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 Class: Biaxial (+). Pleochroism: Slight; X = mauve; Y = light mauve; Z = colorless. Orientation: Y = b; Z \& c = 15°. Absorption: X > Y > Z. \( \alpha = 1.580(1) \) \( \beta = 1.584(1) \) \( \gamma = 1.591(1) \) \( 2V(\text{meas.}) = 81(5)\degree \) \( 2V(\text{calc.}) = 74\degree \)

Cell Data: Space Group: \( P2_1/a \) or \( Pa \). \( a = 14.842(9) \) \( b = 6.976(1) \) \( c = 10.109(4) \) \( \beta = 112.59(5)\degree \) \( Z = 2 \)

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:

\[
\begin{align*}
\text{P}_2\text{O}_5 & \quad 38.2 \\
\text{Al}_2\text{O}_3 & \quad 12.9 \\
\text{FeO} & \quad 1.6 \\
\text{MnO} & \quad 12.0 \\
\text{MgO} & \quad 9.4 \\
\text{CaO} & \quad 5.6 \\
\text{H}_2\text{O} & \quad 20.8 \\
\text{Total} & \quad 100.5
\end{align*}
\]

(1) Tip Top mine, South Dakota, USA; by electron microprobe, total Fe as FeO, total Mn as MnO; H\(_2\)O by TGA-EGA; corresponds to \((\text{Ca}_{0.76}\text{Mn}_{0.24})_{\Sigma=1.00}\text{Mn}_{1.00}^2(\text{Mg}_{81.78}\text{Fe}_{0.17}\text{Mn}_{0.05})_{\Sigma=2.00}\text{Al}_{1.93}(\text{PO}_4)_{4.11}(\text{OH})_{1.46}\cdot8\text{H}_2\text{O}\).

Mineral Group: Whiteite group; Al > Fe\(^{3+}\) in the M(3) structural site.

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

Association: Montgomeryite, tipitopite, rosherite, 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.
