

Crystal Data: Cubic. *Point Group:* $4/m\bar{3}2/m$. As anhedral crystals, to 200 μm , typically imbedded in other sulfides.

Physical Properties: Hardness = n.d. VHN = 446–464 (25 g load). D(meas.) = n.d. D(calc.) = 4.76

Optical Properties: Opaque. *Color:* Steel-gray; in polished section, creamy white. *Luster:* Metallic.

R: (420) 36.4, (460) 40.9, (500) 42.5, (546) 43.4, (589) 45.3, (640) 43.8

Cell Data: *Space Group:* $Fd\bar{3}m$ (by analogy to other thiospinels). $a = 9.520$ $Z = 8$

X-ray Powder Pattern: Fletcher mine, Missouri, USA.
1.68 (vs), 1.83 (s), 2.87 (m), 2.39 (m), 1.37 (m), 1.24 (m), 1.19 (m)

| Chemistry: | (1) | (2) | (3) | (4) |
|------------|-------|------|-------|--------|
| Cu | 19.5 | 14.8 | 26.7 | 20.53 |
| Ni | 25.9 | 34.9 | 24.6 | 18.97 |
| Co | 13.6 | 9.5 | 2.7 | 19.05 |
| Fe | 0.9 | 0.2 | 3.7 | |
| S | 41.6 | 38.5 | 42.3 | 41.45 |
| Total | 101.5 | 97.9 | 100.0 | 100.00 |

- (1) Fletcher mine, Missouri, USA; by electron microprobe, corresponds to $\text{Cu}_{0.95}\text{Fe}_{0.05}(\text{Ni}_{1.36}\text{Co}_{0.71})_{\Sigma=2.07}\text{S}_{4.00}$. (2) Do.; corresponds to $\text{Cu}_{0.78}\text{Fe}_{0.01}(\text{Ni}_{1.98}\text{Co}_{0.54})_{\Sigma=1.99}\text{S}_{4.00}$. (3) Kalgoorlie, Australia; by electron microprobe, corresponds to $\text{Cu}_{1.27}\text{Fe}_{0.20}\text{Ni}_{1.27}\text{Co}_{0.14}\text{S}_{4.00}$. (4) $\text{Cu}(\text{Ni}, \text{Co})_2\text{S}_4$ with Ni:Co = 1:1.

Mineral Group: Linnaeite group.

Occurrence: Disseminated in copper sulfides, in copper-rich pods replacing dolostone (Fletcher mine, Missouri, USA); in black slates (Kalgoorlie, Australia).

Association: Vaesite, pyrite, covellite, chalcopyrite, bornite, digenite (Fletcher mine, Missouri, USA); pyrrhotite (Kalgoorlie, Australia).

Distribution: In the USA, from the Fletcher mine, Reynolds Co., Missouri [TL], and at the New Rambler Cu–Ni mine, Medicine Bow Mountains, east of Encampment, Albany Co., Wyoming. From Băița (Rézbánya), Romania. In Australia, at Rum Jungle, Alligator River district, Northern Territory, and from Kalgoorlie, Western Australia.

Name: For the Fletcher mine in Missouri, USA.

Type Material: The Natural History Museum, London, England; Royal Ontario Museum, Toronto, Canada, M35070; National Museum of Natural History, Washington, D.C., USA, 137072.

References: (1) Craig, J.R. and A.B. Carpenter (1977) Fletcherite, $\text{Cu}(\text{Ni}, \text{Co})_2\text{S}_4$, a new thiospinel from the Viburnum Trend (New Lead Belt), Missouri. *Econ. Geol.*, 72, 480–486. (2) (1977) *Amer. Mineral.*, 62, 596 (abs. ref. 1). (3) Ostwald, J. (1985) Fletcherite and its genesis in the Kalgoorlie area, Western Australia. *Neues Jahrb. Mineral., Monatsh.*, 35–44.