Ferritungstite $\mathbf{(K,Ca,Na)(W^{6+},Fe^{3+})_2(O,OH)_6 \cdot H_2O}$

Crystal Data: Cubic. *Point Group:* $4/m\ \overline{3}\ 2/m$. As octahedra, to 250 μm; as rosettes, in aggregates; as microscopic twinned hexagonal plates forming earthy crusts; fibrous.
Twinning: As penetration twins and platy six-sided cyclic twins according to the spinel law.

Physical Properties: Hardness = n.d. D(meas.) = 5.02–5.2 D(calc.) = [5.16]

Optical Properties: Translucent. *Color:* Pale to bright yellow, orange, brownish yellow, brown. *Luster:* Vitreous.
Optical Class: Isotropic, anomalously anisotropic. n = 2.09–2.15

Cell Data: *Space Group:* $Fd3m$. a = 10.352(1) Z = 8

X-ray Powder Pattern: Nevada Scheelite mine, Nevada, USA.
5.94 (10), 2.966 (10), 3.10 (9), 1.819 (8), 1.550 (7), 2.572 (6), 0.9902 (6)

Chemistry:

	(1)	(2)
WO_3	72.61	77.71
Fe_2O_3	7.33	9.99
FeO	6.51	
CaO	6.03	0.73
Na_2O		0.16
K_2O		2.16
H_2O		[8.45]
LOI	7.52	
Total	[100.00]	[99.20]

(1) Nevada Scheelite mine, Nevada, USA; recalculated to 100% after removal of SiO_2 6.56% as quartz. (2) Kalzas Mountain, Yukon Territory, Canada; by electron microprobe, H_2O calculated from crystal-structure analysis; corresponding to $[(H_2O)_{0.59}Ca_{0.06}Na_{0.02}]_{\Sigma=0.67}(W_{1.46}Fe^{3+}_{0.54})_{\Sigma=2.00}[O_{4.70}(OH)_{1.30}]_{\Sigma=6.00}[(H_2O)_{0.80}K_{0.20}]_{\Sigma=1.00}$.

Occurrence: An alteration coating on, or replacing, primary tungsten minerals, as a product of weathering.

Association: Wolframite, ferberite, scheelite, alumotungstite, russellite, anthoinite, mpororoite, jarosite.

Distribution: In the USA, at the Germania tungsten mine, Deer Trail district, Fruitland, Stevens Co., Washington, and the Nevada Scheelite mine, near Rawhide, Leonard district, Mineral Co., Nevada. From the Flo property, Kalzas Mountain, 67 km southeast of Mayo, Yukon Territory, Canada. In the Borrllealha tungsten mine, Minho, Portugal. In France, at La Bertrande, Haute-Vienne, and Meymac, Corrèze. From the Grancarica scheelite deposit, southwest of Velingrad, Bulgaria. In the Hingston Downs quarry, Calstock, Cornwall, England. At the Namulilo mine, Uganda. From Nyakabingu and Gifurwe, Rwanda. Found in the Nita mine, Yaku Island, Kagoshima Prefecture, Japan. From Aktchatau, Kazakhstan.

Name: For FERRIc iron and TUNGsten in its composition.

Type Material: Harvard University, Cambridge, Massachusetts, 101796; National Museum of Natural History, Washington, D.C., USA, 86985.

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 1093–1094. (2) Richter, D.H., L.E. Reichen, and D.M. Lemmon (1957) New data on ferritungstite from Nevada. Amer. Mineral., 42, 83–90. (3) Sahama, T.G. (1981) The secondary tungsten minerals, a review. Mineral. Record, 12, 83–85. (4) Ercit, T.S. and G.W. Robinson (1994) A refinement of the structure of ferritungstite from Kalzas Mountain, Yukon, and observations on the tungsten pyrochlores. Can. Mineral., 32, 567–574.