

Crystal Data: Orthorhombic. *Point Group:* n.d. Small aggregates of anhedral crystals, to 200 μm .

Physical Properties: Hardness = n.d. VHN = 212–222 (50 g load). D(meas.) = n.d. D(calc.) = 5.64

Optical Properties: Opaque. *Color:* In reflected light, gray with olive-brown tint. *Luster:* Metallic. *Pleochroism:* Distinct. *Anisotropism:* Strong, in yellowish green to bluish gray.

R₁–R₂: n.d.

Cell Data: *Space Group:* n.d. $a = 11.439$ $b = 14.093$ $c = 3.754$ $Z = 4$

X-ray Powder Pattern: Valle del Frigido, Italy.
3.62 (vs), 3.20 (vs), 2.63 (vs), 2.51 (vs), 2.98 (s), 2.89 (s), 14.0 (m)

| Chemistry: | (1) | (2) |
|------------|--------|--------|
| Fe | 9.41 | 10.85 |
| Cu | 0.30 | |
| Sb | 29.90 | 23.65 |
| Bi | 33.28 | 40.59 |
| As | 0.16 | |
| S | 27.43 | 24.91 |
| Total | 100.48 | 100.00 |

(1) Valle del Frigido, Italy; by electron microprobe, corresponds to Fe_{0.79}Cu_{0.02}Sb_{1.15}Bi_{0.74}As_{0.01}S_{4.00}. (2) FeSbBiS₄.

Occurrence: In a hydrothermal copper deposit with disseminated chalcopyrite in siderite gangue.

Association: Chalcopyrite, tetrahedrite, pyrrhotite, pyrite, marcasite, galena, sphalerite, meneghinite, ullmannite, pentlandite, vaesite, bismuthinite, chalcantinite, siderite, quartz.

Distribution: At Valle del Frigido, one km east of Massa, Tuscany, Italy.

Name: In honor of Professor Carlo L. Garavelli (1929–), Italian mineralogist, University of Bari, Bari, Italy.

Type Material: University of Florence, Florence, 100/l; University of Bari, Bari, Italy; National School of Mines, Paris, France; National Museum of Natural History, Washington, D.C., USA, 145868.

References: (1) Gregorio, F., P. Lattanzi, G. Tanelli, and F. Vurro (1979) Garavellite, FeSbBiS₄, a new mineral from the Cu–Fe deposit of Valle del Frigido in the Apuane Alps, northern Tuscany, Italy. *Mineral. Mag.*, 43, 99–102. (2) (1979) *Amer. Mineral.*, 64, 1329–1330 (abs. ref. 1).