Svanbergite $SrAl_3(PO_4)(SO_4)(OH)_6$

Crystal Data: Hexagonal. *Point Group:* $\overline{3}\ 2/m$. Crystals typically rhombohedral $\{10\overline{1}1\}$, may be pseudocubic, with $\{10\overline{1}2\}$, $\{02\overline{2}1\}$, $\{0001\}$, to 5 mm; granular, massive.

Physical Properties: *Cleavage:* On $\{0001\}$, distinct. Hardness = 5 D(meas.) = 3.20–3.24 D(calc.) = 3.24

Optical Properties: Translucent. *Color:* Colorless, cream-yellow, rose, reddish brown; colorless in transmitted light. *Luster:* Vitreous to adamantine.
Optical Class: Uniaxial (+). $\omega = 1.631$–1.635 $\epsilon = 1.646$–1.649

Cell Data: *Space Group:* $R\overline{3}m$. $a = 6.970$–6.992 $c = 16.567$–16.75 Z = 3

X-ray Powder Pattern: Champion mine, California, USA. (ICDD 39-1361).
2.949 (100), 2.2069 (85), 1.8923 (45), 1.4543 (40), 2.766 (30), 1.7433 (30), 5.675 (25)

Chemistry:	(1)	(2)	(3)		(1)	(2)	(3)
SO_3	17.34	15.88	17.34	CaO	3.25	1.02	
P_2O_5	16.70	17.42	15.37	SrO	12.84	21.18	22.45
Al_2O_3	36.91	32.91	33.13	BaO		0.22	
Fe_2O_3	0.24	0.00		H_2O	12.51	[11.37]	11.71
				Total	99.79	[100.00]	100.00

(1) Near Hawthorne, Nevada, USA. (2) Champion mine, California, USA; by electron microprobe, H_2O by difference; corresponding to $(Sr_{0.94}Ca_{0.08}Ba_{0.01})_{\Sigma=1.03}Al_{2.96}(PO_4)_{1.12}(SO_4)_{0.91}(OH)_6$. (3) $SrAl_3(PO_4)(SO_4)(OH)_6$.

Mineral Group: Beudantite group.

Occurrence: In aluminous medium-grade metamorphic deposits; from bauxite deposits; a product of sulphatic argillic wall-rock alteration in hydrothermal vein and disseminated ore deposits, replacing apatite.

Association: Pyrophyllite, kyanite, andalusite, lazulite, augelite, alunite, kaolinite, quartz.

Distribution: From Hålsjöberg (Horrsjöberg), Värmland, and at the Västanå mine, near Näsum, Skåne, Sweden. In the Novodmitrievsk Pb–Zn deposit, Donets Basin, Ukraine. From Wheal Coates, St. Agnes, Cornwall, England. In France, at Chizeuil, near Chalmoux, Saône-et-Loire. From Andorinha-Cantahede, Portugal. In the Radjou iron deposit, Syria. From the Sallanlatvi carbonatite, Kola Peninsula, and in the Shakhtam deposit, not otherwise located in the Transbaikal, and at a number of less-well-defined localities in Russia. In the USA, in the Dover andalusite mine, about 20 km northeast of Hawthorne, Mineral Co., Nevada; at Ogilby, Imperial Co., and at the Champion mine, White Mountains, Mono Co., California; from Summitville, Rio Grande Co., and several other minor occurrences in Colorado; at Tyrone, Grant Co., New Mexico. In the Rio São Jose, near Paraguaçu, Bahia, Brazil. From La Granja, Peru. At La Escondida, about 150 km south-southeast of Antofagasta, Chile. Additional occurrences have been reported, but require modern confirmation or better location.

Name: Honoring Lars Fredrik Svanberg (1805–1878), Swedish chemist, Professor of Mineralogy, University of Uppsala, Uppsala, Sweden.

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