

**Crystal Data:** Monoclinic. *Point Group:* 2/m or m. Composite prismatic crystals, tabular on {101}, show {101}, {111}, {011}, {110}, to 2 mm; in thin films and intergrown with leucophosphite.

**Physical Properties:** *Tenacity:* Brittle. Hardness = ~5 D(meas.) = 2.69(5) D(calc.) = 2.62

**Optical Properties:** Semitransparent. *Color:* Magenta to light brownish red, commonly zoned with colorless leucophosphite. *Streak:* Pink. *Luster:* Vitreous.

*Optical Class:* Biaxial (+). *Pleochroism:* Strong; X = pale orange-brown; Y = pale purple; Z = dark purplish red. *Orientation:* X = b. *Absorption:* Z > Y > X. α = 1.591(3) β = 1.597(3) γ = 1.604(3) 2V(meas.) = 86° 2V(calc.) = 86°

**Cell Data:** *Space Group:* P2/n or Pn. a = 9.602(8) b = 9.532(6) c = 9.543(11) β = 103.16(6)° Z = 4

**X-ray Powder Pattern:** Tip Top mine, South Dakota, USA.

6.68 (10), 5.91 (8), 3.006 (7), 2.616 (6b), 4.157 (5), 3.723 (5), 2.836 (5)

Chemistry:	(1)	(2)
P <sub>2</sub> O <sub>5</sub>	42.2	42.24
Al <sub>2</sub> O <sub>3</sub>	26.6	30.34
Fe <sub>2</sub> O <sub>3</sub>	5.2	
Mn <sub>2</sub> O <sub>3</sub>	1.1	
K <sub>2</sub> O	12.4	14.02
H <sub>2</sub> O	[12.5]	13.40
Total	[100.0]	100.00

(1) Tip Top mine, South Dakota, USA; by electron microprobe, total Fe as Fe<sub>2</sub>O<sub>3</sub>, total Mn as Mn<sub>2</sub>O<sub>3</sub>, H<sub>2</sub>O by difference; corresponds to K<sub>0.89</sub>(Al<sub>1.75</sub>Fe<sub>0.22</sub>Mn<sub>0.05</sub>)<sub>Σ=2.02</sub>(PO<sub>4</sub>)<sub>2</sub>(OH)<sub>0.95</sub>•1.86H<sub>2</sub>O.  
(2) KAl<sub>2</sub>(PO<sub>4</sub>)<sub>2</sub>(OH)•2H<sub>2</sub>O.

**Occurrence:** Moderately abundant in highly altered triphylite pods in a complex zoned granite pegmatite (Tip Top mine, South Dakota, USA). In caves.

**Association:** Leucophosphite, triphylite, rockbridgeite-frondelite, tavorite, robertsite, jahnsite, carbonate-apatite, laueite (Tip Top mine, South Dakota, USA).

**Distribution:** Found in the Tip Top mine, 8.5 km southwest of Custer, Custer Co., South Dakota, USA. At the Sapucaia pegmatite mine, about 50 km east-southeast of Governador Valadares, Minas Gerais, Brazil. Well-crystallized from the Bendada pegmatite, near Guarda, Portugal. In Cioclovina Cave, Sureanu Mountains, Romania. At an archaeological site, Santana do Riacho, ~90 km north of Belo Horizonte, Minas Gerais, Brazil.

**Name:** To honor Frank C. *Tinsley* (1916-1996), Rapid City, South Dakota, USA, for his efforts to preserve mineral specimens for research.

**Type Material:** National Museum of Natural History, Washington, D.C., USA, 149791, 159882.

References: (1) Dunn, P.J., R.C. Rouse, T.J. Campbell, and W.L. Roberts (1984) Tinsleyite, the aluminum analogue of leucophosphite, from the Tip Top pegmatite in South Dakota. *Amer. Mineral.*, 69, 374-376. (2) da Costa, G.M. and R.R. Viana (2001) The occurrence of tinsleyite in the archaeological site of Santana do Riacho, Brazil. *Amer. Mineral.*, 86, 1053-1056. (3) Marincea, S., D. Dumitras, and R. Gibert (2002) Tinsleyite in the “dry” Cioclovina Cave (Sureanu Mountains, Romania): the second occurrence. *Eur. J. Mineral.*, 14(1), 157-164. (4) Yakubovich, O.V., W. Massa, and O.V. Dimitrova (2012) A novel potassium-rich variant of tinsleyite, |K<sub>1.5</sub>(H<sub>2</sub>O)<sub>0.5</sub>| [Al<sub>2</sub>(OH){(OH)<sub>0.5</sub>(H<sub>2</sub>O)<sub>0.5</sub>}(PO<sub>4</sub>)<sub>2</sub>]. *Can. Mineral.*, 50, 559-569.