Shenzhuangite $NiFeS_2$

Crystal Data: Tetragonal. *Point Group*: $\bar{4}$ 2*m*. As irregular grains to 60 μm; as spherules to 10 μm.

Physical Properties: *Cleavage*: n.d. *Tenacity*: n.d. *Fracture*: n.d. Hardness = n.d.
D(meas.) = n.d. D(calc.) = 4.013

Optical Properties: Opaque. *Color*: n.d.; yellowish in reflected light. *Streak*: n.d. *Luster*: n.d.
Optical Class: n.d. *Anisotropism*: Weak, light brown to greenish.
R_1-R_2: (471.1) 24.8-26.0, (548.3) 34.9-36.2, (586.6) 37.7-39.1, (652.3) 40.4-41.1

Cell Data: *Space Group*: $I\bar{4}2d$. a = 5.3121(4) c = 10.4772(7) Z = 4

X-ray Powder Pattern: Suizhou meteorite.
3.05 (100), 1.591 (25), 1.875 (20), 1.215 (10), 1.080 (10), 2.652 (5), 1.330 (5)

Chemistry:

	(1)	(2)	(3)
Ni	22.37	32.68	32.85
Fe	30.87	30.81	31.26
Cu	10.88	0.55	
Co	0.07	1.89	
S	35.42	34.06	35.89
Total	99.61	100.00	100.00

(1) Suizhou meteorite; average of 4 electron microprobe analyses; corresponds to $(Ni^{2+}_{0.69}Cu^{+}_{0.31})_{\Sigma=1.00}(Fe^{2+}_{0.69}Fe^{3+}_{0.31})_{\Sigma=1.00}S_{2.00}$. (2) Muong Nong-type tektites, Laos; electron microprobe analysis; corresponds to $Ni_{1.007}Fe_{0.998}Cu_{0.016}Co_{0.058}S_{1.922}$. (3) $NiFeS_2$.

Occurrence: In shock melt veins less than 300 μm thick in a meteorite; in spherical heterogeneous, two-phase sulfide inclusions less than 10 μm in terrestrial tektites.

Association: Taenite, forsterite, pyroxene, plagioclase glass (maskelynite), troilite (meteorite); troilite, glass (tektite).

Distribution: From the shocked (S5) meteorite, Suizhou L6 chondrite; from Australasian Muong Nong-type tektites in Laos (~ 10 km north of the village of Muong Nong).

Name: Honors Professors Shangyue Shen (b. 1941) and Xiaoli Zhuang (b. 1961) who first discovered the Ni-rich variety of chalcopyrite in the Suizhou meteorite.

Type Material: Natural History Museum, University of Florence, Italy (3238/I).

References: (1) Bindi, L. and X. Xie (2018) Shenzhuangite, $NiFeS_2$, the Ni-analog of chalcopyrite from the Suizhou L6 chondrite. Eur. J. Mineral., 30(1), 165-169. (2) (2018) Amer. Mineral., 103, 1714 (abs. ref. 1). (3) Křížová, Š., R. Skála, P. Halodová, K. Žák1, and L. Ackerman (2019) Near end-member shenzhuangite, $NiFeS_2$, found in Muong Nong-type tektites from Laos. Amer. Mineral., 104, 1165-1172.