Hauchecornite $Ni_9Bi(Sb,Bi)S_8$

Crystal Data: Tetragonal. *Point Group:* $4/m\ 2/m\ 2/m$. Crystals are tabular on {001}, also short prismatic and dipyramidal, to 4 mm.

Physical Properties: *Fracture:* Flat, conchoidal. Hardness = 5 VHN = 447–655 (50 g load). D(meas.) = 6.35–6.47 D(calc.) = 6.58

Optical Properties: Opaque. *Color:* Pale bronze-yellow, tarnishing darker. *Streak:* Gray-black. *Luster:* Lively metallic on fresh break. *Pleochroism:* Very weak in air; more distinct in oil. *Anisotropism:* Distinct.
R_1–R_2: (400) 35.8–37.9, (420) 37.2–39.3, (440) 38.6–40.7, (460) 40.0–42.2, (480) 41.4–43.8, (500) 42.7–45.4, (520) 44.0–46.9, (540) 45.2–48.2, (560) 46.3–49.3, (580) 47.3–50.2, (600) 48.2–51.0, (620) 49.0–51.7, (640) 49.7–52.3, (660) 50.4–52.9, (680) 51.0–53.4, (700) 51.5–53.9

Cell Data: *Space Group:* $P4/mmm$. $a = 7.300(3)$ $c = 5.402(2)$ $Z = 1$

X-ray Powder Pattern: Friedrich mine, Germany.
2.79 (10), 2.39 (6), 2.30 (6), 4.34 (5), 1.861 (5), 3.64 (4), 3.25 (4)

Chemistry:

	(1)	(2)	(3)
Ni	45.47	46.8	45.57
Co	0.76	0.3	
Fe	0.22		
Bi	24.11	22.3	27.05
Sb	6.48	7.8	5.25
As	0.67	0.2	
S	22.75	22.6	22.13
Total	100.46	100.0	100.00

(1) Friedrich mine, Germany; average of two analyses, corresponds to $(Ni_{8.74}Co_{0.14}Fe_{0.04})_{\Sigma=8.92}(Bi_{1.30}Sb_{0.60}As_{0.10})_{\Sigma=2.00}S_{8.00}$. (2) Do.; by electron microprobe, corresponds to $(Ni_{9.05}Co_{0.06})_{\Sigma=9.11}(Bi_{1.21}Sb_{0.73}As_{0.03})_{\Sigma=1.97}S_{8.00}$. (3) $Ni_9Bi(Sb,Bi)S_8$ with Bi:Sb = 3:1.

Mineral Group: Hauchecornite group.

Occurrence: Of hydrothermal origin.

Association: Millerite, bismuthian-arsenian ullmannite, antimonian gersdorffite, siegenite, bismuthinite, gold, galena, sphalerite, quartz.

Distribution: From the Friedrich mine, near Wissen, North Rhine-Westphalia, Germany [TL].

Name: Honors William Hauchecorn (1828–1900), Director of the Geological Survey and the Mining Academy, Berlin, Germany.

Type Material: Harvard University, Cambridge, Massachusetts, USA, 89710.

References: (1) Peacock, M.A. (1950) Hauchecornite. Amer. Mineral., 35, 440–446. (2) Gait, R.I. and D.C. Harris (1972) Hauchecornite – antimonian arsenian, and tellurian varieties. Can. Mineral., 11, 819–825. (3) Kocman, V. and E.W. Nuffield (1974) The crystal structure of antimonian hauchecornite from Westphalia. Can. Mineral., 12, 269–274. (4) Just, J. (1980) Bismutohauchecornite – new name: hauchecornite redefined. Mineral. Mag., 43, 873–876.