Livingstonite  \(\text{HgSb}_4\text{S}_8\)

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

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

**Optical Properties:** Opaque, translucent in thin fragments.  \(\text{Color: }\) Blackish gray; in polished section, white; red in transmitted light, with deep red internal reflections.  \(\text{Streak: }\) Red.  \(\text{Luster: }\) Adamantine to metallic.  \(\text{Optical Class: }\) Biaxial (-).  \(\text{Pleochroism: }\) Weak.  \(\text{Orientation: }\) Z = b, \(n > 2.72\)  \(\text{Anisotropism: }\) Strong.

\(R_1 - R_2:\)  \((400)\) 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:**  \(\text{Space Group: }\) A2/a.  \(\text{a} = 30.567(6);\) \(\text{b} = 4.015(1);\) \(\text{c} = 21.465(3)\)  \(\beta = 103.39(1)\)\(^\circ\)  \(Z=8\)

**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:**

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(1) Huitzuco, Mexico; recalculated after deduction of 13-16% impurities.  (2) Do.; by electron microprobe.  (3) HgSb\(_4\)S\(_8\).

**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, Guadalcazar, San Luis Potosi. From the Matsuo mine, Iwate Prefecture, Japan. At Khaydarkan, Fergana Valley, Alai Range, Kyrgyzstan. From Pedrosa del Rey, Leon, Spain.

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