

**Keyite****Cu<sub>3</sub>(Zn, Cu)<sub>4</sub>Cd<sub>2</sub>(AsO<sub>4</sub>)<sub>6</sub>•2H<sub>2</sub>O**

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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)

<b>Chemistry:</b>	(1)	(2)
As <sub>2</sub> O <sub>5</sub>	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 <sub>2</sub> O	[2.38]	[2.40]
<b>Total</b>	<b>[101.03]</b>	<b>[102.31]</b>

(1) Tsumeb, Namibia; by electron microprobe, average of six analyses on five crystals; no H<sub>2</sub>O detected; with H<sub>2</sub>O from crystal-structure analysis, corresponds to Cu<sub>3</sub>(Zn<sub>3.33</sub>Cu<sub>0.58</sub>)<sub>Σ=3.91</sub>(Cd<sub>1.66</sub>Mn<sub>0.23</sub>Ca<sub>0.21</sub>Pb<sub>0.03</sub>)<sub>Σ=2.13</sub>(AsO<sub>4</sub>)<sub>5.98</sub>•2H<sub>2</sub>O. (2) Do.; by electron microprobe, H<sub>2</sub>O determined from crystal-structure analysis; corresponds to Cu<sub>3</sub>(Zn<sub>3.68</sub>Cu<sub>0.14</sub>)<sub>Σ=3.82</sub>(Cd<sub>1.69</sub>Mn<sub>0.20</sub>Ca<sub>0.14</sub>Pb<sub>0.10</sub>)<sub>Σ=2.13</sub>(AsO<sub>4</sub>)<sub>6.02</sub>•2H<sub>2</sub>O.

**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, Cu<sub>3</sub><sup>2+</sup>(Zn, Cu<sup>2+</sup>)<sub>4</sub>Cd<sub>2</sub>(AsO<sub>4</sub>)<sub>6</sub>(H<sub>2</sub>O)<sub>2</sub>, an oxysalt mineral with essential cadmium. *Can. Mineral.*, 34, 623–630.