Cassagnaite $Ca_4Fe^{3+}_4(OH)_4V^{3+}_2O_2(OH)_2(SiO_4)_2(Si_3O_{10})$

Crystal Data: Orthorhombic. *Point Group*: 2/*m* 2/*m* 2/*m*. As prismatic to tabular {001} crystals, usually elongated along [100], to 0.1 mm, exhibiting forms {011}, {001} and {100}; as entangled aggregates.

Physical Properties: *Cleavage*: {001} (or parting). *Tenacity*: Brittle.
Hardness = n.d. D(meas.) = n.d. D(calc.) = 3.22

Optical Properties: Transparent. *Color*: Golden brown. *Streak*: Nearly white. *Luster*: Vitreous.
Pleochroism: Very weak; *N* = golden yellow-brown, *n* = pale golden yellow-brown.
Optical Class: Biaxial. *N* (parallel to *a*) = 1.810(5) *n* = 1.800(5)

Cell Data: *Space Group*: *Cmcm*. *a* = 6.066(1) *b* = 8.908(1) *c* = 18.995(2) *Z* = 2

X-ray Powder Pattern: Cassagna mine, Italy.
9.52 (100), 2.66 (70), 2.54 (65), 4.85 (50), 4.98 (45), 4.03 (40), 2.32 (40)

Chemistry:

	(1)	(2)	(3)
CaO	17.85–18.93	18.42	18.42
MnO	14.61–15.20	14.98	5.20
Mn_2O_3			10.88
Fe_2O_3	12.37–13.02	12.61	12.61
Al_2O_3	6.71–8.49	7.55	7.55
MgO	2.07–2.61	2.36	2.36
V_2O_3	5.04–5.84	5.42	5.42
SiO_2	29.25–33.75	31.69	31.69
H_2O_{calc}			5.87
Total			100.00

(1) Cassagna mine, Italy; range of 7 electron microprobe analyses, OH^- confirmed by micro-Raman analysis. (2) Cassagna mine, Italy; mean of 7 electron microprobe analyses. (3) Cassagna mine, Italy; H_2O by difference, (Ca + Mn^{2+}) recalculated to equal 4 wt%; corresponding to $Ca_{3.3}Mn^{2+}_{0.7}Fe^{3+}_{1.6}Mn^{3+}_{1.4}Al_{1.5}V^{3+}_{0.7}Mg_{0.6}Si_{5.2}O_{26}H_{6.5}$.

Occurrence: Filling fractures in braunite and quartz layered mineralization developed under prehnite-pumpellyite facies metamorphism.

Association: Braunite, quartz, piemontite.

Distribution: At the Cassagna mine, Graveglia manganese district, Northern Apennines, Liguria, Italy.

Name: For the locality that produced the first specimens, the Cassagna mine, Italy.

Type Material: Dipartimento per lo Studio del Territorio e delle sue Risorse (Dip.Te.Ris), University of Genoa, Italy.

References: (1) Basso, R., C. Carbone, and A. Palenzona (2008) Cassagnaite, a new, V-bearing silicate mineral from the Cassagna mine, northern Apennines, Italy. Eur. J. Mineral., 20, 95–100.
(2) (2008) Amer. Mineral., 93, 1686-7 (abs. ref. 1).