Grechishchevite $Hg_3S_2(Br,Cl,I)_2$

Crystal Data: Tetragonal. *Point Group:* $4/m2/m2/m, \overline{4}2m$, or $4mm$. As prismatic crystals, granular, to 0.3 mm; in coatings and powdery masses.

Physical Properties: *Cleavage:* One direction, ‖ prism elongation, distinct.
Tenacity: Brittle. Hardness = ∼2.5 VHN = 88–116, average 106 (25 g load).
D(meas.) = 7.23 (synthetic). D(calc.) = 7.16 (synthetic).

Optical Properties: Transparent. *Color:* Bright to dark orange, darkening to orange-brown, then black; in reflected light, gray-white with strong orange internal reflections. *Streak:* Deep yellow to yellow with slight orange tint. *Luster:* Vitreous to adamantine.
Optical Class: Uniaxial (+). *Pleochroism:* E = straw-yellow; O = yellow. $\omega = > 2.0$ $\epsilon = > 2.0$
Anisotropism: Observed. *Bireflectance:* Distinct; gray-white to gray.
R_1–R_2: (436) 22.8–19.2, (460) 24.5–22.2, (500) 21.4–18.9, (546) 19.8–17.3, (590) 18.8–16.5, (620) 18.9–16.7, (656) 18.1–15.9

Cell Data: *Space Group:* [$P4/mmm, P\overline{4}2m$, or $P4mm$] (by analogy to synthetic material).
$a = 13.208(6)$ $c = 6.698(9)$ Z = 8

X-ray Powder Pattern: Arzak deposit, Russia.
2.65 (100), 3.95 (60), 3.02 (60), 2.60 (40), 2.341 (40), 2.180 (30b), 1.873 (30)

Chemistry:

	(1)
Hg	73.00
Cl	2.05
Br	9.85
I	5.86
S	7.83
Se	0.02
Total	98.61

(1) Arzak and Kadyrel deposits, Russia; by electron microprobe (average of 11 analyses from Arzak and two from Kadyrel); corresponds to $Hg_{3.05}S_{2.04}(Br_{1.03}Cl_{0.49}I_{0.39})_{\Sigma=1.91}$.

Occurrence: In hydrothermal mercury deposits.

Association: Cinnabar, calomel, kuzminite, corderoite, kadyrelite, lavrentievite, eglestonite.

Distribution: In the Arzak and Kadyrel deposits, Tuva, Siberia, Russia.

Name: To honor Oleg Konstantinovich Grechishchev (1936–), Institute of Geology, Novosibirsk, Russia, a student of the Tuva mercury deposits.

Type Material: Institute of Geology and Geophysics, Siberian Division, Academy of Sciences, Novosibirsk; Mining Museum, State University, St. Petersburg, Russia.

References: (1) Vasil'ev, V.I., L.V. Usova, and N.A. Pal'chik (1989) Grechishchevite – $Hg_3S_2(Br,Cl,I)_2$ – a new supergene mercury sulfohalide. Geol. Geophys., 30(7), 61–69 (in Russian). (2) (1991) Amer. Mineral., 76, 1729–1730 (abs. ref. 1).