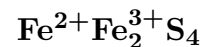


Greigite



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Crystal Data: Cubic. *Point Group:* $4/m\bar{3}2/m$. As balls of intergrown octahedra with curved faces, to 0.5 mm, rarely as cubes; also as minute grains, and very fine-grained, disseminated.

Physical Properties: Hardness = 4–4.5 VHN = 401–423 (50 g load). D(meas.) = 4.049 D(calc.) = 4.079 Strongly magnetic.

Optical Properties: Opaque. *Color:* Pale pink, tarnishing to a metallic blue; sooty black when very fine grained; in polished section, pale creamy white. *Luster:* Metallic.

R: (400) 30.5, (420) 31.1, (440) 31.7, (460) 32.2, (480) 32.7, (500) 33.2, (520) 33.6, (540) 34.2, (560) 34.7, (580) 35.3, (600) 35.9, (620) 36.4, (640) 37.1, (660) 37.6, (680) 38.1, (700) 38.7

Cell Data: *Space Group:* $Fd\bar{3}m$. $a = 9.876$ $Z = 8$

X-ray Powder Pattern: Kramer-Four Corners area, California, USA.

2.980 (100), 1.746 (77), 2.470 (55), 3.498 (32), 1.008 (31), 1.901 (29), 1.105 (16)

Chemistry:

	(1)	(2)	(3)
Fe	56.5	55.9	56.64
Cu	0.08	0.2	
Ni	0.10		
Zn	0.01		
Mn		0.1	
Cr	0.14		
Sb		1.3	
As	0.38		
S	42.2	42.2	43.36
Total	99.41	99.7	100.00

(1) Zacatecas, Mexico; corresponds to $(\text{Fe}_{3.08}\text{As}_{0.02}\text{Cr}_{0.01}\text{Ni}_{0.01})_{\Sigma=3.12}\text{S}_{4.00}$. (2) Cornwall, England; by electron microprobe, corresponds to $(\text{Fe}_{3.04}\text{Sb}_{0.03}\text{Mn}_{0.01}\text{C}_{0.01})_{\Sigma=3.09}\text{S}_{4.00}$.

(3) $\text{Fe}^{2+}\text{Fe}_2^{3+}\text{S}_4$.

Mineral Group: Linnaeite group.

Occurrence: Formed in lacustrine beds consisting of interbedded calcareous clays, silts, and fine- to medium-grained arkosic sands; in varvelike laminae of grayish black sulfide-bearing clays and fine silts; possibly as the result of seasonal variation in the composition and physical condition of lake waters; also in hydrothermal vein deposits; formed in magnetotactic bacteria, and by sulfate-reducing bacteria.

Association: Montmorillonite, chlorite, calcite, colemanite, veatchite (Kramer-Four Corners area, California, USA); sphalerite, pyrite, marcasite, galena, calcite, dolomite (Zacatecas, Mexico).

Distribution: In the USA, in California, from the Kramer-Four Corners area, San Bernardino Co. [TL]; about 13 km west, in the Mudd mine, Kramer borate district, Boron, Kern Co.; and at Coyote Peak, near Orick, Humboldt Co. In Mexico, near Zacatecas. From the bed of the Black Sea, and in the Gal-Khaya deposit, northeast Sakha, Russia. At Montemesola, Taranto, Italy. In the Lojane chromium deposit, 40 km northeast of Skopje, Macedonia. From the Treore mine, St. Teath, Cornwall, England. In the Hanoaka mine, Odate, Akita Prefecture, and the Akagane mine, Iwate Prefecture, Japan. Additional occurrences have been characterized.

Name: Honoring Dr. Joseph Wilson Greig (1895–1977), mineralogist and physical chemist, Pennsylvania State University, State College, Pennsylvania, USA.

Type Material: National Museum of Natural History, Washington, D.C., USA, 117502, 136415.

References: (1) Skinner, B.J., R.C. Erd, and F.S. Grimaldi (1964) Greigite, the thio-spinel of iron; a new mineral. *Amer. Mineral.*, 49, 543–555. (2) Criddle, A.J. and C.J. Stanley, Eds. (1993) Quantitative data file for ore minerals, 3rd ed. Chapman & Hall, London, 214.

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