Sperrylite $PtAs_2$

Crystal Data: Cubic. *Point Group:* $2/m\ \overline{3}$. Commonly well crystallized as cubes and cubo-octahedrons, to 5 cm; may be highly modified with rounded edges and corners; as intergrowths with Pt–Fe alloys.

Physical Properties: *Cleavage:* Indistinct on {001}. *Fracture:* Conchoidal. *Tenacity:* Brittle. Hardness = 6–7 VHN = 960–1277 ⊥ (100); 960–1277 ⊥ (111) (100 g load). D(meas.) = 10.58 D(calc.) = 10.78

Optical Properties: Opaque. *Color:* Tin-white. *Streak:* Black. *Luster:* Metallic. R: (400) 53.6, (420) 53.6, (440) 53.9, (460) 53.9, (480) 53.9, (500) 53.9, (520) 54.0, (540) 53.9, (560) 53.8, (580) 53.7, (600) 53.5, (620) 53.1, (640) 52.7, (660) 52.3, (680) 51.9, (700) 51.4

Cell Data: *Space Group: Pa*3. $a = 5.967$ $Z = 4$

X-ray Powder Pattern: Vermilion mine, Sudbury, Canada.
1.801 (100), 0.777 (90), 1.148 (70), 2.98 (60), 0.798 (60), 2.11 (50), 3.43 (40)

Chemistry:

	(1)	(2)		(1)	(2)
Pt	56.8	56.56	As	42.8	43.44
Sb	0.08		Total	99.68	100.00

(1) Vermilion mine, Sudbury, Canada; by electron microprobe, corresponding to $Pt_{1.01}As_{1.96}$.
(2) $PtAs_2$.

Mineral Group: Pyrite group.

Occurrence: The most widespread platinum mineral, occurring in every type of deposit.

Association: Pyrrhotite, pentlandite, chalcopyrite, violarite, cubanite, bornite, sphalerite, galena, linnaeite, magnetite, testibiopalladite, sudburyite, omeiite, gold, argentian gold (Danba, China); leadamalgam, chromite, ilmenite, magnetite, gersdorffite, pyrite, chalcopyrite, violarite, millerite, galena, stibnite, argentian gold, niggliite, iridosmine, platinum, merenskyite, kotulskite (Shiaonanshan, China); also cooperite, laurite.

Distribution: In Canada, at the Vermilion [TL], Victoria, and Frood mines, Algoma district, near Sudbury, Ontario. In the USA, 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; and from the Stillwater complex, Montana. In the Bushveld complex, on the Merensky reef, Transvaal, South Africa, fine crystals from the Tweefontein Farm, near Potgietersrus; also at the Atok, Onverwacht, and Rustenburg mines. From Antamponbato, Madagascar. In China, from Danba, Sichuan Province; and Shiaonanshan, Inner Mongolia. In Australia, at several deposits east of Broken Hill, New South Wales, and at Kambalda, 56 km south of Kalgoorlie, Western Australia. In Russia, large crystals from the Talnakh area, Noril'sk region, and at Nikolaevsky, Amur, Siberia; in the Konder massif, Aldan Shield, Sakha; and elsewhere. In Finland, at Rometölväs Hill, in the Koillismaa complex; from the Hitura Cu–Ni deposit; and in the Siikakama intrusion.

Name: Honors Francis Lewis Sperry (1861–1906), chemist of Sudbury, Ontario, Canada, who first found the mineral.

Type Material: Royal Ontario Museum, Toronto, Canada; Yale University, New Haven, Connecticut, USA, 1.2950, 1.5895.

References: (1) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 292–293. (2) Szymański, J.T. (1979) The crystal structure of plararsite, Pt(As, S), and a comparison with sperrylite, $PtAs_2$. Can. Mineral., 17, 117–123. (3) Berry, L.G. and R.M. Thompson (1962) X-ray powder data for the ore minerals. Geol. Soc. Amer. Mem. 85, 89. (4) Cabri, L.J., Ed. (1981) Platinum group elements: mineralogy, geology, recovery. Can. Inst. Min. & Met., 136–138. (5) Ramdohr, P. (1969) The ore minerals and their intergrowths, (3rd edition), 809–811. (6) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 521.