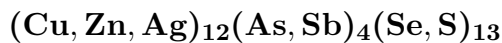


Giraudite

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Crystal Data: Cubic. *Point Group:* $\bar{4}3m$. As anhedral individuals, to 400 μm ; more rarely as micro-myrmekitic intergrowths with chaméanite.

Physical Properties: Hardness = n.d. VHN = 233–333 (25 g load). D(meas.) = n.d. D(calc.) = 5.75

Optical Properties: Opaque. *Color:* Pale gray, with a creamy tint in reflected light. *Luster:* Metallic.

R: (400) —, (420) 32.2, (440) 32.1, (460) 31.8, (480) 31.7, (500) 31.6, (520) 31.5, (540) 31.7, (560) 31.8, (580) 31.7, (600) 31.7, (620) 31.8, (640) 31.6, (660) 31.5, (680) 31.3, (700) 30.8

Cell Data: *Space Group:* $I\bar{4}3m$. $a = 10.578$ $Z = 2$

X-ray Powder Pattern: Chaméane mine, France. 3.050 (100), 1.868 (90), 1.593 (70), 1.932 (60), 2.497 (50), 2.076 (40), 1.714 (40)

Chemistry:

	(1)	(2)	(3)
Cu	30.06	32.78	32.70
Zn	3.37	3.19	0.22
Ag	3.89	1.73	0.15
Hg	0.57	0.30	8.97
Fe	0.19	0.03	0.22
As	7.61	9.56	14.02
Sb	10.66	7.50	0.19
Se	41.09	40.62	39.08
S	2.73	4.12	3.69
Total	100.17	99.83	99.04

(1) Chaméane mine, France; by electron microprobe, corresponding to $(\text{Cu}_{9.24}\text{Ag}_{0.76})_{\Sigma=10.00}(\text{Zn}_{1.12}\text{Cu}_{0.84}\text{Fe}_{0.08}\text{Hg}_{0.04})_{\Sigma=2.08}(\text{As}_{2.16}\text{Sb}_{1.88})_{\Sigma=4.04}(\text{Se}_{11.08}\text{S}_{1.80})_{\Sigma=12.88}$. (2) Do.; by electron microprobe, corresponding to $(\text{Cu}_{9.68}\text{Ag}_{0.32})_{\Sigma=10.00}(\text{Zn}_{1.00}\text{Cu}_{0.92}\text{Hg}_{0.04})_{\Sigma=1.96}(\text{As}_{2.60}\text{Sb}_{1.28})_{\Sigma=3.88}(\text{Se}_{10.52}\text{S}_{2.64})_{\Sigma=13.16}$. (3) Niederschlema-Alberoda deposit, Germany; by electron microprobe, corresponding to $(\text{Cu}_{9.96}\text{Ag}_{0.04})_{\Sigma=10.00}(\text{Hg}_{1.00}\text{Cu}_{0.92}\text{Zn}_{0.08}\text{Fe}_{0.01})_{\Sigma=2.01}(\text{As}_{3.95}\text{Sb}_{0.06})_{\Sigma=4.00}(\text{Se}_{10.84}\text{S}_{2.14})_{\Sigma=12.98}$.

Mineral Group: Tetrahedrite group.

Occurrence: A rare late-stage mineral with other selenides and sulfides in uranium deposits.

Association: Geffroyite, chaméanite, ankerite (Chaméane mine, France); berzelianite, clausthalite (Niederschlema-Alberoda deposit, Germany).

Distribution: From the Chaméane uranium mine, near Vernet-la-Varenne, Puy-de-Dôme, France [TL]. In the Niederschlema-Alberoda uranium deposit, Saxony, Germany.

Name: To honor Roger Giraud (1936–), French electron microprobe analyst, B.R.G.M.–C.N.R.S., Orléans, France.

Type Material: National School of Mines, Paris, France.

References: (1) Johan, Z., P. Picot, and F. Ruhlmann (1982) Evolution paragenétique de la minéralisation uranifère de Chaméane (Puy-de-Dôme) France: chaméanite, geffroyite et giraudite, trois séléniures nouveaux de Cu, Fe, Ag, and As. *Tschermaks Mineral. Petrog. Mitt.*, 29, 151–167 (in French with English abs.). (2) (1982) *Amer. Mineral.*, 67, 1074–1075 (abs. ref. 1). (3) Förster, H.-J., D. Rhede, and G. Tischendorf (2002) Continuous solid solution between mercurian giraudite and hakite. *Can. Mineral.*, 40, 1161–1170.

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