Fairbankite $Pb^{2+}_{12}(Te^{4+}O_3)_{11}(SO_4)$

Crystal Data: Triclinic. *Point Group*: 1. Crystals nearly equant, to 0.5 mm; typically, as thin crusts.

Physical Properties: *Tenacity*: Brittle. Hardness = 2 D(meas.) = n.d. D(calc.) = n.d.

Optical Properties: Transparent. *Color*: Colorless. *Luster*: Resinous to adamantine. *Optical Class*: Biaxial (-) or (+). $\alpha = 2.29$ $\beta = 2.31$ $\gamma = 2.33$ 2V(meas.) = 86° 2V(calc.) = 90° *Dispersion*: Weak. Visually very similar to cerussite and anglesite.

Cell Data: *Space Group*: *P*1. $a = 7.0205(3)$ $b = 10.6828(6)$ $c = 14.4916(8)$ $\alpha = 75.161(5)°$ $\beta = 81.571(4)°$ $\gamma = 83.744(4)°$ Z = 1

X-ray Powder Pattern: Grand Central mine, Arizona, USA.
3.268 (100), 3.151 (82), 3.025 (50), 3.105 (49), 1.923 (35), 2.830 (34), 2.520 (34)

Chemistry:

	(1)	(2)
TeO_2	38.62	38.89
PbO	59.51	59.33
SO_3	1.23	1.77
SiO_2	0.05	.
Total	99.79	100.00

(1) Grand Central mine, Arizona, USA; average electron microprobe analysis; corresponds to $Pb^{2+}_{12.17}Te^{4+}_{11.04}S_{0.92}Si_{0.04}O_{37}$. (2) $Pb^{2+}_{12}(Te^{4+}O_3)_{11}(SO_4)$.

Occurrence: Very rare on the mine dump from a hydrothermal Au-Te-bearing ore deposit.

Association: Winstanleyite, cerussite, chlorargyrite, jarosite, rodalquilarite, "opal".

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

Name: Honors Nathaniel Kellogg *Fairbank* (1829-1903), who organized the company that developed the Grand Central lode, Tombstone, Arizona, USA.

Type Material: Natural History Museum, Paris; The Natural History Museum, London, England, 1980,540; National Museum of Natural History, Washington, D.C., USA, 160238.

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). (3) Missen, O.P., M.S. Rumsey, S.J. Mills, M. Weil, J. Najorka, J. Spratt, and U. Kolitsch (2021) Elucidating the natural-synthetic mismatch of $Pb^{2+}Te^{4+}O_3$: The redefinition of fairbankite to $Pb^{2+}_{12}(Te^{4+}O_3)_{11}(SO_4)$. Amer. Mineral., 106 (2), 309-316.