**Ferrovalleriite**  
\(2(\text{Fe,Cu})\text{S} \cdot 1.5\text{Fe(OH)}\_2\)

**Crystal Data:** Hexagonal.  
--- **Point Group:** 3 \(m\), 3 \(m\), 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:**  
--- **Color:** Dark bronze (fresh), to nearly black.  
--- **Streak:** Black.  
--- **Luster:** Metallic (fresh), dull, or tarnishes to iridescent golden-brown.  
--- **Pleochroism:** Yellow to gray.  
--- **Bireflectance:** Moderate.  
--- **Anisotropism:** Strong, bluish gray to yellowish beige.  
**Optical Class:** n.d.

**Cell Data:**  
--- **Space Group:** \(R3\_m\), \(R3m\), 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  
H [0.98]  
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, \(\text{H}\) calculated as if present only as \(\text{OH}\), presence of \(\text{OH}\) and absence of \(\text{H}_2\text{O}\) confirmed by IR spectroscopy; corresponding to \((\text{Fe}_{1.09}\text{Cu}_{0.91})\)\(\_2\cdot2\cdot0\text{S}_2\cdot(\text{Fe}^{2+}_{1.34}\text{Fe}^{3+}_{0.12}\text{Al}_{0.01})\)\(\_2\cdot1.47(\text{OH})\)\(\_3.07\).

**Mineral Group:** Valleriite group.

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

**Association:** Ferrotochilinite, 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:**  