

Valleriite**4(Fe, Cu)S·3(Mg, Al)(OH)₂**

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Crystal Data: Hexagonal *Point Group:* $\bar{3} 2/m$ or $3m$. Massive, as nodules, to 5 mm; also in tiny splinters, very thin flakes, and thin crusts.

Physical Properties: *Cleavage:* On {0001}, excellent. *Hardness* = < 1, less than graphite. VHN = n.d. D(meas.) = 3.14 D(calc.) = 3.21

Optical Properties: Opaque. *Color:* Bronze-yellow, resembling pyrrhotite. *Luster:* Metallic to submetallic. *Pleochroism:* Strong; pale yellow to deep brown. *Anisotropism:* Strong; golden yellow.

R₁–R₂: (400) 10.5–11.1, (420) 10.8–11.3, (440) 10.7–12.7, (460) 10.6–14.2, (480) 10.5–15.8, (500) 10.5–17.3, (520) 10.3–18.8, (540) 10.3–20.1, (560) 10.3–21.3, (580) 10.2–22.4, (600) 10.3–23.4, (620) 10.3–24.4, (640) 10.3–25.1, (660) 10.4–25.8, (680) 10.3–26.4, (700) 10.3–26.9

Cell Data: *Space Group:* $R\bar{3}m$ or $R3m$. *a* = 64.46 *c* = 34.10 *Z* = [390]

X-ray Powder Pattern: Loolekop, South Africa.

11.39 (100), 5.71 (100), 3.27 (60), 3.80 (50), 3.23 (50), 2.846 (50), 1.885 (50)

Chemistry:	(1)	(2)	(3)		(1)	(2)	(3)
Cu	17.7	17.6	19.8	CaO	0.3	1.7	1.3
Fe	26.3	21.2	20.0	K ₂ O	0.3		
S	22.5	21.4	21.6	Na ₂ O	0.6		
Al ₂ O ₃	5.1	8.1	8.5	H ₂ O	10.8	12.2	10.8
MgO	10.6	16.2	16.0	SiO ₂ + insol.		1.8	3.3
				Total	94.2	100.2	101.3

(1) Kopparberg, Sweden; from five partial analyses. (2) Kaveltorp, Sweden. (3) Loolekop, South Africa.

Occurrence: An alteration product of chalcopyrite in chromitites and dunites (Cyprus); in copper-bearing carbonatites, replacing magnetite (Phalaborwa, South Africa); in Cu–Ni sulfide-bearing serpentized and uralized ultramafic rocks.

Association: Chalcopyrite, cubanite, pyrrhotite, troilite, millerite, pentlandite, pyrite, marcasite, mackinawite, tochilinite, magnetite.

Distribution: An inconspicuous mineral, now recognized from a number of localities in addition to those listed here. In Sweden, in Kopparberg, from the Aurora mine, Ljusnarsberg [TL], and at Kaveltorp. In South Africa, in Transvaal, from the Loolekop carbonatite, Phalaborwa, and at the Mooihoek and Onverwacht pipes, in the Merensky Reef, Bushveld complex. From near Pefkos, Cyprus. In Canada, at the Little Chief mine, near Whitehorse, Yukon Territory; in the Marbridge mine, Malartic, Quebec; and at Sudbury, Ontario. In the USA, from the Elizabeth mine, South Strafford, Strafford Co., Vermont; in the Pima mine, near Tucson, Pima Co., and at the Christmas mine, Gila Co., Arizona; from the Continental mine, Fierro, Grant Co., New Mexico. In Russia, in the Talnakh area, Noril'sk region, western Siberia; from the Kovdor and Monchegorsk massifs, Kola Peninsula. At Alnalyk, Uzbekistan. In the Akagane mine, Iwate Prefecture, Japan. From Wannaway, Western Australia. On the East Pacific Rise (21°N).

Name: In honor of Johan Gottschalk Wallerius (Vallerius) (1709–1785), Swedish chemist and mineralogist.

Type Material: Wroclaw University, Wroclaw, Poland, II–14152.

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