Denningite $(Ca, Mn^{2+})(Mn^{2+}, Zn)(Te_2^{4+}O_5)_2$

Crystal Data: Tetragonal. *Point Group:* $4/m\ 2/m\ 2/m$. Rare as octagonal thin platy crystals, flattened on {001}, with {001}, {110}, and {100}, to 4 mm; most commonly in cleavable masses.

Physical Properties: *Cleavage:* Perfect on {001}. *Fracture:* Conchoidal. Hardness = 4
D(meas.) = 5.05(5) D(calc.) = 5.07

Optical Properties: Translucent to transparent. *Color:* Pale green to pale gray, may be colorless; colorless in transmitted light. *Streak:* White. *Luster:* Adamantine.
Optical Class: Uniaxial (+), may be biaxial. $\omega = 1.89(1)$ $\epsilon = 2.00(1)$ 2V(meas.) = 0°–15°

Cell Data: *Space Group:* $P4_2/nbc$. $a = 8.82(5)$ $c = 13.04(5)$ Z = 4

X-ray Powder Pattern: Moctezuma mine, Mexico.
4.42 (vs), 3.38 (s+), 3.12 (s), 2.62 (s), 2.03 (s), 1.53 (ms), 6.26 (m)

Chemistry:

	(1)
TeO_2	82.34
MnO	10.28
ZnO	2.63
CaO	4.23
H_2O	0.03
excess O	0.09
insol.	0.03
rem.	0.27
Total	99.90

(1) Moctezuma mine, Mexico; Mg determined spectrographically, after deduction of minor components corresponds to $(Ca_{0.60}Mn_{0.40})_{\Sigma=1.00}(Mn_{0.72}Zn_{0.24}Mg_{0.04})_{\Sigma=1.00}(Te_2O_5)_{2.01}$.

Occurrence: In a hydrothermal Au–Te deposit.

Association: Tellurium, tellurite, paratellurite, spiroffite, zemannite.

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

Name: To honor Reynolds McConnell Denning (1916–1967), Professor of Mineralogy, University of Michigan, Ann Arbor, Michigan, USA.

Type Material: Natural History Museum, Paris, 175.81; National School of Mines, Paris, France; Royal Ontario Museum, Toronto, Canada, M25000–M25005.

References: (1) Mandarino, J.A., S.J. Williams, and R.S. Mitchell (1961) Denningite, a new tellurite mineral from Moctezuma, Sonora, Mexico. Can. Mineral., 7, 340–341 (abs.). (2) (1962) Amer. Mineral., 47, 1484 (abs. ref. 1). (3) Mandarino, J.A., S.J. Williams, and R.S. Mitchell (1961) Denningite, a new tellurite mineral from Moctezuma, Sonora, Mexico. Can. Mineral., 7, 443–452. (4) (1963) Amer. Mineral., 48, 1419 (abs. ref. 3). (5) Walitzi, E.M. (1965) Die Kristallstruktur von Denningit, $(Mn, Ca, Zn)Te_2O_5$. Ein Beispiel für die Koordination um vierwertiges Tellur. Tschermaks Mineral. Petrog. Mitt., 10, 241–255 (in German with English abs.).