Svabite $Ca_5(AsO_4)_3(F,OH)$

Crystal Data: Hexagonal. *Point Group*: 6/*m*. As stout prismatic hexagonal crystals, typically modified by several bipyramids, to 5 mm; massive.

Physical Properties: *Cleavage*: Indistinct on {1010}. *Tenacity*: Brittle. Hardness = 4-5 D(meas.) = 3.5-3.8 D(calc.) = 3.67 Fluoresces reddish orange under LW UV and yellow under SW UV.

Optical Properties: Transparent to translucent. *Color*: Colorless, yellowish white, gray, grayish green; colorless to pale lilac in transmitted light. *Luster*: Vitreous to subresinous. *Optical Class*: Uniaxial (–). ω = 1.706 ε = 1.698

Cell Data: Space Group: $P6_3/m$. a = 9.7268(5) c = 6.9820(4) Z = 2

X-ray Powder Pattern: Långban, Sweden.
2.87 (10), 2.79 (9), 1.860 (6), 3.44 (5), 3.94 (4), 2.65 (4), 1.981 (4)

Chemistry:	(1)	(2)		(1)	(2)
SO_3	0.49		CaO	39.31	44.14
P_2O_5	0.21		Na_2O	0.13	
V_2O_5	0.04		F	2.12	1.50
As_2O_5	51.21	54.28	Cl	0.08	
SiO_2	0.19		H_2O	[0.33]	0.71
MnO	0.48		$-O = (F,Cl)_2$	0.91	0.63
SrO	0.03		Total	98.90	100.00
PbO	5.19				

(1) Jakobsberg, Sweden; average of 10 electron microprobe analyses supplemented by FTIR spectroscopy, H_2O calculated; corresponding to $(Ca_{4.66}Pb_{0.16}Mn_{0.04}Na_{0.03})_{\Sigma=4.89}(As_{2.96}S_{0.04}Si_{0.02}P_{0.02})_{\Sigma=3.04}O_{12}[F_{0.74}(OH)_{0.24}Cl_{0.01}]$. (2) $Ca_5(AsO_4)_3(F,OH)$ with F:OH = 1:1.

Mineral Group: Apatite supergroup.

Occurrence: A rare accessory mineral in calcsilicate contact metamorphic rocks (skarns).

Association: Manganoan diopside, brandtite, sarkinite, garnet (Harstigen mine, Sweden); hausmannite (Jakobsberg, Sweden); manganoan diopside, tilasite, manganberzeliite, bergslagite, hematite, calcite, barite (Långban, Sweden).

Distribution: In Sweden, found in the Harstigen mine, near Persberg, at Jakobsberg, and at Långban, Värmland; from Kesebol, Dalsland; in the Ultevis district, Jokkmokk, Swedish Lappland. From the Clara Mine, near Oberwolfach, Black Forest, Germany.

Name: Honors Anton Svab (1703-1768), Swedish mining official.

Type Material: Harvard University, Cambridge, Massachusetts, USA (113494).

References: (1) Palache, C., H. Berman, and C. Frondel (1951) Dana's system of mineralogy, (7th edition), v. II, 899-900. (2) Welin, E. (1968) X-ray powder data for minerals from Långban and the related mineral deposits of Central Sweden. Arkiv Mineral. Geol., 4(30), 499-541, esp. 536. (3) Biagioni, C., F. Bosi, U. Hålenius, and M. Pasero(2016) The crystal structure of svabite, $Ca_5(AsO_4)_3F$, an arsenate member of the apatite supergroup. Amer. Mineral., 101, 1750-1755.