Winstanleyite $TiTe_3^{4+}O_8$

Crystal Data: Cubic. *Point Group:* $2/m\ \overline{3}$. Cubes, rarely modified by the octahedron, with concave faces, to 0.5 mm, in castellated groups.

Physical Properties: *Tenacity:* Brittle but tough. Hardness = 4 D(meas.) = 5.57(4) D(calc.) = [5.63]

Optical Properties: Semitransparent. *Color:* Bright yellow, tan, cream. *Streak:* Very pale yellow.
Optical Class: Isotropic. $n = 2.34(2)$

Cell Data: *Space Group:* $Ia3$. a = 10.963 Z = [8]

X-ray Powder Pattern: Grand Central mine, Arizona, USA.
3.165 (10), 1.938 (8), 1.653 (8), 2.741 (7), 4.474 (6), 2.930 (4), 2.583 (4)

Chemistry:

	(1)	(2)
TeO_2	85.8	85.70
TiO_2	10.9	14.30
Fe_2O_3	3.2	
Total	99.9	100.00

(1) Grand Central mine, Arizona, USA; corresponds to $Ti_{0.76}Fe_{0.11}Te_{3.00}O_8$. (2) $TiTe_3O_8$.

Occurrence: Very rare in strongly altered and pyritized granodiorite from the dump of a hydrothermal Au–Te-bearing ore deposit.

Association: Jarosite, chlorargyrite, rodalquilarite, "opal".

Distribution: From the Grand Central mine, Tombstone, Cochise Co., Arizona, USA.

Name: To honor Betty Jo Winstanley Williams (1934–), who collected the first specimen.

Type Material: Natural History Museum, Paris, France; The Natural History Museum, London, England, 1980,538; Harvard University, Cambridge, Massachusetts, USA, 119095.

References: (1) Williams, S.A. (1979) Girdite, oboyerite, fairbankite, and winstanleyite, four new tellurium minerals from Tombstone, Arizona. Mineral. Mag., 43, 453–457. (2) (1980) Amer. Mineral., 65, 809 (abs. ref. 1).