Tetrataenite FeNi

Crystal Data: Tetragonal. *Point Group:* $4/m\ 2/m\ 2/m$. Irregular crystals, to 100 μm, as grains and in rims around taenite.

Physical Properties: Hardness = n.d. VHN = 170–200 (25 g load). D(meas.) = n.d. D(calc.) = n.d.

Optical Properties: Opaque. *Color:* Creamy in reflected light. *Luster:* Metallic. *Anisotropism:* Distinct on well-polished surfaces, bluish green to brownish orange.
R_1–R_2: n.d.

Cell Data: *Space Group:* $P4/mmm$. a = 2.533(2) c = 3.582(2) Z = 1

X-ray Powder Pattern: Linville Ni-rich ataxite meteorite.
3.40 (100), 2.879 (80), 2.526 (80), 4.239 (60), 2.279 (10), 2.187 (10), 2.070 (10)

Chemistry:

	(1)	(2)
Fe	49.00	48.75
Ni	51.00	51.25
Cu	0.20	
Co	0.08	
P	< 0.01	
Total	100.28	100.00

(1) By electron microprobe, average of analyses from 18 meteorites. (2) FeNi.

Occurrence: In slowly cooled meteorites, by the ordering of Fe and Ni atoms in taenite. It is most abundant in mesosiderites and chondrites.

Association: Kamacite, troilite, taenite.

Distribution: Widely distributed in chondrite, mesosiderite, iron, and pallas types of meteorites.

Name: In allusion to the symmetry of the mineral, and the genetic link to taenite.

Type Material: National Museum of Natural History, Washington, D.C., USA, meteorite collection 1025.

References: (1) Ramsden, A.R. and E.N. Cameron (1966) Kamacite and taenite superstructures and a metastable tetragonal phase in iron meteorites. Amer. Mineral., 51, 37–55. (2) Clark, R.S., Jr. and E.R.D. Scott (1980) Tetrataenite – ordered FeNi, a new mineral in meteorites. Amer. Mineral., 65, 624–630. (3) Albertson, J.F., G.B. Jensen, and J.M. Knudsen (1978) Structure of taenite in two iron meteorites. Nature, 273, 453–454. (4) Rubin, A.E. (1994) Euhedral tetrataenite in the Jelica meteorite. Mineral. Mag., 58, 215–221.