Minohlite $(Cu,Zn)_7(SO_4)_2(OH)_{10}\cdot 8H_2O$

Crystal Data: Hexagonal. *Point Group*: n.d. Hexagonal platy crystals, to 50 μm, form rosettes to 100 μm.

Physical Properties: *Cleavage*: Perfect on {0001}. *Fracture*: n.d. *Tenacity*: Brittle. Hardness = < 2 D(meas.) = 3.39 [Impure material.] D(calc.) = 3.28 Soluble in dilute HCl.

Optical Properties: Transparent. *Color*: Bluish green. *Streak*: Pale green. *Luster*: Pearly to vitreous.
Optical Class: n.d. Anisotropic. *Birefringence*: Moderate. *Pleochroism*: None.

Cell Data: *Space Group*: n.d. a = 8.2535(11) c = 8.1352(17) Z = 1

X-ray Powder Pattern: Hirao mine, Minoh (Minoo) City, Osaka Prefecture, Japan.
2.702 (100), 2.564 (76), 1.560 (43), 4.128 (24), 1.532 (24), 8.138 (20), 1.351 (12)

Chemistry:	(1)
CuO	37.18
ZnO	21.08
FeO	0.49
SO_3	16.78
SiO_2	0.44
H_2O	[24.03]
Total	100.00

(1) Hirao mine, Minoh City, Osaka Prefecture, Japan; average of 5 electron microprobe analyses, H_2O by difference, OH, H_2O, SO_4 confirmed by IR spectroscopy; corresponds to $(Cu_{4.43}Zn_{2.45}Fe_{0.06})_{\Sigma=6.94}[(SO_4)_{1.99}(SiO_4)_{0.07}]_{\Sigma=2.06}(OH)_{9.64}\cdot 7.81H_2O$.

Occurrence: A secondary mineral in the oxidized zone of a Cu Zn sulfide deposit.

Association: Chamosite, muscovite, smithsonite, serpierite, ramsbeckite, limonite, chalcopyrite.

Distribution: From the Hirao mine, Minoh (Minoo) City, Osaka Prefecture, Japan.

Name: For Minoh City, from where the first specimens were collected.

Type Material: National Museum of Nature and Science, Tsukuba (NSM-M43670 & M43671), and the Kyoto University Museum, Kyoto (KUM-M00001), Japan.

References: (1) Ohnishi, M., N. Shimobayashi, D. Nishio-Hamane, K. Shinoda, K. Momma, and T. Ikeda (2013) Minohlite, a new copper-zinc sulfate mineral from Minoh, Osaka, Japan. Mineral. Mag., 77(3), 335-342. (2) (2015) Amer. Mineral., 100, 2011-2012 (abs. ref. 1).