

Whiteite-(CaMnMg)**CaMn²⁺Mg₂Al₂(PO₄)₄(OH)₂•8H₂O**

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Crystal Data: Monoclinic. *Point Group:* 2/*m* or *m*. Dipyramidal crystals, to 1.5 mm; may be in etched anhedral blebs.

Physical Properties: *Cleavage:* Poor on {001}. *Tenacity:* Brittle. Hardness = 3.5
D(meas.) = 2.63(2) D(calc.) = 2.64

Optical Properties: Transparent. *Color:* Yellow, greenish yellow, pink or pale lavender.
Streak: White. *Luster:* Dull.
Optical Class: Biaxial (+). *Pleochroism:* Slight; X = mauve; Y = light mauve; Z = colorless.
Orientation: Y = *b*; Z ∧ *c* = 15°. *Absorption:* X > Y > Z. α = 1.580(1) β = 1.584(1)
γ = 1.591(1) 2V(meas.) = 81(5)° 2V(calc.) = 74°

Cell Data: *Space Group:* P2/*a* or *Pa*. *a* = 14.842(9) *b* = 6.976(1) *c* = 10.109(4)
β = 112.59(5)° Z = 2

X-ray Powder Pattern: Tip Top mine, South Dakota, USA; close to other whiteites.
9.31 (10), 2.790 (8), 4.85 (5), 3.51 (5), 2.953 (5), 3.256 (4), 2.867 (4)

Chemistry:

	(1)
P ₂ O ₅	38.2
Al ₂ O ₃	12.9
FeO	1.6
MnO	12.0
MgO	9.4
CaO	5.6
H ₂ O	20.8
Total	100.5

(1) Tip Top mine, South Dakota, USA; by electron microprobe, total Fe as FeO, total Mn as MnO; H₂O by TGA-EGA; corresponds to (Ca_{0.76}Mn_{0.24})_{Σ=1.00}Mn_{1.00}²⁺(Mg_{1.78}Fe_{0.17}²⁺Mn_{0.05})_{Σ=2.00}Al_{1.93}(PO₄)_{4.11}(OH)_{1.46}•8.1H₂O.

Mineral Group: Whiteite group; Al > Fe³⁺ in the M(3) structural site.

Occurrence: Along fracture surfaces in beryl and quartz in a zoned complex granite pegmatite.

Association: Montgomeryite, tiptopite, roscherite, englishite, beryl.

Distribution: From the Tip Top mine, 8.5 km southwest of Custer, Custer Co., South Dakota, USA.

Name: For its relation to sl whiteite-(CaFeMg); the suffix indicates sequentially the dominant atom in the X, M(1), and M(2) structural positions.

Type Material: Canadian Museum of Nature, Ottawa, Canada, 49707, 49712; National Museum of Natural History, Washington, D.C., USA, 15085, 163775, R18801.

References: (1) Grice, J.D., P.J. Dunn, and R.A. Ramik (1989) Whiteite-(CaMnMg), a new mineral species from the Tip Top pegmatite, Custer, South Dakota. Can. Mineral., 27, 699–702.
(2) (1990) Amer. Mineral., 75, 933 (abs. ref. 1).