Taenite γ–(Fe,Ni)

Crystal Data: Cubic. *Point Group:* $4/m\ \bar{3}\ 2/m$. As small plates and grains, fine scales, spherules, and large ellipsoidal masses, to 40 kg; in intergrowths with, or narrow selvages around, kamacite in meteorites.

Physical Properties: *Tenacity*: Malleable, flexible. Hardness = 5-5.5 VHN = 350-500 (100 g load). D(meas.) = 7.8-8.22 D(calc.) = 8.29 (ordered). Strongly magnetic.

Optical Properties: Opaque. *Color*: Silver-white to grayish white. *Luster*: Metallic.
Optical Class: Isotropic.
R: n.d.

Cell Data: *Space Group*: *Fm*3*m*. a = 7.146 Z = 32

X-ray Powder Pattern: Linville ataxite meteorite (ordered structure).
3.340 (100), 2.879 (80), 2.526 (80), 4.239 (60), 2.279 (10), 2.187 (10), 2.070 (10)

Chemistry:

	(1)	(2)
Fe	68.13	74.78
Ni	30.85	24.32
Co	0.69	0.33
Cu	0.33	
C		0.50
Total	100.00	99.93

(1) Cañon Diablo meteorite, corresponds to $Fe_{2.32}Ni_{1.00}Cu_{0.02}Co_{0.01}$. (2) Welland meteorite, corresponds to $Fe_{3.27}Ni_{1.00}C_{0.02}Co_{0.01}$.

Occurrence: Important in meteorites. As spherules in lunar rocks. In serpentinized nickeliferous ultramafic rocks, as particles or spherules in placer sands, and as loose, detached masses which give few clues as to their ultimate origin. In mafic igneous rocks that assimilated carbon under reducing conditions.

Association: Kamacite, awaruite, graphite, cohenite, moissanite, schreibersite, troilite, daubréelite, oldhamite, other meteorite minerals.

Distribution: From Gorge River, South Island, New Zealand. In the USA, in Josephine and Jackson Cos., Oregon; and in California, near South Fork, Smith River, Del Norte Co. In Canada, on the Fraser River, Lillooet district, British Columbia and as spherules in Pleistocene sediment, Alberta. In the Mt. Ozernaya mafic intrusion, Siberian Platform, Russia. Also found in all octahedrite meteorites which exhibit Widmannstätten structures as well as in some nickel-rich ataxites.

Name: From the Greek for *band* or *strip*, in allusion to its platy structure.

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) Albertsen, J.F., G.B. Jensen, and J.M. Knudsen (1978) Structure of taenite in two iron meteorites. Nature, 273, 453-454. (3) Ramdohr, P. (1969) The ore minerals and their intergrowths, (3rd edition), 360-361. (4) Palache, C., H. Berman, and C. Frondel (1944) Dana's system of mineralogy, (7th edition), v. I, 117-119 ["nickel-iron"].