Tsygankoite $Mn_8Tl_8Hg_2(Sb_{21}Pb_2Tl)S_{48}$

Crystal Data: Monoclinic. *Point Group*: 2/*m*. As elongated lath-like crystals to 0.2 mm.

Physical Properties: *Cleavage*: None. *Fracture*: Uneven. *Tenacity*: Brittle. Hardness = ~3 VHN = 131-167, 144 average (10 g load). D(meas.) = n.d. D(calc.) = 5.450

Optical Properties: Opaque. *Color*: Black; white in reflected light. S*treak*: Black. *Luster*: Metallic.
Optical Class: n.d. Weakly bireflectant. *Anisotropism*: Strong, light gray to dark gray to black.
R_1-R_2: (400) 33.85-30.53, (420) 33.64-30.94, (440) 32.39-30.72, (460) 32.88-31.56, (470) 33.16-31.67, (480) 33.44-31.78, (500) 33.22-31.71, (520) 32.84-31.49, (540) 32.53-31.26, (546) 32.41-31.11, (560) 32.26-31.00, (580) 31.89-30.54, (589) 31.58-30.18, (600) 31.51-30.14, (620) 30.95-29.83, (640) 30.27-29.10, (650) 29.83-28.73, (660) 29.37-28.39, (680) 28.29-27.58, (700) 27.41-26.74

Cell Data: Space Group: *C*2/*m*. $a = 21.362(4)$ $b = 3.8579(10)$ $c = 27.135(4)$ $\beta = 106.944(14)°$ Z = 1

X-ray Powder Pattern: Calculated pattern.
3.587 (100), 2.786 (99), 3.204 (88), 2.841 (72), 3.353 (70), 3.391 (68), 2.858 (64)

Chemistry:

	(1)	(2)
Mn	6.29	6.11
Hg	5.42	5.57
Tl	26.05	25.59
Pb	5.84	5.77
As	3.39	
Sb	30.89	35.56
S	21.87	21.40
Total	99.75	100.00

(1) Vorontsovskoe gold deposit, Sverdlovskaya Oblast', Northern Urals, Russia; average of 7 electron microprobe analyses; corresponds to $Mn_{8.06}Tl_{8.97}Hg_{1.90}Sb_{17.86}As_{3.19}Pb_{1.98}S_{48.03}$.
(2) $Mn_8Tl_8Hg_2(Sb_{21}Pb_2Tl)S_{48}$.

Occurrence: In mineralized limestone breccias (calcite-dolomite, up to 85% of volume) in the ores of the sulfide-carbonate type in a gold deposit of uncertain origin.

Association: Aktashite, arsenopyrite, barite, cinnabar, fluorapatite, orpiment, pyrite, realgar, routhierite, sphalerite, tilasite, titanite, calcite, dolomite, clinochlore, alabandine.

Distribution: At the Vorontsovskoe gold deposit, 0.5 km west of Vorontsovka, 13 km south of Krasnotur'insk, Sverdlovskaya Oblast', Northern Urals, Russia.

Name: Honors Mikhail Vladimirovich Tsyganko (b. 1979), a mineral collector from Severouralsk, Sverdlovskaya Oblast', Northern Urals, Russia and founder of the mineralogical museum in that city. He collected the specimens where the new mineral was discovered.

Type Material: A.E. Fersman Mineralogical Museum, Russian Academy of Sciences, Moscow, Russia (5018/1).

References: (1) Kasatkin, A.V., E. Makovicky, J. Plášil, R. Škoda, A.A. Agakhanov, V.Y. Karpenko, and F. Nestola (2018) Tsygankoite, $Mn_8Tl_8Hg_2(Sb_{21}Pb_2Tl)_{\Sigma 24}S_{48}$, a new sulfosalt from the Vorontsovskoe Gold Deposit, Northern Urals, Russia. Minerals, 8(5), 218. (2) (2020) Amer. Mineral., 105, 1118 (abs. ref. 1).