

**Crystal Data:** Monoclinic. *Point Group:*  $2/m$ . As flaky to tabular grains to 40  $\mu\text{m}$  or as massive aggregates of fine acicular grains. *Twining:* Frequent.

**Physical Properties:** *Cleavage:* Perfect on {001}. *Tenacity:* n.d. *Fracture:* n.d. *Hardness* = n.d. *D(meas.)* = n.d. *D(calc.)* = n.d.

**Optical Properties:** [Translucent.] *Color:* n.d. *Streak:* n.d. *Luster:* [Vitreous.]  
*Optical Class:* [Biaxial.] *Pleochroism:*  $X = \text{light reddish brown}$ ,  $Y = Z = \text{pale yellow green}$  or  $X = \text{brownish red}$ ,  $Y = Z = \text{pale greenish brown}$ .  $\alpha = 1.653(5)$   $\gamma = 1.691(5)$   $2V(\text{meas.}) = 0^\circ\text{-}10^\circ$  (light reddish brown) or  $\alpha = 1.677(5)$   $\gamma = 1.721(5)$   $2V(\text{meas.}) = \text{Small}$ . (brownish red)

**Cell Data:** *Space Group:*  $C2/m$ .  $a = 5.402(6)$   $b = 9.237(4)$   $c = 10.306(7)$   $\beta = 99^\circ 16'(10)$

**X-ray Powder Pattern:** Dales Gorge Member iron-formation, Wittenoom area, Western Australia. 10.159 (vs), 3.684 (m), 3.379 (m), 1.696 (m), 1.600 (w), 2.905 (vw), 2.666 (vw)

Chemistry:	(1)	(2)
MgO		7.24
MnO		0.03
CaO		0.05
NiO		0.04
Na <sub>2</sub> O		0.02
K <sub>2</sub> O	8.71	8.33
Al <sub>2</sub> O <sub>3</sub>		1.42
Cr <sub>2</sub> O <sub>3</sub>		0.02
Fe <sub>2</sub> O <sub>3</sub>	14.77	13.25
FeO	39.86	29.77
SiO <sub>2</sub>	33.33	35.49
TiO <sub>2</sub>		0.01
H <sub>2</sub> O	n.d.	n.d.
Total	96.67	95.67

(1)  $\text{KFe}^{2+}_3(\text{Si}_3\text{Fe}^{3+})\text{O}_{10}(\text{OH})_2$ . (2) Dales Gorge Member iron-formations, Wittenoom area, Western Australia, electron microprobe analysis; corresponds to  $(\text{K}_{0.902}\text{Ca}_{0.005}\text{Na}_{0.004})_{\Sigma=0.911}(\text{Fe}^{2+}_{2.113}\text{Mg}_{0.916}\text{Ni}_{0.002}\text{Mn}_{0.002}\text{Cr}_{0.001})_{\Sigma=3.034}(\text{Si}_{3.01}\text{Fe}^{3+}_{0.846}\text{Al}_{0.14})_{\Sigma=3.996}\text{O}_{10}(\text{OH})_2$ .

**Polymorphism & Series:** Forms series with tetraferriphlogopite and annite. 1M polytype.

**Mineral Group:** Trioctahedral mica group.

**Occurrence:** In low-grade metamorphosed banded iron formation.

**Association:** Hematite, magnetite, quartz, ankerite, stilpnomelane, riebeckite.

**Distribution:** Studied material from the Dales Gorge Member iron-formations, Wittenoom area, Western Australia [TL].

**Name:** Prefixes, *tetra* for the tetrahedral coordination sites in which  $\text{Fe}^{3+}$  cations (identified by *ferri*), reside in a compound analogous to *annite*.

**References:** (1) Miyano, T. and S. Miyano (1982) Ferri-annite from the Dales Gorge Member iron-formations, Wittenoom area, Western Australia. *Amer. Mineral.*, 67, 1179-1194. (2) Rieder, M., G. Cavazzini, Yu.S. D'yakonov, V.A. Frank-Kamenetskii, G. Gottardi, S. Guggenheim, P.V. Koval', G. Müller, A.M.R. Neiva, E.W. Radoslovich, J.-L. Robert, F.P. Sassi, H. Takeda, Z. Weiss, and D.R. Wones (1998) Nomenclature of the micas. *Can. Mineral.*, 36, 905-912. (3) Comodi, P., P.F. Zanazzi, Z. Weiss, M. Rieder, and M. Drábek (1999) "Cs-tetra-ferri-annite:" High-pressure and high-temperature behavior of a potential nuclear waste disposal phase. *Amer. Mineral.*, 84, 325-332 [synthetic analog of tetra-ferri-annite].