Eckhardite $(Ca,Pb)Cu^{2+}Te^{6+}O_5(H_2O)$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. As needles or blades elongated along [010] and flattened on {101}, to 150 μm; in sub-radial to radial aggregates.

Physical Properties: *Cleavage*: Likely but not observed on {101}. *Fracture*: Irregular. *Tenacity*: Brittle. Hardness = 2-3 D(meas.) = n.d. D(calc.) = 4.644

Optical Properties: Transparent. *Color*: Light bluish green. *Streak*: Very pale bluish green. *Luster*: Vitreous to subadamantine.
Optical Class: Biaxial (-). α(calc.) = 1.770 β(calc.) = 1.860 γ = 1.895(5) 2V(meas.) = 61.2(5)°
Dispersion: perceptible, $r < v$. *Orientation*: $Z = b$; $X \approx$ [101].
Pleochroism: Z = light blue-green, X = colorless, Y = very pale blue-green. *Absorption*: $Z < Y < X$.

Cell Data: *Space Group*: $P2_1/n$. a = 8.1606(8) b = 5.3076(6) c = 11.4412(15) β = 101.549(7)° Z = 4

X-ray Powder Pattern: Bird Nest drift, Otto Mountain, San Bernardino County, California, USA. 5.94 (100), 2.645 (89), 3.287 (80), 2.485 (48), 2.245 (46), 1.53 (43), 1.522 (42)

Chemistry:	(1)	(2)
PbO	4.79	
CaO	15.90	17.03
MgO	0.06	
CuO	22.74	24.16
Fe_2O_3	0.06	
TeO_3	51.01	53.33
H_2O	[5.45]	5.47
Total	100.01	100.00

(1) Bird Nest drift, Otto Mountain, San Bernardino County, California, USA; normalized average of 4 electron microprobe analyses, supplemented by Raman spectroscopy, H_2O calculated from structure; corresponds to $Ca_{0.962}Pb_{0.073}Cu^{2+}_{0.971}Mg_{0.005}Fe^{3+}_{0.002}Te^{6+}_{0.986}O_6H_{2.052}$.
(2) $CaCu^{2+}Te^{6+}O_5(H_2O)$.

Occurrence: A secondary mineral in vugs in quartz formed from the partial oxidation of primary sulfides and tellurides during or following the brecciation of quartz veins.

Association: Br-rich chlorargyrite, gold, housleyite, khinite, markcooperite, ottoite.

Distribution: From the Bird Nest drift and Aga mine, Otto Mountain, near Baker, San Bernardino County, California, USA.

Name: Honors Colonel Eckhard D. Stuart (b. 1939) of Madison, Mississippi, USA., a mineral collector who has provided numerous samples for research, including this new species.

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA (62512 and 64011).

References: (1) Kampf, A.R., S.J. Mills, R.M. Housley, G.R. Rossman, J. Marty, and B. Thorne (2013) Lead-tellurium oxysalts from Otto Mountain near Baker, California: XI. Eckhardite, $(Ca,Pb)Cu^{2+}Te^{6+}O_5(H_2O)$, a new mineral with HCP stair-step layers Amer. Mineral., 98, 1617-1623.