

Crystal Data: Hexagonal. *Point Group:* $\bar{3}m$, $3m$, or 32 . As hexagonal or rounded plates to 5 mm, in rose-like aggregates of thin, distorted or curved flakes or as crusts to 2 cm.

Physical Properties: *Cleavage:* Perfect on {001}. *Fracture:* n.d. *Tenacity:* Flexible, inelastic. Hardness = 1 VHN = 35 (10 g load). D(meas.) = n.d. D(calc.) = 3.72

Optical Properties: Opaque. *Color:* Dark bronze (fresh), to nearly black. *Streak:* Black. *Luster:* Metallic (fresh), dull, or tarnishes to iridescent golden-brown. *Pleochroism:* Yellow to gray. *Birefractance:* Moderate. *Anisotropism:* Strong, bluish gray to yellowish beige. *Optical Class:* n.d.
 R_1 - R_2 : (470) 15.0-16.6, (546) 14.8-20.5, (589) 14.5-24.1, (650) 14.5-24.1

Cell Data: *Space Group:* $R\bar{3}m$, $R3m$, or $R32$. $a = 3.792(2)$ $c = 34.06(3)$ $Z = 3$

X-ray Powder Pattern: Oktyabr'skiy mine, Norilsk district, Krasnoyarskiy Kray, Russia. 5.69 (100), 3.268 (58), 1.871 (45), 3.163 (36), 1.894 (34), 2.143 (19), 11.42 (18), 3.784 (17)

Chemistry:	(1)
Al	0.10
Mn	0.03
Fe	45.31
Ni	0.07
Cu	18.29
S	20.37
O	15.62
<u>H</u>	<u>[0.98]</u>
Total	100.77

(1) Oktyabr'skiy mine, Norilsk district, Krasnoyarskiy Kray, Russia; average of 6 electron microprobe analyses, $\text{Fe}^{2+}/\text{Fe}^{3+}$ calculated for charge balance, H calculated as if present only as OH, presence of OH and absence of H_2O confirmed by IR spectroscopy; corresponding to $(\text{Fe}_{1.09}\text{Cu}_{0.91})_{\Sigma=2.00}\text{S}_2 \cdot (\text{Fe}^{2+}_{1.34}\text{Fe}^{3+}_{0.12}\text{Al}_{0.01})_{\Sigma=1.47}(\text{OH})_{3.07}$.

Mineral Group: Valleriite group.

Occurrence: Of low-temperature hydrothermal origin coating cavities in pentlandite-mooihoekite-cubanite ore with minor magnetite and chalcopyrite.

Association: Ferrotchilinite, magnetite, an Fe-rich chlorite-type phyllosilicate, hibbingite, rhodochrosite.

Distribution: From several Cu-Ni-PGM deposits of the Norilsk region, including at the Oktyabr'skiy mine, Talnakh, Krasnoyarskiy Kray, Siberia, Russia.

Name: As the structural analogue (based on chemical, X-ray, and IR data similarities) of *valleriite* with essential *ferrous iron*.

Type Material: A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia.

References: (1) Pekov, I.V., E.V. Sereda, V.O. Yapaskurt, Yu.S. Polekhovskiy, S.N. Britvin, and N.V. Chukanov (2012) Ferrovalleriite, $2(\text{Fe,Cu})\text{S}\cdot 1.5\text{Fe}(\text{OH})_2$: validation as a mineral species and new data. Zap. Ross. Mineral. Obshch., 141(6), 29-43 (in Russian, with English abstract). (2) (2014) Amer. Mineral., 99, 243 (abs. ref. 1).