

Bowieite**(Rh, Ir, Pt)₂S₃**

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Crystal Data: Orthorhombic. *Point Group:* $2/m\ 2/m\ 2/m$. As anhedral grains, to 0.5 mm across, and as inclusions in other platinum group minerals.

Physical Properties: *Tenacity:* Very slightly brittle. Hardness = n.d. VHN = 858–1635, 1288 average (100 g load). *D(meas.)* = n.d. *D(calc.)* = 6.91–6.96

Optical Properties: Opaque. *Color:* Pale gray to pale gray-brown in reflected light.

Luster: Metallic. *Anisotropism:* Weak, dark gray to very dark brown.

R_1 – R_2 : (400) 43.5–44.5, (420) 44.2–45.2, (440) 44.8–45.8, (460) 45.3–46.5, (480) 45.7–46.9, (500) 45.9–47.3, (520) 46.1–47.6, (540) 46.2–47.8, (560) 46.3–48.0, (580) 46.4–48.2, (600) 46.5–48.3, (620) 46.6–48.4, (640) 46.8–48.5, (660) 46.8–48.6, (680) 46.9–48.6, (700) 47.0–48.7

Cell Data: *Space Group:* $Pbcn$. $a = 8.454$ – 8.473 $b = 5.995$ – 6.002 $c = 6.121$ – 6.143
 $Z = 4$

X-ray Powder Pattern: Goodnews Bay, Alaska, USA.

3.00 (vvs), 0.7877 (vvs), 0.7768 (vvs), 0.7726 (vvs), 1.757 (vs), 2.143 (s), 1.728 (s)

Chemistry:

	(1)	(2)	(3)
Rh	30.8	68.80	29.2
Ir	35.4		44.6
Pt	8.8		
S	25.3	31.05	24.1
Total	100.3	99.85	97.9

(1) Salmon River, Alaska, USA; by electron microprobe; corresponds to $(\text{Rh}_{1.14}\text{Ir}_{0.70}\text{Pt}_{0.17})_{\Sigma=2.01}\text{S}_{3.00}$ (2) Gaositai, China; by electron microprobe, corresponds to $\text{Rh}_{2.07}\text{S}_{3.00}$. (3) Gusevogorskii massif, Russia; by electron microprobe, corresponds to $(\text{Rh}_{1.13}\text{Ir}_{0.93})_{\Sigma=2.06}\text{S}_{3.00}$.

Occurrence: In platinum alloy nuggets recovered from dredging operations (Salmon River, Alaska, USA); in platinum-bearing ultramafic rocks intruded into a granite gneiss–“hornblende” gneiss complex (Gaositai, China).

Association: Platinum-iridium, platinum, osmium, laurite, silicate inclusions (Salmon River, Alaska, USA).

Distribution: From the Salmon River, Goodnews Bay, Alaska, USA [TL]. In the Santiago River, Esmeraldas Province, Ecuador. From the Gusevogorskii massif, Ural Mountains, and the Baimka placer, Chukotka, Far Eastern Region, Russia. At Gaositai, Hebei Province, China. In sediments in the Blagoevgrad graben, southwest Bulgaria. At Milverton, near Fifield, New South Wales, Australia. In the Pirogues River, New Caledonia.

Name: To honor the Scottish scientist, Dr. Stanley Hay Umphray Bowie (1917–), of the Institute of Geological Sciences, London, England.

Type Material: The Natural History Museum, London, England, 1983,70, E813.

References: (1) Desborough, G.A. and A.J. Criddle (1984) Bowieite: a new rhodium–iridium–platinum sulfide in platinum-alloy nuggets, Goodnews Bay, Alaska. *Can. Mineral.*, 22, 543–552. (2) (1989) *Amer. Mineral.*, 74, 9 and 1215 (abs. ref. 1)?? [must see??what are these??] (3) Parthé, E., D. Hohnke, and F. Hulliger (1967) A new structure type with octahedron pairs for Rh_2S_3 , Rh_2Se_3 and Ir_2S_3 . *Acta Cryst.*, 23, 832–840.