

Zemannite**Mg_{0.5}ZnFe³⁺(Te⁴⁺O₃)₃•4.5H₂O**

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Crystal Data: Hexagonal. *Point Group:* 6/*m*. Crystals are hexagonal, prismatic {10 $\bar{1}$ 0}, terminated by {10 $\bar{1}$ 1}, to 1 mm.

Physical Properties: *Tenacity:* Very brittle. *Hardness* = “Soft”. *D*(meas.) = n.d.
D(calc.) = 4.19

Optical Properties: Translucent to transparent. *Color:* Pale to dark brown. *Streak:* White.
Luster: Adamantine.

Optical Class: Uniaxial (+). *Pleochroism:* *O* = reddish brown; *E* = yellowish brown.

Absorption: *O* > *E*. $\omega = 1.85$ $\epsilon = 1.93$

Cell Data: *Space Group:* *P*6₃/*m*. *a* = 9.404(2) *c* = 7.636(4) *Z* = 2

X-ray Powder Pattern: Moctezuma mine, Mexico.

8.15 (10), 2.778 (9), 4.07 (8), 2.96 (6), 2.845 (6), 1.726 (6), 2.345 (5)

Chemistry:

	(1)
TeO ₂	62.9
SeO ₂	0.07
Fe ₂ O ₃	10.8
MnO	0.11
ZnO	10.5
MgO	2.53
H ₂ O	10.25
<u>Total</u>	<u>97.16</u>

(1) Moctezuma mine, Mexico; by electron microprobe, H₂O by TGA, total Fe³⁺ as Fe₂O₃, confirmed by Mössbauer spectroscopy; corresponds to Mg_{0.47}Zn_{1.04}Mn_{0.01}Fe_{1.02}³⁺(TeO₃)_{2.97}•4.2H₂O.

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

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

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

Name: To honor Dr. Josef Zemann (1923–), Austrian crystallographer, Professor of Mineralogy, University of Vienna, Vienna, Austria, specialist in tellurium minerals.

Type Material: Natural History Museum, Paris, France; Royal Ontario Museum, Toronto, Canada, M25933; National Museum of Natural History, Washington, D.C., USA, 128390.

References: (1) Mandarino, J.A., E. Matzat, and S.J. Williams (1976) Zemannite, a zinc tellurite from Moctezuma, Sonora, Mexico. *Can. Mineral.*, 14, 387–390. (2) (1969) *Amer. Mineral.*, 55, 1448 (abs. ref. 1). (3) Miletich, R. (1995) Crystal chemistry of the microporous tellurite minerals zemannite and kinichilite, Mg_{0.5}[Me²⁺Fe³⁺(TeO₃)₃]•4.5H₂O, (Me²⁺ = Zn, Mn). *Eur. J. Mineral.*, 7, 509–523.