Whiteite-(CaMgMg) $CaMg_3Al_2(PO_4)_4(OH)_2 \cdot 8H_2O$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. Crystals display {100}, {010}, {13$\bar{1}$ }, {11$\bar{1}$ }, and {001} as tapered blades, elongated along [100], flattened on {001}in radial fans. *Twinning*: By reflection on {001} common.

Physical Properties: *Cleavage*: Perfect on {001}. *Tenacity*: Brittle. *Fracture*: Stepped irregular. Hardness = ~ 4 D(meas.) = 2.48(1) D(calc.) = 2.477

Optical Properties: Transparent. *Color*: Colorless. *Streak*: White. *Luster*: Vitreous. *Optical Class*: Biaxial (+). $\alpha = 1.564$ $\beta = 1.565$ $\gamma = 1.575$ 2V(meas.) = 24.1° 2V(calc.) = 35.3° *Orientation*: $X = b$; $Z \wedge a = 41°$ in obtuse β. No dispersion or pleochroism were observed.

Cell Data: *Space Group*: $P2_1/a$. $a = 14.8237(19)$ $b = 7.0302(3)$ c = 9.946(3) $\beta = 110.115(12)°$ Z = 2

X-ray Powder Pattern: Northern Belle mine, Candelaria district, Mineral County, Nevada, USA. 2.805 (100), 9.20 (82), 4.88 (64), 2.849 (45), 2.936 (40), 3.510 (35), 1.9527 (35)

Chemistry:	(1)	(2)
CaO	8.18	7.74
MgO	16.47	16.68
FeO	0.13	
Al_2O_3	13.35	14.06
P_2O_5	38.84	39.16
H_2O	[22.32]	22.36
Total	99.29	100.00

(1) Northern Belle mine, Candelaria district, Mineral County, Nevada, USA; average of 7 electron microprobe analyses supplemented by Raman and FTIR spectroscopy, H_2O calculated from structure; corresponds to $Ca_{1.07}Mg_{2.99}Fe^{2+}_{0.01}Al_{1.91}P_4O_{26}H_{18.11}$. (2) $CaMg_3Al_2(PO_4)_4(OH)_2 \cdot 8H_2O$.

Mineral Group: Jahnsite group, whiteite subgroup.

Occurrence: A low-temperature secondary mineral presumed to have formed as a result of hydrothermal alteration of phosphate nodules derived from the sediments.

Association: Crandallite, fluorwavellite, montgomeryite, variscite/metavariscite, pyrite, quartz.

Distribution: Found at the Northern Belle mine (also known as Argentum mine), Candelaria district, Mineral County, Nevada, USA.

Name: For a member of the whiteite group with the *M*3 site occupied by Al^{3+} and the suffix indicates the dominance of Ca at the *X* site and Mg at both the *M*1 and *M*2 sites.

Type Material: Mineral Sciences Department, Natural History Museum of Los Angeles County, Los Angeles, California, USA (65642 and 65643).

References: (1) Kampf, A.R., P.M. Adams, and B.P. Nash (2016) Whiteite-(CaMgMg), $CaMg_3Al_2(PO_4)_4(OH)_2 \cdot 8H_2O$, a new jahnsite-group mineral from the Northern Belle Mine, Candelaria, Nevada, U.S.A. Can. Mineral., 54(6), 1513-1523. (2) (2017) Amer. Mineral., 102, 2346 (abs. ref. 1).