Cattierite CoS_2

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Crystal Data: Cubic. *Point Group:* $2/m\ \overline{3}$. Cubic crystals, to 1 cm; granular intergrowths with other sulfides.

Physical Properties: *Cleavage:* {001}, perfect. Hardness = > 4 VHN = 1018–1114 (10 g load). D(meas.) = 4.82 D(calc.) = 4.80

Optical Properties: Opaque. *Color:* Pinkish to gray, tobacco-brown; in polished section, white. *Luster:* Metallic.

R: (400) 35.8, (420) 35.2, (440) 34.5, (460) 34.3, (480) 34.6, (500) 35.1, (520) 35.8, (540) 36.7, (560) 37.6, (580) 38.4, (600) 39.4, (620) 40.2, (640) 41.1, (660) 41.9, (680) 42.6, (700) 43.3

Cell Data: *Space Group: Pa*3. a = 5.52 Z = 4

X-ray Powder Pattern: Shinkolobwe, Congo.
2.750 (100), 2.463 (60), 1.663 (55), 1.063 (55), 2.249 (48), 1.950 (34), 1.474 (22)

Chemistry:

	(1)	(2)	(3)
Co	42.20	42.3	47.90
Ni	3.25	0.6	
Cu		0.4	
Fe	2.80	5.4	
S	51.75	51.9	52.10
Total	[100.00]	100.6	100.00

(1) Shinkolobwe, Congo; recalculated to 100% from an original total of 99.86% after deduction of quartz 0.08% and chalcopyrite 0.59%; then corresponds to $(Co_{0.89}Ni_{0.07}Fe_{0.06})_{\Sigma=1.02}S_{2.00}$. (2) Do.; by electron microprobe, corresponds to $(Co_{0.89}Fe_{0.12}Ni_{0.01}Cu_{0.01})_{\Sigma=1.03}S_{2.00}$. (3) CoS_2.

Polymorphism & Series: Forms a series with pyrite and vaesite.

Mineral Group: Pyrite group.

Occurrence: In carbonate rocks (Shinkolobwe, Congo).

Association: Pyrite, chalcopyrite, other linnaeite–polydymite group minerals.

Distribution: From Shinkolobwe, Katanga Province, Congo (Shaba Province, Zaire) [TL]. At Gänsberg, near Wiesloch, and Hohensachsen, Black Forest, Germany. In Sweden, near Filipstad, Värmland. In the USA, from Bald Knob, near Sparta, Alleghany Co., North Carolina, and in the Fletcher mine, Reynolds Co., Missouri.

Name: Honors Félicien Cattier (1869–1946), former Chairman of Union Miniére du Haut Katanga, Belgium.

Type Material: n.d.

References: (1) Kerr, P.F. (1945) Cattierite and vaesite: new Co–Ni minerals from the Belgian Congo. Amer. Mineral., 30, 483–497. (2) Pratt, J.L. and P. Bayliss (1979) Crystal-structure refinement of cattierite. Zeits. Krist., 150, 163–167. (3) Nowack, E., D. Schwarzenbach, and T. Hahn (1991) Charge densities in CoS_2 and NiS_2 (pyrite structure). Acta Cryst., 650–659. (4) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 78.

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