Melliniite $(Ni, Fe)_4P$

Crystal Data: Cubic. *Point Group*: 23. As anhedral to subhedral grains to 100 μm.

Physical Properties: *Cleavage*: None. *Tenacity*: Brittle. *Fracture*: Uneven. Hardness = 8-8.5 VHN = 440-454, 447 average (500 g load). D(meas.) = n.d. D(calc.) = 7.88

Optical Properties: Opaque. *Color*: Cream-yellowish in reflected light. *Streak*: Gray.
Luster: Metallic.
Optical Class: Isotropic.
R: (471.1) 60.5, (548.3) 50.4, (586.6) 52.5, (652.3) 55.9

Cell Data: *Space Group*: $P2_13$. $a = 6.025(1)$ $Z = 4$

X-Ray Diffraction Pattern: Northwest Africa 1054 acapulcoite meteorite.
2.005 (100), 1.906 (60), 1.816 (20), 2.694 (15), 1.182 (15), 1.119 (15), 1.420 (10)

Chemistry:

	(1)
Fe	34.9
Co	0.22
Ni	51.4
Si	0.01
Mg	0.03
P	12.4
S	0.02
Total	98.98

(1) Northwest Africa 1054 acapulcoite meteorite; average electron microprobe analysis; corresponds to $(Ni_{2.30}Fe_{1.64}Co_{0.01})_{\Sigma=3.95}P_{1.05}$.

Occurrence: In an acapulcoite meteorite.

Association: Kamacite, nickelphosphide.

Distribution: From the Northwest Africa 1054 acapulcoite meteorite.

Name: Honors Marcello *Mellini,* Professor of Mineralogy, University of Siena, Italy, for his contributions to the study of meteorites.

Type Material: Meteorite Collection, Museum of Planetary Science, Prato, Italy (MSP-2378).

References: (1) Pratesi, G., L. Bindi, and V. Moggi-Cecchi (2006) Icosahedral coordination of phosphorus in the crystal structure of melliniite, a new phosphide mineral from the Northwest Africa 1054 acapulcoite. Amer. Mineral., 91, 451-454 and Erratum, 1956.