Smamite $Ca_2Sb(OH)_4[H(AsO_4)_2]\cdot 6H_2O$

Crystal Data: Triclinic. *Point Group*: $\bar{1}$. As lenticular crystals, in aggregates to ~0.5 mm.

Physical Properties: *Cleavage*: None. *Fracture*: Curved. *Tenacity*: Brittle. Hardness = ~3.5 D(meas.) = 2.72(3) D(calc.) = 2.709 Quickly soluble in dilute (10%) HCl.

Optical Properties: Transparent. *Color*: White to colorless. *Streak*: White. *Luster*: Vitreous. *Optical Class*: Biaxial (–). $\alpha = 1.556(1)$ $\beta = 1.581(1)$ $\gamma = 1.588(1)$ 2V(meas.) = 54(1)° 2V(calc.) = 55.1° *Dispersion*: Weak, $r > v$. *Pleochroism*: None.

Cell Data: Space Group: $P\bar{1}$. $a = 5.8207(4)$ $b = 8.0959(6)$ $c = 8.21296(6)$ $\alpha = 95.8343(7)°$ $\beta = 110.762(8)°$ $\gamma = 104.012(7)°$ Z = 1

X-ray Powder Pattern: Giftgrube mine, Rauenthal, Sainte-Marie-Aux-Mines district, France. 5.07 (100), 6.03 (60), 2.858 (51), 5.66 (47), 3.992 (43), 7.56 (41), 3.783 (36)

Chemistry:

	(1)	(2)
CaO	17.34	17.07
Sb_2O_5	23.92	24.63
SiO_2	0.12	
As_2O_5	34.93	34.99
H_2O	[23.50]	23.31
Total	99.81	100.00

(1) Giftgrube mine, Rauenthal, Sainte-Marie-Aux-Mines district, France; average electron microprobe analysis supplemented by Raman spectroscopy, H_2O calculated from structure; corresponds to $Ca_{2.03}Sb_{0.97}(OH)_4[H_{1.10}(As_{1.99}Si_{0.01}O_4)_2]\cdot 6H_2O$. (2) $Ca_2Sb(OH)_4[H(AsO_4)_2]\cdot 6H_2O$.

Occurrence: A supergene mineral from the oxidative weathering of primary As-mineralization [native arsenic, tennantite-tetrahedrite (fahlore), arsenides of Co and Ni, löllingite and chalcopyrite].

Association: Picropharmacolite, fluckite, pharmacolite, quartz, calcite, dolomite.

Distribution: From the Giftgrube mine, Rauenthal, Sainte-Marie-Aux-Mines district, Haut-Rhin department, Grand Est, France.

Name: From the acronym (*SMAM*) for the Sainte-Marie-aux-Mines district, were the mineral was found.

Type Material: Mineralogical Collection, Musée cantonal de géologie, University of Lausanne, Switzerland (MGL 093481, 093482, and 093483) and the Natural History Museum of Los Angeles County, Los Angeles, California, USA (67169).

References: (1) Plášil, J., A.R. Kampf, N. Meisser, C. Lheur, T. Brunsperger, and R. Škoda (2020) Smamite, $Ca_2Sb(OH)_4[H(AsO_4)_2]\cdot 6H_2O$, a new mineral and a possible sink for Sb during weathering of fahlore. Amer. Mineral., 105(4), 555-560.