Timroseite $Pb_2Cu_5(TeO_6)_2(OH)_2$

Crystal Data: Orthorhombic. *Point Group*: *mm*2. As irregular, rounded masses and rarely as equant rhombs, or diamond-shaped plates that exhibit {001}, {110}, and {010}, in subparallel sheaf-like aggregates to 0.5 mm.

Physical Properties: *Cleavage*: None. *Tenacity*: Brittle. *Fracture*: Irregular. Hardness = 2.5 D(meas.) = n.d. D(calc.) = 6.982

Optical Properties: Transparent. *Color*: Olive to lime-green. *Streak*: Very pale yellowish green. *Luster*: Dull to adamantine.
Optical Class: Biaxial (+). Indices of refraction > 2. 2V = Large. *Orientation*: *X* = *b*, *Y* = *a*, *Z* = *c*. *Pleochroism*: *X* = greenish yellow, *Y* = yellowish green, *Z* = dark green. *Absorption*: *Z* > *Y* > *X*.

Cell Data: *Space Group*: $P2_1nm$. a = 5.2000(2) b = 9.6225(4) c = 11.5340(5) Z = 2

X-ray Powder Pattern: Otto Mountain, San Bernardino County, California, USA.
2.732 (100), 2.950 (88), 3.008 (84), 3.578 (44), 3.693 (43), 1.475 (36), 1.785 (33)

Chemistry:

	(1)	(2)
PbO	35.85	36.79
CuO	29.57	32.78
TeO_3	27.75	28.94
Cl	0.04	
H_2O	[1.38]	1.48
- O = Cl	0.01	.
Total	94.58	100.00

(1) Otto Mountain, San Bernardino County, California, USA; average of 4 electron microprobe analyses; corresponds to $Pb_{2.07}Cu^{2+}_{4.80}Te^{6+}_{2.04}O_{12}(OH)_{1.98}Cl_{0.02}$. (2) $Pb_2Cu^{2+}_5(Te^{6+}O_6)_2$.

Occurrence: A secondary phase on fracture surfaces and in small vugs in quartz veins. Formed from the partial oxidation of primary sulfides (e.g., galena) and tellurides (e.g., hessite) during or following brecciation of the quartz veins. The Cl may be sourced in part from primary phases; however, it is most likely from salty brines interacting with primary tellurides.

Association: Acanthite, cerussite, bromine-rich chlorargyrite, chrysocolla, gold, housleyite, iodargyrite, khinite-4*O*, markcooperite, ottoite, paratimroseite, thorneite, vauquelinite, wulfenite.

Distribution: From the Aga mine and the Bird Nest drift, southwest flank of Otto Mountain, ~2 km northwest of Baker, San Bernardino County, California, USA. At the Vesley mine, Granite Gap, Hidalgo County, New Mexico, USA.

Name: Honors Timothy (Tim) P. Rose (b. 1960) geochemist at Lawrence Livermore National Laboratory. An avid mineral collector, he collected and provided two of the studied specimens.

Type Material: Natural History Museum of Los Angeles County, Los Angeles, California, USA (62531, 62532, and 62533).

References: (1) Kampf, A.R., S.J. Mills, R.M. Housley, J. Marty, and B. Thorne (2010) Lead-tellurium oxysalts from Otto Mountain near Baker, California: V. Timroseite, $Pb_2Cu^{2+}_5(Te^{6+}O_6)_2(OH)_2$, and paratimroseite, $Pb_2Cu^{2+}_4(Te^{6+}O_6)_2(H_2O)_2$, two new tellurates with Te-Cu polyhedral sheets. Amer. Mineral., 95, 1560-1568.