Tazieffite $Pb_{20}Cd_2(As, Bi)_{22}S_{50}Cl_{10}$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. As needle-shaped crystals, to 400 μm, generally forming randomly oriented fibrous sprays.

Physical Properties: *Cleavage*: None. *Tenacity*: Brittle. *Fracture*: n.d. Hardness = n.d. D(meas.) = n.d. D(calc.) = 6.07

Optical Properties: Opaque. *Color*: Silvery gray, may have a magenta tint in aggregates of extremely fine needles. *Streak*: Black. *Luster*: Metallic.
Optical Class: Weakly bireflectant. *Pleochroism*: Weak, dark gray to a blue-gray.
Anisotropism: Weak, without characteristic rotation tints.
R_1-R_2: (471.1) 33.9-34.1, (548.3) 32.8-33.0, (586.6) 32.4-32.6, (652.3) 30.9-31.1

Cell Data: *Space Group*: *C*2/*c*. a = 8.3520(17) b = 45.5920(92) c = 27.2610(55) β = 98.84(3)°
Z = 4

X-ray Powder Pattern: Mutnovsky volcano, Kamchatka Peninsula, Far East Asia, Russia.
3.313 (100), 3.361 (65), 3.80 (53), 4.07 (39), 2.835 (39), 2.789 (36), 3.66 (24)

Chemistry:

	(1)
Pb	42.90
Cd	1.03
Sn	0.48
Bi	21.90
As	9.66
S	16.58
Se	1.04
Cl	2.63
Br	0.12
I	0.42
Total	96.79

(1) Mutnovsky volcano, Kamchatka Peninsula, Far East Asia, Russia; average electron microprobe analysis supplemented by Raman spectroscopy, low totals due to the small thickness of analyzed fibers; corresponds to $Pb_{20.06}(Cd_{0.89}Sn_{0.39}In_{0.02})_{\Sigma=1.30}(As_{12.49}Bi_{10.15})_{\Sigma=22.64}(S_{50.08}Se_{1.28})_{\Sigma=51.36}(Cl_{7.18}I_{0.32}Br_{0.15})_{\Sigma=7.65}$.

Occurrence: A sublimate at an active volcanic fumarole.

Association: Greenockite, galena, mutnovskite, kudriavite, Cd-rich cannizzarite, pyrite, anhydrite, cristobalite.

Distribution: From Mutnovsky volcano, Kamchatka Peninsula, Far East Asia, Russia.

Name: Honors Haroun *Tazieff* (1914-1998), Belgian/French volcanologist, a pioneer in the field study of volcanoes who devoted his life to the study of volcanic gases.

Type Material: University of Bari, Italy (8/nm-V28), A.E. Fersman Museum, Moscow, Russia (92674), and the School of Mines, Paris, France (78986).

References: (1) Zelenski, M., A. Garavelli, D. Pinto, F. Vurro, Y. Moëlo, L. Bindi, E. Makovicky, and E. Bonaccorsi (2009) Tazieffite, $Pb_{20}Cd_2(As,Bi)_{22}S_{50}Cl_{10}$, a new chloro-sulfosalt from Mutnovsky volcano, Kamchatka Peninsula, Russian Federation . Amer. Mineral., 94, 1312-1324.