Moctezumite $Pb(UO_2)(Te^{4+}O_3)_2$

Crystal Data: Monoclinic. *Point Group:* $2/m$. Crystals are bladelike, elongated along [010] and flattened on {201}, commonly with curved faces, to 3 mm; in subparallel radiating groups and rosettes.

Physical Properties: *Cleavage:* On {100}, perfect. Hardness = ∼3 D(meas.) = 5.73 D(calc.) = 7.256 Radioactive.

Optical Properties: Semitransparent. *Color:* Bright orange, brownish orange to dark orange. *Luster:* Dull.
Optical Class: Biaxial (–). *Orientation:* Parallel extinction. $\alpha = > 2.11$ $\beta = > 2.11$ $\gamma = > 2.11$ 2V(meas.) = 5°–10°

Cell Data: *Space Group:* $P2_1/c$. $a = 7.813(5)$ $b = 7.061(2)$ $c = 13.775(4)$ $\beta = 93.71(2)°$ Z = 4

X-ray Powder Pattern: Moctezuma mine, Mexico.
3.156 (10), 3.492 (9), 2.997 (8), 3.088 (7), 3.385 (6), 2.012 (5), 1.949 (4)

Chemistry:

	(1)	(2)
UO_3	34.20	34.53
TeO_2	40.18	38.53
PbO	25.62	26.94
Total	[100.00]	100.00

(1) Moctezuma mine, Mexico; average of two analyses originally totalling 99.42%; recalculated to 100% after deduction of WO_3 8.63% and CaO 2.09% as scheelite contaminant introduced during separation, Fe_2O_3 0.29%, insoluble 3.26%, and loss on ignition 0.05%; then corresponding to $Pb_{0.94}(UO_2)_{0.98}(TeO_3)_{2.06}$. (2) $Pb(UO_2)(TeO_3)_2$.

Occurrence: A rare secondary mineral in the oxidized zone of a hydrothermal Au–Te deposit.

Association: Schmitterite, burckhardtite, zemannite, emmonsite, pyrite, barite, "limonite".

Distribution: From the Moctezuma (Bambolla) mine, 12 km south of Moctezuma, Sonora, Mexico.

Name: For its occurrence in the Moctezuma mine, Mexico.

Type Material: Natural History Museum, Paris, France, 175.84; Harvard University, Cambridge, Massachusetts, 119086; National Museum of Natural History, Washington, D.C., USA, 128392, 164345, 164346.

References: (1) Gaines, R.V. (1965) Moctezumite, a new lead uranyl tellurite. Amer. Mineral., 50, 1158–1163. (2) Swihart, G.H., P.K. Sen Gupta, E.O. Schlemper, M.E. Back, and R.V. Gaines (1993) The crystal structure of moctezumite $[PbUO_2](TeO_3)_2$. Amer. Mineral., 78, 835–839.