

Keyite**Cu₃(Zn, Cu)₄Cd₂(AsO₄)₆•2H₂O**

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Crystal Data: Monoclinic. *Point Group:* 2/m. Tapered crystals, prismatic along [001] to tabular on {010}; as subparallel sheaflike aggregates, to 2 mm; dominant forms include {010}, {210}, {110}, and {011}.

Physical Properties: *Cleavage:* Good on {001}. *Hardness* = 3.5–4 *D*(meas.) = > 4.2 *D*(calc.) = 5.106

Optical Properties: Translucent. *Color:* Deep sky-blue. *Streak:* Pale blue. *Optical Class:* Biaxial. *Pleochroism:* Strong; *X* = pale blue; *Y* = greenish blue; *Z* = deep blue. *Orientation:* *Y* = *b*; *X* ∧ *c* = 11°, variable with wavelength. *Dispersion:* Strong. *Absorption:* *Z* > *Y* > *X*. *α* = 1.80 *β* = n.d. *γ* = 1.87 *2V*(meas.) = n.d.

Cell Data: *Space Group:* I2/a. *a* = 11.654(3) *b* = 12.780(5) *c* = 6.840(3) *β* = 99.11(3)° *Z* = 2

X-ray Powder Pattern: Tsumeb, Namibia. 2.795 (vvs), 3.29 (vs), 2.876 (vs), 6.41 (ms), 1.644 (ms), 3.15 (m), 1.700 (m)

Chemistry:	(1)	(2)
As ₂ O ₅	45.36	46.00
MnO	1.07	0.94
CdO	14.08	14.44
CuO	18.81	16.61
ZnO	17.90	19.93
PbO	0.63	1.46
CaO	0.80	0.53
H ₂ O	[2.38]	[2.40]
Total	[101.03]	[102.31]

(1) Tsumeb, Namibia; by electron microprobe, average of six analyses on five crystals; no H₂O detected; with H₂O from crystal-structure analysis, corresponds to Cu₃(Zn_{3.33}Cu_{0.58})_{Σ=3.91}(Cd_{1.66}Mn_{0.23}Ca_{0.21}Pb_{0.03})_{Σ=2.13}(AsO₄)_{5.98}•2H₂O. (2) Do.; by electron microprobe, H₂O determined from crystal-structure analysis; corresponds to Cu₃(Zn_{3.68}Cu_{0.14})_{Σ=3.82}(Cd_{1.69}Mn_{0.20}Ca_{0.14}Pb_{0.10})_{Σ=2.13}(AsO₄)_{6.02}•2H₂O.

Occurrence: A secondary mineral in the oxidized zone of a dolostone-hosted hydrothermal polymetallic ore deposit.

Association: Cuprian adamite, schulténite, metazeunerite, zincian olivenite, tennantite.

Distribution: From Tsumeb, Namibia.

Name: Honors Charles Locke Key (1935–), Windhoek, Namibia, American mineral dealer who furnished the first specimen.

Type Material: The Natural History Museum, London, England, 1973,236, 1975,660; Harvard University, Cambridge, Massachusetts, USA, 119917.

References: (1) Embrey, P.G., E.E. Fejer, and A.M. Clark (1977) Keyite: a new mineral from Tsumeb. *Mineral. Record*, 8(3), 87–90. (2) (1977) *Amer. Mineral.*, 62, 1259 (abs. ref. 1). (3) Cooper, M.A. and F.C. Hawthorne (1996) The crystal structure of keyite, Cu₃²⁺(Zn, Cu²⁺)₄Cd₂(AsO₄)₆(H₂O)₂, an oxysalt mineral with essential cadmium. *Can. Mineral.*, 34, 623–630.