

**Crystal Data:** Monoclinic. *Point Group:* 2/*m*. As needles elongated [010], to 12 cm; also fibrous, massive, columnar, and in globular masses and interlaced needles. *Twinning:* Twin gliding postulated. Polysynthetic-twinninglike features noted in polished section.

**Physical Properties:** *Cleavage:* Perfect on {001}, poor on {010} and {100}. *Tenacity:* Flexible. Hardness = 2 VHN = 96–125 (100 g load). D(meas.) = 4.8(2); 4.88(2) (synthetic). D(calc.) = 4.98

**Optical Properties:** Opaque, translucent in thin fragments. *Color:* Blackish gray; in polished section, white; red in transmitted light, with deep red internal reflections. *Streak:* Red. *Luster:* Adamantine to metallic.

*Optical Class:* Biaxial (-). *Pleochroism:* Weak. *Orientation:* Z = b. n = > 2.72  
*Anisotropism:* Strong.

R<sub>1</sub>–R<sub>2</sub>: (400) 35.0–44.3, (420) 34.2–44.3, (440) 33.2–44.4, (460) 32.8–44.9, (480) 32.6–44.9, (500) 32.3–43.8, (520) 31.8–42.3, (540) 31.2–41.0, (560) 30.7–40.0, (580) 30.4–39.2, (600) 29.9–38.1, (620) 29.1–36.8, (640) 28.4–35.7, (660) 27.8–34.9, (680) 27.4–34.2, (700) 26.9–33.6

**Cell Data:** *Space Group:* A2/a. a = 30.567(6) b = 4.015(1) c = 21.465(3)  
β = 103.39(1)° Z = 8

**X-ray Powder Pattern:** Huitzuco, Mexico (may show preferred orientation).  
3.00 (100), 3.74 (70), 3.48 (70), 2.28 (60), 1.734 (50), 5.16 (40), 2.67 (30)

Chemistry:	(1)	(2)	(3)
Hg	22.52	21.0	21.25
Sb	53.75	51.6	51.58
S	23.73	28.6	27.17
Total	100.00	101.2	100.00

(1) Huitzuco, Mexico; recalculated after deduction of 13–16% impurities. (2) Do.; by electron microprobe. (3) HgSb<sub>4</sub>S<sub>8</sub>.

**Occurrence:** In low-temperature hydrothermal veins.

**Association:** Cinnabar, stibnite, sulfur, gypsum.

**Distribution:** In Mexico, from the La Cruz mine, Huitzuco, Guerrero [TL]; and at the Trinidad mine, Guadalcázar, San Luis Potosí. From the Matsuo mine, Iwate Prefecture, Japan. At Khaydarkan, Fergana Valley, Alai Range, Kyrgyzstan. From Pedrosa del Rey, León, Spain.

**Name:** Honors David Livingstone (1813–1873), Scottish explorer and missionary in Africa.

**References:** (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 485–486. (2) Srikrishnan, T. and W. Nowacki (1975) A redetermination of the crystal structure of livingstonite, HgSb<sub>4</sub>S<sub>8</sub>. Zeits. Krist., 141, 174–192. (3) Berry, L.G. and R.M. Thompson (1962) X-ray powder data for the ore minerals. Geol. Soc. Amer. Mem. 85, 170. (4) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 326.