)(OH)₆.

Polymorphism & Series: Ardennite series.

Occurrence: A product of pumpellyite-actinolite-facies metamorphism of Fe-Mn-ore (quartz, hematite, braunite) in metachert.

Association: Ardennite-(V), piemontite, hematite, quartz.

Distribution: From Kannan Mountain, Ozu district, Ehime Prefecture, Japan.

Name: For the locality that produced the first specimen, *Kannan* Mountain, Japan.

Type Material: National Museum of Nature and Science, Tokyo, Japan (NSM M-44527).

References: (1) Nishio-Hamane, D., M. Nagashima, N. Ogawa, and T. Minakawa (2018) Kannanite, a new mineral from Kannan Mountain, Japan. *J. Mineral. Petrol. Sci.*, 113(5), 245-250. (2) (2020) *Amer. Mineral.*, 105, 1112-1113 (abs. ref. 1).