Kotulskite

**Crystal Data:** Hexagonal. **Point Group:** n.d. As minute grains included in other minerals.

**Physical Properties:** Hardness = n.d. VHN = 165–184; 277–322, 291 average (15 g load). D(meas.) = n.d. D(calc.) = 9.18

**Optical Properties:** Opaque. **Color:** Steel-gray; in polished section, cream or pale yellow. **Luster:** Metallic. **Pleochroism:** Distinct, from pale cream to darker grayish cream. **Anisotropism:** Strong, from gray to dark bluish gray.

\[ R_1 - R_2: \ (400) - , \ (420) 46.3–46.5, \ (440) 50.5–52.1, \ (460) 54.2–57.1, \ (480) 57.1–61.1, \ (500) 59.7–64.2, \ (520) 61.4–66.3, \ (540) 62.7–67.9, \ (560) 64.0–69.4, \ (580) 64.6–70.2, \ (600) 65.8–71.2, \ (620) 66.3–72.7, \ (640) 67.0–72.9, \ (660) 67.5–73.4, \ (680) 67.3–73.5, \ (700) 68.6–74.6 \]

**Cell Data:** **Space Group:** n.d. **a** = 4.145(5) \( c = 5.67(1) \) \( Z = 1 \)

**X-ray Powder Pattern:** Rustenburg mine, South Africa. 3.03 (100), 2.22 (90), 2.08 (70), 1.52 (30), 1.72 (20), 1.67 (20), 1.32 (10)

**Chemistry:**

<table>
<thead>
<tr>
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<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
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<tbody>
<tr>
<td>Pd</td>
<td>44.3</td>
<td>43.0</td>
<td>45.9</td>
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<tr>
<td>Pt</td>
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<tr>
<td>Bi</td>
<td>1.8</td>
<td>7.0</td>
<td>17.2</td>
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<tr>
<td>Te</td>
<td>53.5</td>
<td>49.4</td>
<td>38.0</td>
<td>54.53</td>
</tr>
</tbody>
</table>


| Total    | 101.9 | 99.4  | 101.1 | 100.00 |

(1) Thierry mine, Canada; by electron microprobe, corresponds to \( \text{Pd}_{0.97} \text{Pt}_{0.03} \text{Te}_{0.98} \text{Bi}_{0.02} \sum_{=1.00} \). (2) Messina, South Africa; by electron microprobe, corresponds to \( \text{Pd}_{1.00} \text{Te}_{0.96} \text{Bi}_{0.04} \sum_{=1.04} \). (3) Rustenburg mine, South Africa; by electron microprobe, corresponds to \( \text{Pd}_{1.00} \text{Te}_{0.69} \text{Bi}_{0.19} \sum_{=0.88} \). (4) PdTe.

**Occurrence:** A minor accessory mineral, of primary or secondary hydrothermal origin, in many Pt–Pd-bearing Cu–Ni deposits in ultramafic rocks.

**Polymorphism & Series:** Forms a series with sobolevskite.

**Association:** Sobolevskite, merenskyite, melonite, michenerite, moncheite, braggite, many other Pt–Pd minerals, chalcopryite, bornite, pentlandite, pyrrhotite, pyrite.

**Distribution:** Some prominent localities include: in Russia, from the Monchegorsk Cu–Ni deposit, Kola Peninsula [TL]; in the Noril’sk region, western Siberia; from the Likkulaisvaara layered intrusion, Karelia. In South Africa, at the Rustenburg platinum mine, in the Merensky Reef of the Bushveld complex; and in the Artonvilla mine, Messina, Transvaal. In Canada, in the Levak West and Creighton mines, Sudbury; the Lac des Iles complex; and from the Thierry mine, near Pickle Lake, Ontario. In the Stillwater complex, Montana; at the New Rambler Cu–Ni mine, Medicine Bow Mountains, east of Encampment, Albany Co., Wyoming; in the Key West mine, east of Moapa, Bunkerville district, Clark Co., Nevada. In China, at Shiaonanshan, Inner Mongolia, and at Danba, Sichuan Province.

**Name:** To honor Vladimir Klement’evich Kotul’skii (1879–1949), Russian economic geologist and authority on Cu–Ni sulfide deposits, of the Mining Institute, St. Petersburg, Russia.

**Type Material:** Geology Museum, Kola Branch, Academy of Sciences, Apatity, Russia, 5966.


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