

Tinsleyite

$\text{KAl}_2(\text{PO}_4)_2(\text{OH}) \cdot 2\text{H}_2\text{O}$

©2001-2005 Mineral Data Publishing, version 1

Crystal Data: Monoclinic. *Point Group:* $2/m$ or m . Composite prismatic crystals, tabular on $\{\bar{1}01\}$, showing $\{\bar{1}01\}$, $\{\bar{1}11\}$, $\{011\}$, $\{110\}$, 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:* $Z > Y > X$. $\alpha = 1.591(3)$ $\beta = 1.597(3)$
 $\gamma = 1.604(3)$ $2V(\text{meas.}) = 86^\circ$ $2V(\text{calc.}) = 86^\circ$

Cell Data: *Space Group:* $P2/n$ or Pn . $a = 9.602(8)$ $b = 9.532(6)$ $c = 9.543(11)$
 $\beta = 103.16(6)^\circ$ $Z = 4$

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_2O_5	42.2	42.24
Al_2O_3	26.6	30.34
Fe_2O_3	5.2	
Mn_2O_3	1.1	
K_2O	12.4	14.02
H_2O	[12.5]	13.40
Total	[100.0]	100.00

(1) Tip Top mine, South Dakota, USA; by electron microprobe, total Fe as Fe_2O_3 , total Mn as Mn_2O_3 , H_2O by difference; corresponds to $\text{K}_{0.89}(\text{Al}_{1.75}\text{Fe}_{0.22}\text{Mn}_{0.05})_{\Sigma=2.02}(\text{PO}_4)_2(\text{OH})_{0.95} \cdot 1.86\text{H}_2\text{O}$. (2) $\text{KAl}_2(\text{PO}_4)_2(\text{OH}) \cdot 2\text{H}_2\text{O}$.

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

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.

Name: To honor Frank C. Tinsley (1916–), 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.