Alacránite As_8S_9

Crystal Data: Monoclinic. *Point Group:* 2/*m*. Crystals are pinacoidal, prismatic, and flattened on [100], striated ‖ [001] on {100}, to 1 mm; as subhedral flattened prismatic grains.

Physical Properties: *Cleavage:* Imperfect on {100}. *Fracture:* Conchoidal. *Tenacity:* Very brittle. Hardness = 1.5 VHN = 69 (20 g load). D(meas.) = 3.43(3) D(calc.) = 3.503

Optical Properties: Transparent to translucent. *Color:* Orange to pale gray with rose-yellow internal reflections in reflected light; orange-yellow in transmitted light. *Streak:* Yellow-orange. *Luster:* Adamantine, vitreous, resinous, greasy.
Optical Class: Biaxial (+). α = 2.39(1) β = n.d. γ = 2.52(2) 2V = n.d.
R_1-R_2: (400) 13.0-14.0, (425) 13.2-14.6, (450) 13.3-14.8, (475) 13.4-14.8, (500) 13.3-14.5, (525) 13.1-14.3, (550) 13.2-14.5, (575) 13.4-14.7, (600) 13.5-14.8, (625) 13.6-14.9, (650) 13.7-15.0, (675) 13.8-15.0, (700) 13.9-15.1

Cell Data: *Space Group: P*2/*c*. a = 9.943(1) b = 9.366(1) c = 8.908(1) β = 102.007° Z = 2

X-ray Powder Pattern: Uzon caldera, Russia.
3.064 (100), 5.91 (90), 2.950 (90), 5.11 (80), 4.05 (70), 3.291 (50), 6.89 (40)

Chemistry:	(1)	(2)	(3)	(4)
As	67.35	67.80	70.03	67.52
S	32.61	32.20	29.97	32.48
Total	99.96	100.00	100.00	100.00

(1) Uzon caldera, Russia; average of 4 electron microprobe analyses; corresponding to $As_{0.88}S_{1.00}$. (2) Kateřina mine, Czech Republic; average of 3 electron microprobe analyses; corresponds to $As_{8.00}S_{8.88}$. (3) AsS. (4) As_8S_9.

Polymorphism & Series: Trimorphous with pararealgar and realgar. Forms a series with non-stoichiometric As_8S_{9-x} phases.

Occurrence: In hydrothermal As-S veins (Alacrán mine, Chile); in the condensation zone of a hydrothermal Hg-Sb-As system as cement in a sandy gravel (Uzon caldera, Russia); formed at low temperatures in a polymetallic hydrothermal deposit on a submarine seamount (Conical Seamount, Papua New Guinea); as sublimates on a burning mine dump (Kateřina mine, Czech Republic).

Association: Realgar, orpiment, smithite, arsenic, sulfur, stibnite, pyrite, greigite, arsenopyrite, arsenolamprite, sphalerite, acanthite, barite, quartz, calcite (Alacrán mine, Chile); realgar, orpiment, uzonite, stibnite, cinnabar, pyrite, sulfur (Uzon caldera, Russia); realgar, pyrite, sphalerite, galena, chalcopyrite, amorphous silica (Conical Seamount, Papua New Guinea); orpiment, sulfur, amorphous As-S alloy, realgar, pararealgar, anhydrite (Kateřina mine, Czech Republic).

Distribution: From the Alacrán mine, Pampa Larga district, Copiapó, Chile. In the Uzon caldera, Kamchatka, Russia. At Tiefengraben, Reinerzau, Black Forest, Germany. On Conical Seamount, ten km south-southeast of Lihir Island, Papua New Guinea. From the Nishinomaki mine, Gunma Prefecture, Japan. On the burning dumps of the Kateřina mine, Radvanice, Czech Republic.

Name: For the occurrence in the Alacrán deposit, Chile.

Type Material: Il'menskii Preserve Museum, Miass (catalog number U-2); A.E. Fersman Mineralogical Museum, Academy of Sciences, Moscow, Russia.

References: (1) Popova, V.I., V.A. Popov, A. Clark, V.O. Polyakov, and S.E. Borisovskii (1986) Alacranite - a new mineral. Zap. Vses. Mineral. Obshch., 115, 360-368 (in Russian). (2) (1988) Amer. Mineral., 73, 189 (abs. ref. 1). (3) Bonazzi, P., L. Bindi, V. Popova, G. Pratesi, and S. Menchetti (2003) Alacranite, As_8S_9: structural study of the holotype and re-assignment of the original chemical formula. Amer. Mineral., 88, 1796-1800. (4) Bonazzi, P., L. Bindi, F. Olmi, and S. Menchetti (2003) How many alacranites exist? A structural study of non-stoichiometric As_8S_{9-x}

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