Tlapallite $\mathbf{H_6(Ca,Pb)_2Cu_3(SO_4)(Te^{4+}O_3)_4(Te^{6+}O_6)}$

Crystal Data: Monoclinic. *Point Group:* n.d. As paintlike to botryoidal crusts, comprised of sheaves or rosettes of tabular or bladed crystals, to 0.1 mm.

Physical Properties: Hardness = 3 D(meas.) = 5.38(1) D(calc.) = 5.05–5.465

Optical Properties: Semitransparent. *Color:* Veridian green to Cyprus green. *Streak:* Pale green.
Optical Class: Biaxial (–). *Pleochroism:* Moderate; in shades of bottle-green. *Absorption:* $Z = Y > X$. $\alpha = 1.815$–1.915 $\beta = 1.960$–2.115 $\gamma = 1.960$–2.115 2V(meas.) = n.d.

Cell Data: *Space Group:* n.d. $a = 11.97$ $b = 9.11$ $c = 15.66$ $\beta = 90°36'$ Z = 4

X-ray Powder Pattern: Moctezuma mine, Mexico.
11.97 (10), 2.985 (10), 3.540 (6), 5.946 (5), 4.731 (5), 2.887 (5), 3.732 (4)

Chemistry:

	(1)	(2)
SO_3	5.2	5.57
TeO_3	11.4	12.5
TeO_2	41.4	44.3
CuO	15.6	15.8
ZnO	0.8	0.7
PbO		13.6
CaO	8.3	4.3
H_2O		4.25
Total		101.02

(1) Moctezuma mine, Mexico; with H^{1+} calculated for charge balance, corresponds to $H_{4.76}Ca_{2.00}Cu_{2.65}(SO_4)_{0.88}(Te^{4+}O_3)_{3.51}(Te^{6+}O_6)_{0.88}$. (2) Tombstone, Arizona, USA; H_2O by the Penfield method, with H^+ calculated for charge balance, corresponds to $H_{6.26}(Ca_{1.12}Pb_{0.88})_{\Sigma=2.00}(Cu_{2.88}Zn_{0.13})_{\Sigma=3.01}(SO_4)_{1.01}(Te^{4+}O_3)_{4.04}(Te^{6+}O_6)_{1.03}$.

Occurrence: Very rare in partially oxidized portions of a tellurium-bearing polymetallic hydrothermal sulfide deposit (Moctezuma mine, Mexico); an alteration product of tellurides in calcsilicate tactite (Tombstone, Arizona).

Association: Carlfriesite, calcite, barite, muscovite, quartz (Moctezuma mine, Mexico).

Distribution: From the Moctezuma (Bambolla) mine, 12 km south of Moctezuma, Sonora, Mexico. In the USA, at Tombstone, Cochise Co., Arizona, from the Lucky Cuss and Emerald mines.

Name: From the Nahua language for *paint*, in allusion to the typical habit as films as though painted on rock.

Type Material: The Natural History Museum, London, England; University of Arizona, Tucson, Arizona; Harvard University, Cambridge, Massachusetts, 119092; National Museum of Natural History, Washington, D.C., USA, 144519.

References: (1) Williams, S.A. and M. Duggan (1978) Tlapallite, a new mineral from Moctezuma, Sonora, Mexico. Mineral. Mag., 42, 183–186. (2) (1979) Amer. Mineral., 64, 465 (abs. ref. 1).