Tedhadleyite $Hg^{2+}Hg^{1+}_{10}O_4I_2(Cl, Br)_2$

Crystal Data: Triclinic. *Point Group*: $\bar{1}$. As partially hollow, spheroidal masses, to 0.3 mm.

Physical Properties: *Cleavage*: Poor on {010}. *Fracture*: Uneven. *Tenacity*: Brittle. Hardness = <3 D(meas.) = n.d. D(calc.) = 9.43

Optical Properties: Opaque to translucent. *Color*: Dark red to black, bluish white in reflected light with deep red to purplish red internal reflections. *Streak*: Red. *Luster*: Adamantine to submetallic. *Optical Class*: Moderately anisotropic.
R_1-R_2: (400) 28.25-29.40, (420) 28.00-29.30, (440) 27.60-29.50, (460) 27.40-29.85, (470) 27.20-30.00, (480) 26.70-29.90, (500) 26.20-29.50, (520) 25.35-28.80, (540) 24.60-27.70, (546) 24.40-27.60, (560) 23.85-26.90, (580) 23.10-25.90, (589) 22.80-25.40, (600) 22.60-25.15, (620) 22.20-24.35, (640) 21.80-24.00, (650) 21.60-23.90, (660) 21.50-23.80, (680) 21.15-23.70, (700) 21.05-23.60

Cell Data: Space Group: $A\bar{1}$. $a = 7.0147(5)$ $b = 11.8508(7)$ $c = 12.5985(8)$ $\alpha = 115.583(5)^o$ $\beta = 82.575(2)^o$ $\gamma = 100.619(2)^o$ Z = 2

X-ray Powder Pattern: Near the Clear Creek mine, San Benito County, California, USA.
2.885 (100), 3.143 (90), 2.675 (90), 3.005 (70), 5.281 (50), 2.981 (50), 2.508 (40)

Chemistry:

	(1)	(2)
HgO	[8.36]	8.23
Hg_2O	[80.50]	79.24
I	11.11	9.64
Cl	2.20	1.56
Br	1.62	2.55
- O = Cl,I,Br	1.36	1.22
Total	102.43	100.00

(1) Near the Clear Creek mine, San Benito County, California, USA; by electron microprobe, average of 7 analyses, total Hg (85.15 wt.%) partitioned from structure analysis; corresponds to $Hg^{2+}_{1.0}Hg^{1+}_{9.8}O_{3.7}I_{2.2}(Cl_{1.6}Br_{0.5})_{\Sigma=2.1}$. (2) $Hg^{2+}Hg^{1+}_{10}O_4I_2(Cl_{1.16}Br_{0.84})_{\Sigma=2}$.

Occurrence: On the wall of a vug in quartz, likely formed, in situ, as a replacement of native mercury, during a period of high activity of I (with lower Cl and Br) in the fluid or vapor phase.

Association: Native mercury, calomel, cinnabar, eglestonite, montroydite, quartz, magnesite.

Distribution: From a prospect pit near the former Clear Creek mercury mine, New Idria district, San Benito County, California, USA.

Name: Honors Ted A. Hadley (b. 1961) of Sunnyvale, California, who participated in the collection of the holotype specimen and for his contributions to mineralogy generally.

Type Material: National Mineral Collection, Geological Survey of Canada, Ottawa, Ontario (NMC68088) and The Natural History Museum, London, England.

References: (1) Roberts, A.C., M.A. Cooper, F.C. Hawthorne, A.J. Criddle, J.A.R. Stirling, and G.E. Dunning, (2002) Tedhadleylite, $Hg^{2+}Hg^{1+}_{10}O_4I_2(Cl,Br)_2$, a new mineral from the Clear Creek Claim, San Benito County, California. Can. Mineral., 40, 909-914. (2) (2003) Amer. Mineral., 88(2-3), 477 (abs. ref. 1). (3) Cooper, M.A. and F.C. Hawthorne (2009) The crystal structure of tedhadleyite, $Hg^{2+}Hg^{1+}_{10}O_4I_2(Cl,Br)_2$, from the Clear Creek Claim, San Benito County, California. Mineral. Mag., 73(2), 227-234. (4) (2010) Amer. Mineral., 95(8), 1360-1361 (abs. ref. 3).