Decagonite $Al_{71}Ni_{24}Fe_5$

Crystal Data: Quasicrystal. *Point Group*: n.d. As anhedral grains to ~60 μm.

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

Optical Properties: Opaque. *Color*: Gray to black. *Streak*: n.d. *Luster*: Metallic.
Optical Class: n.d.

Cell Data: *Space Group*: $P10_5/mmc$. Structure is not reducible to a three-dimensional unit cell.

X-Ray Diffraction Pattern: Grain 126 of the Khatyrka meteorite.
2.024 (100), 3.765 (50), 2.051 (45), 3.405 (40), 1.9799 (40), 1.4219 (35), 1.8014 (30)

Chemistry:

	(1)
Al	52.19
Ni	39.01
Fe	8.18
Total	99.92

(1) Grain 126 of the Khatyrka meteorite; average electron microprobe analysis; corresponding to $Al_{70.2}Ni_{24.5}Fe_{5.3}$.

Mineral Group: Quasicrystal.

Occurrence: From impact shock metamorphism in a CV3 carbonaceous chondrite meteorite.

Association: Al-bearing trevorite, diopside, forsterite, ahrensite, clinoenstatite, nepheline, coesite, pentlandite, Cu-bearing troilite, icosahedrite, khatyrkite, taenite, Al-bearing taenite, steinhardtite.

Distribution: From Grain 126 of the Khatyrka meteorite.

Name: For the 10-fold symmetry of its crystal structure.

Type Material: Natural History Museum, University of Florence, Italy (3146/I.).

References: (1) Bindi, L., N. Yao, C. Lin, L.S. Hollister, C.L. Andronicos, V.V. Distler, M.P. Eddy, A. Kostin, V. Kryachko, G.J. MacPherson, W.M. Steinhardt, M. Yudovskaya, and P.J. Steinhardt (2015) Decagonite, $Al_{71}Ni_{24}Fe_5$, a quasicrystal with decagonal symmetry from the Khatyrka CV3 carbonaceous chondrite. Amer. Mineral., 100, 2340-2343.