Briartite $Cu_2(Zn,Fe)GeS_4$

Crystal Data: Tetragonal. *Point Group:* $4mm$ or $\overline{4}m2$. Small grains, to 2 mm, embedded, interstitial, and in networks in other sulfides. *Twinning:* Commonly shows polysynthetic twinning.

Physical Properties: Hardness = 4.5 VHN = n.d. D(meas.) = n.d. D(calc.) = 4.337

Optical Properties: Opaque. *Color:* Gray to gray-blue in reflected light.
Anisotropism: Weak in air, distinct in oil.
R: (400) 23.4, (420) 24.2, (440) 25.0, (460) 25.7, (480) 26.4, (500) 27.0, (520) 27.4, (540) 27.6, (560) 27.5, (580) 27.2, (600) 26.8, (620) 26.0, (640) 25.0, (660) 23.8, (680) 22.5, (700) 21.2

Cell Data: *Space Group:* $I4_1md$ or $I\overline{4}d2$. $a = 5.32$ $c = 10.51$ Z = 2

X-ray Powder Pattern: Kipushi, Congo.
3.06 (FF), 1.888 (m), 1.871 (m), 1.608 (m), 1.591 (m), 2.67 (f), 1.533 (f)

Chemistry:

	(1)	(2)	(3)
Cu	33.1	32.0	32.9
Fe	9.5	5.1	2.6
Zn	6.9	10.8	12.2
Ge	16.0	14.6	13.7
Ga		1.0	2.2
Sn	0.5		
S	32.4	34.8	36.1
Total	98.4	98.3	99.7

(1) Kipushi, Congo; by electron microprobe, corresponding to $Cu_{2.06}(Fe_{0.67}Zn_{0.42})_{\Sigma=1.09}(Ge_{0.87}Sn_{0.02})_{\Sigma=0.89}S_{4.00}$. (2) Do.; by electron microprobe, corresponding to $Cu_{1.86}(Zn_{0.61}Fe_{0.34})_{\Sigma=0.95}(Ge_{0.74}Ga_{0.05})_{\Sigma=0.79}S_{4.00}$. (3) Tsumeb, Namibia; by electron microprobe, corresponding to $Cu_{1.84}(Zn_{0.66}Fe_{0.16})_{\Sigma=0.82}(Ge_{0.67}Ga_{0.11})_{\Sigma=0.78}S_{4.00}$.

Mineral Group: Stannite group.

Occurrence: As rare inclusions in other Ge–Ga-bearing sulfides.

Association: Chalcopyrite, tennantite, reniérite, germanite, galena, sphalerite.

Distribution: From the Prince Leopold mine, Kipushi, 28 km southwest of Lubumbashi, Katanga Province, Congo (Shaba Province, Zaire) [TL]. At Tsumeb, Namibia. From Kabwe (Broken Hill), Zambia. In the Radka deposit, Pazardzhik, Bulgaria. From the Plan d'Argut zinc deposit, central Pyrénées, Haut-Garonne, France. At Cerro de Toro, Las Alpujarrides, Granada [could be Almería??ck] Province, Spain.

Name: For Gaston Briart, geologist who studied the Kipushi deposit.

Type Material: Catholic University of Louvain, Louvain, Belgium, U309; National School of Mines, Paris, France; The Natural History Museum, London, England, 1967,271.

References: (1) Francotte, J., J. Moreau, R. Ottenburgs, and C. Lévy (1965) La briartite, $Cu_2(Fe,Zn)GeS_4$, une nouvelle espèce minérale. Bull. Soc. fr. Minéral., 88, 432–437 (in French). (2) (1966) Amer. Mineral., 51, 1816 (abs. ref. 1). (3) Wintenberger, M. (1979) Etude de la structure cristallographique et magnetique de Cu_2FeGeS_4 et remarque sur la structure magnetique de Cu_2MnSnS_4. Mat. Res. Bull., 14, 1195–1202 (in French with English abs.). (4) Mozgova, N.N., S.N. Nenasheva, Y.S. Borodaev, A.I. Tsepin, and T.A. Kalinina (1994) New data on briartite. Doklady Acad. Nauk SSSR, 335, 780–783 (in Russian).