

Crystal Data: Monoclinic. *Point Group:* $2/m$. As bladed crystals, to 0.50 mm, elongated along [010], that display {001}, {100}, and {010}. *Twining:* A twofold twin axis is along $[10\bar{1}]$.

Physical Properties: *Cleavage:* Perfect on {100}. *Fracture:* n.d. *Tenacity:* Brittle. Hardness = 3.5-4 D(meas.) = n.d. D(calc.) = 4.216

Optical Properties: Transparent. *Color:* Green. *Streak:* Green. *Luster:* Subadamantine. *Optical Class:* Biaxial (-). $\alpha > 1.8$ $\beta > 1.8$ $\gamma > 1.8$ $2V(\text{meas.}) = \text{n.d.}$ $2V(\text{calc.}) = \text{n.d.}$. *Dispersion:* $r > v$, strong.

Cell Data: *Space Group:* $P2_1/m$. $a = 9.9904(6)$ $b = 5.9934(4)$ $c = 5.5255(4)$
 $\beta = 97.428(4)^\circ$ $Z = 2$

X-ray Powder Pattern: Calculated pattern.
4.948 (100), 2.580 (88), 5.214 (65), 2.122 (60), 2.736 (55), 3.450 (54), 3.006 (53)

| Chemistry: | (1) | (2) |
|-------------------|--------|--------|
| CuO | 54.99 | 54.91 |
| MoO ₃ | 35.17 | 36.80 |
| H ₂ O | [8.61] | 8.29 |
| Total | 98.77 | 100.00 |

(1) Childs Aldwinkle mine, Copper Creek, Pinal County, Arizona, USA; average of 13 electron microprobe analyses, supplemented by Raman spectroscopy, H₂O calculated from stoichiometry; corresponds to $\text{Cu}_{2.89}(\text{Mo}_{1.04}\text{O}_4)(\text{OH})_4$. (2) $\text{Cu}_3(\text{MoO}_4)(\text{OH})_4$.

Occurrence: A secondary mineral formed by weathering of a mineralized (molybdenite, bornite, chalcocite, chalcopyrite) breccia pipe.

Association: Brochantite, antlerite, lindgrenite, wulfenite, natrojarosite, chalcantite.

Distribution: From the south glory hole of the Childs Aldwinkle mine, Galiuro Mountains, Bunker Hill District, Copper Creek, Pinal County, Arizona, USA.

Name: Honors Mark Goldberg Ascher, a mineral collector and engineer in Tucson, Arizona, USA, who found the first specimen.

Type Material: University of Arizona Mineral Museum, Tucson, Arizona, USA (19291) and the RRUFF Project (deposition R100030).

References: (1) Yang, H., R.A. Jenkins, R.M. Thompson, R.T. Downs, S.H. Evans, and E.M. Bloch (2012) Markascherite, $\text{Cu}_3(\text{MoO}_4)(\text{OH})_4$, a new mineral species polymorphic with szenicsite, from Copper Creek, Pinal County, Arizona, U.S.A. *Amer. Mineral.*, 97, 197-202.