Nickeltyrrellite $CuNi_2Se_4$

Crystal Data: Cubic. *Point Group*: $4/m\,\bar{3}\,2/m$. As anhedral to subhedral grains to 20 μm.

Physical Properties: *Cleavage*: None. *Tenacity*: Brittle. *Fracture*: Irregular. Hardness = n.d. D(meas.) = n.d. D(calc.) = 7.36 Nonfluorescent.

Optical Properties: Opaque. *Color*: Black, cream to pale pinkish without internal reflections in reflected light. *Streak*: Black. *Luster*: Metallic.
Optical Class: Isotropic.
R: (470) 45.9, (546) 47.6, (589) 48.1, (650) 49.8

Cell Data: *Space Group: Fd*$\bar{3}$ *m*. *a* = 9.99 Z = 8

X-Ray Diffraction Pattern: Characterized by electron backscatter diffraction analysis.

Chemistry:

	(1)	(2)
Cu	13.01	2.79
Fe	0.27	
Co	6.66	
Ni	16.98	23.63
S	1.04	
Se	61.91	63.58
Total	99.87	100.00

(1) El Dragón mine, 30 km southwest of Potosí, Quijarro province, Bolivia; average electron microprobe analysis; corresponds to $Cu_{1.00}(Ni_{1.42}Co_{0.56}Fe_{0.02})_{\Sigma=2.00}(Se_{3.84}S_{0.16})_{\Sigma=4.00}$. (2) $CuNi_2Se_4$.

Mineral Group: Spinel supergroup, tyrrellite subgroup.

Occurrence: As fracture fillings in krut'aite-penroseite by oxidizing, low-T, Cu-Ni-Co-Pb-bearing fluids altering quijarroite-hansblockite-watkinsonite-clausthalite-penroseite aggregates.

Association: Cerromojonite, klockmannite, clausthalite, penroseite.

Distribution: At the El Dragón mine, 30 km southwest of Potosí, Quijarro province, Bolivia.

Name: The prefix identifies the Ni-analogue of *tyrrellite*.

Type Material: Natural History Museum, London, England (BM2018,19 holotype) and the Mineralogical State Collection, Munich, Germany (MSM 73587 cotype).

References: (1) Förster, H.J., C. Ma, G. Grundmann, L. Bindi, and C.J. Stanley (2019) Nickeltyrrellite, $CuNi_2Se_4$, a new member of the spinel supergroup from El Dragón, Bolivia. Can. Mineral., 57, 637-646.