Ferrotochilinite  

**Crystal Data:** Monoclinic.  

- **Point Group:** 2/m, 2 or m.  
- Crystals flattened on [001] mostly split and curved, prismatic to elongated lamellar, or curved ribbon-like, to 3.2 mm; striations on {001} across elongation; as fan- and rosette-like clusters, or chaotic aggregates to 6.5 mm.

**Physical Properties:**  

- **Cleavage:** Perfect on {001}.  
- **Fracture:** n.d.  
- **Tenacity:** Flexible, inelastic.  
- **Hardness:** < 1  
- **VHN:** 13 (2 g load).  
- **D(meas.):** n.d.  
- **D(calc.):** 3.467

**Optical Properties:**  

- **Color:** Dark bronze (fresh), to nearly black; in reflected light, gray with a bluish to pale beige tint.  
- **Streak:** Black.  
- **Luster:** Metallic (fresh), dull, or tarnishes to iridescent purplish or golden-brown.  

**Optical Class:** n.d.  

**Birefringence:** Distinct.  

**Anisotropism:** Distinct, gray-bluish to yellowish beige.  

- **R₁-R₂:** (470) 11.4-11.6, (546) 11.2-12.4, (589) 11.1-13.6, (650) 11.0-15.5

**Cell Data:**  

- **Space Group:** C2/m, Cm, or C2.  
- **a = 5.463(5)**  
- **b = 15.865(17)**  
- **c = 10.825(12)**  
- **β = 93.7(1)°**  
- **Z = 2**

**X-ray Powder Pattern:** Oktyabr’skiy mine, Norilsk district, Krasnoyarskiy Kray, Russia.  

- 5.392 (100), 10.83 (13), 2.696 (12), 2.524 (12), 1.837 (11), 2.152 (8), 3.281 (7)

**Chemistry:**

<table>
<thead>
<tr>
<th>Element</th>
<th>Atomic %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mg</td>
<td>0.02</td>
</tr>
<tr>
<td>Fe</td>
<td>61.92</td>
</tr>
<tr>
<td>Ni</td>
<td>0.03</td>
</tr>
<tr>
<td>Cu</td>
<td>0.09</td>
</tr>
<tr>
<td>S</td>
<td>19.45</td>
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<tr>
<td>O</td>
<td>16.3</td>
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<tr>
<td>H</td>
<td>[1.03]</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>98.84</td>
</tr>
</tbody>
</table>

(1) Oktyabr’skiy mine, Norilsk district, Krasnoyarskiy Kray, Russia; average of 9 electron microprobe analyses, Fe<sup>2+</sup>/Fe<sup>3+</sup> calculated for charge balance, H calculated as if present only as OH, presence of OH and absence of H₂O confirmed by IR spectroscopy; corresponding to (Fe<sub>5.98</sub>Cu<sub>0.015</sub>Ni<sub>0.005</sub>)<sub>2</sub>-6.06S<sub>6</sub>(Fe<sup>2+</sup><sub>4.89</sub>Mg<sub>0.01</sub>)<sub>2</sub>-4.96(OH)<sub>9.80</sub>Fe<sup>3+</sup><sub>0.09</sub>(OH)<sub>0.27</sub>

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

**Association:** Ferrovallerite, magnetite, an Fe-rich chlorite-type phyllosilicate.

**Distribution:** From Shaft no 1, Oktyabr’skiy mine, Oktyabr’skoye Cu-Ni-PGM deposit, Talnakh, Norilsk district, Krasnoyarskiy Kray, Siberia, Russia.

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

**Type Material:** A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia (4058/1).

**References:**  