

Rayite

(Ag, Tl)₂Pb₈Sb₈S₂₁

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Crystal Data: Monoclinic. *Point Group:* n.d. As tabular grains, to 30 μm , and as patches in other minerals.

Physical Properties: Hardness = n.d. VHN = n.d. D(meas.) = n.d. D(calc.) = 6.13

Optical Properties: Opaque. *Color:* Lead-gray; white with greenish and bluish tints in reflected light. *Streak:* Lead-gray. *Luster:* Metallic. *Pleochroism:* Greenish to greenish blue. *Anisotropism:* Perceptible, from dark blue to dark reddish brown.

R_1 – R_2 : (400) 38.3–41.8, (420) 38.0–41.3, (440) 37.8–40.9, (460) 37.6–40.6, (480) 37.6–40.4, (500) 37.5–40.1, (520) 37.5–39.9, (540) 37.5–39.6, (560) 37.4–39.4, (580) 37.2–38.9, (600) 37.0–38.4, (620) 36.7–37.9, (640) 36.3–37.5, (660) 35.9–37.3, (680) 35.6–37.2, (700) 35.3–37.1

Cell Data: *Space Group:* n.d. $a = 13.60(2)$ $b = 11.96(3)$ $c = 24.49(5)$ $\beta = 103.94(12)^\circ$
 $Z = 4$ *Space Group:* n.d.; (synthetic (Ag_{1.5}Tl_{0.5})₂Pb₈Sb₈S₂₁). $a = 21.57$ $b = 23.43$
 $c = 8.10$ $\beta = 100^\circ 7'$ $Z = 8$

X-ray Powder Pattern: Rajpura-Dariba deposit, India.
3.37 (100), 3.26 (90), 2.98 (50), 3.90 (30), 3.74 (30), 2.06 (30), 2.88 (20)

Chemistry:	(1)
Ag	4.54
Tl	2.04
Pb	47.06
Cu	0.03
Sb	27.42
S	19.59
Total	100.68

(1) Rajpura-Dariba deposit, India; by electron microprobe, average of four samples; if related to semseyite (Pb₉Sb₈S₂₁), corresponds to (Ag_{1.45}Tl_{0.34}Cu_{0.02}Pb_{7.81}) $_{\Sigma=9.62}$ Sb_{7.74}S_{21.00}; if related to boulangerite (Pb₅Sb₄S₁₁), corresponds to (Ag_{0.76}Tl_{0.18}Cu_{0.01}Pb_{4.09}) $_{\Sigma=5.04}$ Sb_{4.06}S_{11.00}.

Occurrence: In a Precambrian polymetallic massive-sulfide deposit interbedded with kyanite-graphite schists, diopside-bearing calc-silicates, and meta-cherts.

Association: Galena, meneghinite, owyheeite.

Distribution: From the Rajpura-Dariba polymetallic deposit, Udaipur district, Rajasthan, India [TL].

Name: To honor Professor Santosh K. Ray (1908–1976), Indian petrologist, President College, Calcutta, India.

Type Material: Indian Institute of Technology, Kharagpur, India; Institute of Mineralogy and Geochemistry of Rare Elements, Moscow, Russia.

References: (1) Basu, K., N.S. Bortnikov, A. Mookherjee, N.N. Mozgova, A.I. Tsepin, and L.N. Vyal'sov (1983) Rare minerals from Rajpura-Dariba, Rajasthan, India. IV: A new Pb–Ag–Tl–Sb sulfosalt, rayite. Neues Jahrb. Mineral., Monatsh., 296–304. (2) (1984) Amer. Mineral., 69, 211 (abs. ref. 1). (3) Choudhury, K.R. (1989) Synthesis of rayite/Tl–Ag boulangerite. Indian J. Earth Sciences, 16(2), 136–140.