Paracostibite CoSbS

Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. As irregular and subhedral grains, to 130 μm.

Physical Properties: Hardness = n.d. VHN = 654–763 (100 g load). D(meas.) = 6.9 D(calc.) = 6.97

Optical Properties: Opaque. *Color:* White with a faint grayish tinge. *Luster:* Metallic. *Pleochroism:* Weak. *Anisotropism:* Weak, faint pink to pale buff.
R_1–R_2: (400) 47.8–47.9, (420) 48.0–48.5, (440) 48.2–48.9, (460) 48.2–49.2, (480) 48.2–49.4, (500) 48.4–49.6, (520) 48.7–49.6, (540) 48.9–49.4, (560) 49.0–49.3, (580) 49.2–49.2, (600) 49.5–49.3, (620) 49.7–49.6, (640) 49.9–49.9, (660) 50.2–50.3, (680) 50.3–50.6, (700) 50.5–50.9

Cell Data: *Space Group: Pbca.* $a = 5.842(3)$ $b = 5.951(3)$ $c = 11.666(4)$ $Z = 8$

X-ray Powder Pattern: Trout Bay, Canada.
2.555 (10), 2.035 (8), 5.81 (8), 1.853 (8), 2.826 (7), 2.654 (7), 2.976 (4)

Chemistry:

	(1)	(2)	(3)
Co	26.4	25.0	27.70
Fe	0.4	0.4	
Ni	0.8	1.0	
Sb	56.8	57.6	57.23
As		2.1	
S	14.9	14.5	15.07
Total	99.3	100.6	100.00

(1) Trout Bay, Canada; by electron microprobe, average of five analyses; corresponds to $(Co_{0.96}Ni_{0.03}Fe_{0.02})_{\Sigma=1.01}Sb_{1.00}S_{1.00}$. (2) Wheal Cock, England; by electron microprobe; corresponds to $(Co_{0.91}Ni_{0.04}Fe_{0.01})_{\Sigma=0.96}(Sb_{1.01}As_{0.06})_{\Sigma=1.07}S_{0.97}$. (3) CoSbS.

Polymorphism & Series: Dimorphous with costibite.

Occurrence: In drill core from a massive base-metal sulfide deposit in a carbonatized chlorite-anthophyllite schist that is most likely an altered mafic rock, in a sequence of metavolcanics and metasediments (Trout Bay, Canada); in Pb–Zn–Cu–Ag ore deposits remobilized by hydrothermal solutions from younger granite emplacement (Bergslagen, Sweden).

Association: Sphalerite, chalcopyrite, galena, pyrargyrite, pyrrhotite, antimonial silver (Trout Bay, Canada); costibite, nisbite, chalcopyrite, pyrrhotite, galena, sphalerite, gersdorffite, ullmannite (Bergslagen, Sweden).

Distribution: In drill core from Trout Bay, 32 km west of Red Lake, Kenora district, Ontario, Canada [TL]. At Wheal Cock, Botallack, St. Just, Cornwall, England. In the Gruvåsen and Getön deposits, Bergslagen metallic province, Sweden.

Name: For CObalt and antimony, STIBium, in the chemical composition and probable structural relation to pararammelsbergite.

Type Material: Canadian Museum of Nature, Ottawa; Canadian Geological Survey, Ottawa, 12163; Royal Ontario Museum, Toronto, Canada.

References: (1) Cabri, L.J., D.C. Harris, and J.M. Stewart (1970) Paracostibite (CoSbS) and nisbite ($NiSb_2$), new minerals from the Red Lake Area, Ontario, Canada. Can. Mineral., 10, 232–246. (2) (1971) Amer. Mineral., 56, 631 (abs. ref. 1). (3) Rowland, J.F., E.J. Gabe, and S.R. Hall (1975) The crystal structures of costibite (CoSbS) and paracostibite (CoSbS). Can. Mineral., 13, 188–196. (4) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 411.