Christite $TlHgAsS_3$

Crystal Data: Monoclinic. *Point Group:* $2/m$. As subhedral grains, to 1 mm in length. Some grains are somewhat bladed or flattened, probably on {010}.

Physical Properties: *Cleavage:* Perfect on {010}, excellent on {110} and {001}, good on $\{\bar{1}01\}$. *Fracture:* Uneven. Hardness = 1–2 VHN = 28–35 (10 g load). D(meas.) = 6.15 D(calc.) = 6.37

Optical Properties: Opaque to semitransparent. *Color:* Bright orange to deep red or crimson, darker than realgar; yellowish orange with red tinge, tarnishes brown; in reflected light, grayish white with pale blue tinge, with red or yellow to yellowish brown internal reflections. *Streak:* Bright orange, yellow. *Luster:* Adamantine.
Optical Class: Biaxial. *Pleochroism:* Weak to strong, grayish green, dark violet, bluish violet. *Bireflectance:* Pale gray with blue to yellow tinge.
R_1–R_2: (470) 29.3–30.1, (530) 26.6–26.7, (590) 25.2–26.1, (460) 23.8–24.7

Cell Data: *Space Group:* $P2_1/n$. $a = 6.113$ $b = 16.188$ $c = 6.111$ $\beta = 96.71°$ $Z = 4$

X-ray Powder Pattern: Carlin mine, Nevada, USA.
2.98 (100), 3.62 (80), 4.03 (60), 3.49 (60), 2.692 (60), 3.36 (50), 2.216 (50)

Chemistry:	(1)	(2)	(3)		(1)	(2)	(3)
Tl	35.2	35.29	35.48	Cd		0.04	
Hg	35.1	35.46	34.82	Ag		0.08	
Fe		0.10		As	13.1	12.23	13.00
Zn		0.02		Se		0.03	
Cu		0.02		S	16.6	16.57	16.70
				Total	100.0	99.83	100.00

(1) Carlin mine, Nevada, USA; by electron microprobe, average of four analyses; corresponding to $Tl_{1.00}Hg_{1.01}As_{1.01}S_{3.00}$. (2) Lanmuchang deposit, China; by electron microprobe, average of 13 analyses; corresponding to $Tl_{1.00}Hg_{1.02}As_{0.95}S_{3.00}$. (3) $TlHgAsS_3$.

Occurrence: In hydrothermal barite veins and in mineralized carbonaceous silty dolostone (Carlin mine, Nevada, USA); in thallium-rich pods in a stratabound mercury deposit (Lanmuchang deposit, China).

Association: Realgar, orpiment, lorandite, barite, getchellite (Carlin mine, Nevada, USA); lorandite, barite, marcasite, pyrite (Lanmuchang deposit, China).

Distribution: In the USA, in Nevada, at the Carlin mine, 50 km northwest of Elko, Lynn district, Eureka Co. [TL], and in the Getchell mine, Potosi district, Humboldt Co. At the Lanmuchang Hg–Tl deposit, Guizhou Province, China. From Alšar (Allchar), near Rošden, Macedonia.

Name: To honor Dr. Charles Louis Christ (1916–1980), American physical chemist, mineralogist, and crystallographer with the U.S. Geological Survey.

Type Material: Geology Department, Stanford University, Palo Alto, California; National Museum of Natural History, Washington, D.C., USA, 144272, 144273.

References: (1) Radtke, A.S., F.W. Dickson, J.F. Slack, and K.L. Brown (1977) Christite, a new thallium mineral from the Carlin gold deposit, Nevada. Amer. Mineral., 62, 421–425. (2) Brown, K.L. and F.W. Dickson (1976) The crystal structure of synthetic christite, $HgTlAsS_3$. Zeits. Krist., 144, 367–376. (3) Li Xi-lin, An Xian-Guo, and Nan Jun-Ta (1989) The second discovery of christite in nature. Kexue Tongbao, 34(11), 942–945 (in English).