Sidpietersite $Pb_4(S_2O_3)O_2(OH)_2$

Crystal Data: Triclinic. *Point Group:* $\overline{1}$. Euhedral to subhedral crystals, to 0.3 mm, are bladed, elongated along [01$\overline{1}$], platy on {001}, showing {001}, {100}, {01$\overline{1}$}, in radiating aggregates; more typically in warty nodular to earthy masses.

Physical Properties: *Cleavage:* Perpendicular to [01$\overline{1}$]. *Fracture:* Uneven. *Tenacity:* Sectile. Hardness = 1–2 D(meas.) = n.d. D(calc.) = 6.765

Optical Properties: Transparent to opaque. *Color:* Colorless, white, cream-beige. *Streak:* White to cream-white. *Luster:* Vitreous to pearly. *Optical Class:* [Biaxial.] *Pleochroism:* Slight. α = n.d. β = n.d. γ = n.d. 2V(meas.) = n.d.

Cell Data: *Space Group:* $P\overline{1}$. $a = 7.455(2)$ $b = 6.496(2)$ $c = 11.207(4)$ $\alpha = 114.33(2)°$ $\beta = 89.65(2)°$ $\gamma = 88.68(2)°$ Z = 2

X-ray Powder Pattern: Tsumeb, Namibia.
10.13 (100), 3.414 (100), 3.198 (80), 5.93 (50), 2.622 (40), 4.401 (35), 2.889 (35)

Chemistry:

	(1)	(2)
SO_3	7.58	7.95
S	3.04	3.18
PbO	89.55	88.66
H_2O	[1.79]	1.79
$-O = S$	1.51	1.58
Total	[100.45]	100.00

(1) Tsumeb, Namibia; by electron microprobe, $(S_2O_3)^{2-}$ and $(OH)^{1-}$ confirmed by IR and crystal-structure analysis; after partitioning S 6.07% as S^{6+}:S^{2-} = 1:1 and calculating $(OH)^{1-}$ for stoichiometry, corresponds to $Pb_{4.09}(S^{6+}_{0.97}S^{2-}_{0.97}O_{2.90})O_{2.09}(OH)_{2.03}$.

Occurrence: A very rare late-stage alteration product of galena in the oxidized zone of a dolostone-hosted hydrothermal polymetallic ore deposit.

Association: Smithsonite, zincite, greenockite, galena, sphalerite, quartz.

Distribution: From Tsumeb, Namibia.

Name: To honor Sidney Pieters (1920–2003), Windhoek, Namibia, prominent dealer in Tsumeb minerals.

Type Material: The Natural History Museum, London, England, 1998,36; Canadian Geological Survey, Ottawa, Canada, 68076.

References: (1) Roberts, A.C., M.A. Cooper, F.C. Hawthorne, A.J. Criddle, C.J. Stanley, C.L. Key, and J.L. Jambor (1999) Sidpietersite, $Pb^{2+}_4(S^{6+}O_3S^{2-})O_2(OH)_2$, a new thiosulfate-bearing mineral species from Tsumeb, Namibia. Can. Mineral., 37, 1269–1273. (2) Cooper, M.A. and F.C. Hawthorne (1999) The structure topology of sidpietersite, $Pb^{2+}_4(S^{6+}O_3S^{2-})O_2(OH)_2$, a novel thiosulfate structure. Can. Mineral., 37, 1275–1282. (3) (2000) Amer. Mineral., 85, 1323–1324 (abs. ref. 1–2).