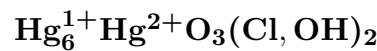


# Hanawaltite



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**Crystal Data:** Orthorhombic. *Point Group:*  $2/m2/m2/m$ . Subhedral to anhedral crystals, platy to bladed, striated || [001], to 0.3 mm.

**Physical Properties:** *Cleavage:* {001}, good. *Fracture:* Uneven. *Tenacity:* Brittle. Hardness = < 5 D(meas.) = n.d. D(calc.) = 9.51 Decrepitates on exposure to sunlight, photoreducing to mercury.

**Optical Properties:** Opaque to translucent on very thin edges. *Color:* Black to very dark brown-black; in reflected light, gray, may have red-orange internal reflections. *Streak:* Black to dark red-brown. *Luster:* Metallic.

*Optical Class:* Biaxial. *Pleochroism:* Weak; bright bluish white to grayish white.

*Anisotropism:* Bright metallic blue. *Birefractance:* Moderate to strong.

$R_1$ – $R_2$ : (400) 26.2–37.6, (420) 25.2–34.8, (440) 24.2–32.5, (460) 23.3–30.6, (480) 22.4–29.0, (500) 21.8–27.7, (520) 21.2–26.7, (540) 20.8–25.9, (560) 20.5–25.2, (580) 20.3–24.6, (600) 20.1–24.1, (620) 20.0–23.7, (640) 20.2–23.3, (660) 20.3–23.1, (680) 20.2–22.9, (700) 20.0–22.8

**Cell Data:** *Space Group:*  $Pbma$ .  $a = 11.790(3)$   $b = 13.881(4)$   $c = 6.450(2)$   $Z = 4$

**X-ray Powder Pattern:** Clear Creek mine, California, USA.

3.053 (100), 5.25 (80), 2.954 (70), 3.164 (60), 2.681 (50), 2.411 (50), 4.35 (40)

## Chemistry:

	(1)
HgO	[14.27]
Hg <sub>2</sub> O	[82.46]
Cl	3.33
S	0.00
H <sub>2</sub> O	[0.34]
–O = Cl <sub>2</sub>	0.75
Total	[99.65]

(1) Clear Creek mine, California, USA; by electron microprobe, calculated for  $\text{Hg}^{1+}:\text{Hg}^{2+} = 6:1$  and  $\text{H}_2\text{O}$  for  $\text{Cl}+(\text{OH}) = 2.00$ ; then corresponding to  $\text{Hg}_{6.00}^{1+}\text{Hg}_{1.00}^{2+}[\text{Cl}_{1.43}(\text{OH})_{0.57}]_{\Sigma=2.00}\text{O}_{3.00}$ .

**Occurrence:** A rare alteration product of cinnabar, in a mercury deposit in silicate-carbonate rock hydrothermally altered from serpentinite.

**Association:** Calomel, mercury, cinnabar, montroydite, ferroan magnesite, quartz.

**Distribution:** Near the Clear Creek mercury mine, New Idria district, San Benito Co., California, USA.

**Name:** To honor Dr. Joseph Donald Hanawalt (1903–1987), American metallurgist, Ann Arbor, Michigan, USA, for his early work in X-ray powder diffraction.

**Type Material:** Canadian Geological Survey, Ottawa, Canada, 67396.

**References:** (1) Roberts, A.C., J.D. Grice, R.A. Gault, A.J. Criddle, and R.C. Erd (1996) Hanawaltite,  $\text{Hg}_6^{1+}\text{Hg}^{2+}[\text{Cl}, (\text{OH})_2]\text{O}_3$  – a new mineral from the Clear Creek claim, San Benito County, California: description and crystal structure. Powder Diffraction, 11, 45–50. (2) (1996) Amer. Mineral., 81, 1282 (abs. ref. 1).