Corderoite $Hg_3S_2(Cl,Br)_2$

Crystal Data: Cubic. *Point Group:* $2/m\ \overline{3}$. Rare as cubic crystals, to 2 mm; as rims and replacements of cinnabar.

Physical Properties: Hardness = ∼3 VHN = 28–61 (25 g load) (synthetic).
D(meas.) = 6.74 (synthetic). D(calc.) = 6.845

Optical Properties: Transparent. *Color:* Pale orange-pink to salmon-pink; on exposure to light, rapidly darkening to pale gray, then black.
Optical Class: Isotropic. $n = > 2.5$
R: 16.7 (470), 15.5 (546), 15.1 (589), 15.1 (650)

Cell Data: *Space Group:* $I2_13$. $a = 8.940(5)$ Z = 4

X-ray Powder Pattern: Synthetic $Hg_3S_2Cl_2$.
3.62 (100), 2.57 (70), 1.749 (60), 2.81 (50), 2.38 (40), 2.10 (40), 6.23 (30)

Chemistry:

	(1)	(2)	(3)
Hg	82.6	81.4	81.68
S	8.65	8.54	8.70
Cl	9.49	9.11	9.62
Br		1.28	
Total	100.74	100.33	100.00

(1) Arzak deposit, Russia; by electron microprobe, average of four grains; corresponds to $Hg_{3.00}S_{1.96}Cl_{1.95}$. (2) Kadyrel deposit, Russia; by electron microprobe, corresponds to $Hg_{3.00}S_{1.96}(Cl_{1.90}Br_{0.12})_{\Sigma=2.02}$. (2) $Hg_3S_2Cl_2$.

Polymorphism & Series: Dimorphous with lavrentievite.

Occurrence: In lake-bed sediments and underlying silicified rhyolite tuffs, possibly of low-temperature secondary origin (McDermitt mine, Nevada, USA); in an oxidized hydrothermal deposit (Arzak deposit, Russia).

Association: Cinnabar, kleinite, kenhsuite, radtkeite, montmorillonite, quartz, cristobalite, orthoclase, plagioclase (McDermitt mine, Nevada, USA); cinnabar, calomel, eglestonite, arzakite, lavrentievite, kuznetsovite, mercury, quartz, kaolinite (Arzak deposit, Russia).

Distribution: In the USA, in Nevada, from the McDermitt mercury mine, Opalite district, Humboldt Co. [TL]; at the Paradise Peak mine, Fairplay district, Nye Co.; and in the Gold Quarry mine, near Carlin, Maggie Creek district, Eureka Co. From the Arzak and Kadyrel mercury deposits, Tuva, Siberia, Russia. In the Khaydarkan mercury deposit, Fergana Valley, Alai Range, Kyrgyzstan. At Landsberg, near Obermoschel, and from Königsberg, near Wolfstein, Rhineland-Palatinate, Germany.

Name: For its occurrence in the McDermitt (formerly Cordero) mine, USA.

Type Material: Stanford University, Palo Alto, California; National Museum of Natural History, Washington, D.C., USA, 133354.

References: (1) Foord, E.E., P. Berendsen, and L.O. Storey (1974) Corderoite, first natural occurrence of α–$Hg_3S_2Cl_2$, from the Cordero mercury deposit, Humboldt County, Nevada. Amer. Mineral., 59, 652–655. (2) Vasil'ev, V.I. and O.K. Grechishchev (1979) First discovery of corderoite (α–$Hg_3S_2Cl_2$) in mercury ores of the USSR. Doklady Acad. Nauk SSSR, 246, 951–953 (in Russian). (3) Vasil'ev, V.I. and Y.G. Lavrent'ev (1979) New finds and data on the composition of corderoite (α–$Hg_3S_2Cl_2$). Soviet Geol. Geophys., 27(12), 112–115. (4) Aurivillius, K.L. (1967) An X-ray single crystal study of $\alpha - Hg_3S_2Cl_2$. Arkiv för Kemi, 26, 497–505. (5) Carlson, E.H. (1967) The growth of HgS and $Hg_3S_2Cl_2$ single crystals by a vapor phase method. J. Crystal Growth, 1, 271–277. (6) Frueh, A.J. and N. Gray (1968) Confirmation and refinement of the structure of $Hg_3S_2Cl_2$. Acta Cryst., 24, 156–157.