Braggite  
(Pt, Pd, Ni)S

Crystal Data:  Tetragonal.  Point Group:  4/m or 4.  As prisms, to 2 cm, and rounded grains.  Twinning:  Rarely observed.

Physical Properties:  Hardness = n.d.  VHN = 946–1064, 997 average (100 g load).  D(meas.) = ∼10  D(calc.) = 9.383


R₁–R₂:  (400) 41.3–41.8, (420) 41.8–42.4, (440) 42.1–43.0, (460) 42.4–43.4, (480) 42.5–43.8, (500) 42.7–44.1, (520) 41.9–44.0, (540) 41.9–43.9, (560) 41.9–43.8, (580) 41.5–43.8

Cell Data:  Space Group:  P4₂/m.  a = 6.367  c = 6.561  Z = 8

X-ray Powder Pattern:  Potgietersrus district, South Africa; can be confused with vysotskite. 2.86 (100), 2.93 (30), 2.64 (30), 1.852 (30), 1.423 (30), 1.713 (20), 1.595 (2)

Chemistry:  

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</thead>
<tbody>
<tr>
<td>Pt</td>
<td>63.2</td>
<td>62.1</td>
<td>Ni</td>
<td>4.4</td>
</tr>
<tr>
<td>Pd</td>
<td>15.4</td>
<td>19.0</td>
<td>S</td>
<td>17.4</td>
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Total 100.4 100.0

(1) Potgietersrus district, South Africa; by electron microprobe, corresponding to (Pt₀.₆₀Pd₀.₂₇Ni₀.₁₄)Σ=1.₀₁S₁.₀₀.  (2) Stillwater complex, Montana, USA; by electron microprobe, corresponding to (Pt₀.₆₀Pd₀.₃₄Ni₀.₀₆)Σ=1.₀₀S₁.₀₀.

Polymorphism & Series:  Forms a series with vysotskite; dimorphous with cooperite.

Occurrence:  In layered mafic intrusives, formed at high magmatic temperatures.

Association:  Sperrylite, cooperite, laurite, platinum (Potgietersrus district, South Africa); pentlandite, pyrrhotite, chalcopyrite, cubanite, nickelian mackinawite, gold, cooperite, vysotskite, moncheite, isoferooplum, kotulskite, keithconnite, palladian tulameenite (Stillwater complex, Montana, USA).

Distribution:  One of most common and economically important platinum group minerals.  From the Rustenburg and Potgietersrus [TL] districts, in the Merensky Reef, Bushveld complex, Transvaal, South Africa.  At the Stillwater complex, Montana, USA.  From the Lac des Iles complex, Ontario, Canada.  In the Santiago River, Esmeraldas Province, Ecuador.  At the Luanga complex, Serra dos Carajas, Para, Brazil.  From the Noril’sk region, western Siberia, and in the Lukkulaisvaara layered intrusion, Karelia, Russia.  On Rum Island, Inner Hebrides, Scotland.  In the Siikakama intrusion and the Kirakkajuppura deposit, Penikat layered complex, northeast of Kemi, Finland.  At Little Darling Creek, east of Broken Hill, New South Wales, Australia.  On Round Hill, near Orepuki, New Zealand.  Additional localities are known.

Name:  To honor Sir William Henry Bragg (1862–1942) and Professor William Lawrence Bragg (1890–1971), Cambridge University, Cambridge, England, pioneers in the X-ray investigation of crystals, as this was the first new mineral to be discovered by X-ray methods alone.


References:  (1) Palache, C., H. Berman, and C. Frondel (1944) Dana’s system of mineralogy, (7th edition), v. I, 259.  (2) Childs, J.D. and Hall, S.R. (1973) The crystal structure of...