Tarkianite  
(Cu,Fe)(Re,Mo)$_4$S$_8$

**Crystal Data:** Isometric.  
*Point Group:* $\bar{4} 3m$.  
As equant grains to 0.5 mm.

**Physical Properties:**  
*Cleavage:* None.  
*Fracture:* Uneven.  
*Tenacity:* Brittle.  
*Hardness =* 5.5-6  
VHN = 537–584 (15 g load).  
D(meas.) = n.d.  
D(calc.) = 7.30

**Optical Properties:**  
*Color:* Black; light gray in reflected light in air, brownish gray in oil.  
*Streak:* Black.  
*Luster:* Metallic.  
*Optical Class:* Isotropic.

**Cell Data:**  
*Space Group:* $F\bar{4} 3m$.  
*a* = 9.563(1)  
*Z* = 4

**X-ray Powder Pattern:**  
Hitura mine, Nivala, west-central Finland.  
5.531 (100), 2.885 (90), 2.389 (90), 1.841 (90), 1.690 (80), 2.194 (70), 1.952 (60)

**Chemistry:**

<table>
<thead>
<tr>
<th>Element</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fe</td>
<td>0.59</td>
</tr>
<tr>
<td>Ni</td>
<td>0.09</td>
</tr>
<tr>
<td>Co</td>
<td>0.08</td>
</tr>
<tr>
<td>Cu</td>
<td>5.48</td>
</tr>
<tr>
<td>Mo</td>
<td>12.32</td>
</tr>
<tr>
<td>Re</td>
<td>53.61</td>
</tr>
<tr>
<td>Os</td>
<td>0.84</td>
</tr>
<tr>
<td>S</td>
<td>26.77</td>
</tr>
<tr>
<td>Total</td>
<td>99.78</td>
</tr>
</tbody>
</table>

(1) Hitura mine, Nivala, west-central Finland; average of 34 electron microprobe analyses, corresponding to (Cu$_{0.83}$Fe$_{0.10}$Ni$_{0.02}$Co$_{0.01}$)$_{\Sigma=0.96}$(Re$_{2.79}$Mo$_{1.22}$Os$_{0.04}$)$_{\Sigma=4.03}$S$_{8.01}$.

**Occurrence:**  
In a heavy mineral concentrate derived from a serpentinized, disseminated sulfide and PGM-bearing, ultramafic intrusion.

**Association:** Pentlandite, chromite, pyrrhotite, valleriite, chalcopyrite, cubanite, mackinawite, sperrylite, michenerite, irarsite, froodite, hollingworthite.

**Distribution:** From the Hitura mine, 13 km south of Nivala, west-central Finland and the Stillwater complex, Montana, USA. Other reported occurrences are the Coldwell complex, Ontario, Canada; the Lukkulaisvaara complex, Karelia, and Monchegorsk, Kola Peninsula, Russia; Ekojoki, Finland, and two localities in Sweden.

**Name:** Honors Prof. Mahmud Tarkian (b. 1941) of the University of Hamburg, Germany, who earlier described an occurrence of the mineral.

**Type Material:** Finnish Museum of Natural History, Geological Museum, University of Helsinki, Finland; C4001.

**References:**  