Crowningshieldite $(Ni_{0.9}Fe_{0.1})S$

Crystal Data: Hexagonal. *Point Group*: 6/*m* 2/*m* 2/*m*. As irregular grains, to 20 μm.

Physical Properties: *Cleavage*: n.d. *Tenacity*: n.d. *Fracture*: n.d.
Hardness = 3-3.5 (by analogy to millerite) D(meas.) = n.d. D(calc.) = 5.47(1)

Optical Properties: Opaque. *Color*: Bronze yellow. *Streak*: n.d. *Luster*: Metallic.
Optical Class: n.d.

Cell Data: *Space Group*: $P6_3/mmc$. a = 3.44(1) c = 5.36(1) Z = 2

X-ray Powder Pattern: Letseng diamond mine, Lesotho.
1.992 (100), 1.718 (55), 2.978 (53), 2.608 (35), 2.693 (17), 1.304 (17), 1.453 (7)

Chemistry:

	(1)	(2)
Ni	58.50	64.67
Fe	5.89	
S	35.61	35.33
Total	100.00	100.00

(1) Letseng diamond mine, Lesotho; average semiquantitative EDS analysis; corresponds to $(Ni_{0.9}Fe_{0.1})S$. (2) NiS.

Polymorphism & Series: High-temperature polymorph of millerite (β-NiS), with an inversion temperature of 379 °C.

Occurrence: Part of a multiphase inclusion in a gem-quality, colorless, type IIa (containing less than ~5 ppm N) diamond from a kimberlite pipe.

Association: Diamond, magnetite-magnesioferrite, hematite, graphite.

Distribution: From the Letseng diamond mine, Lesotho.

Name: Honors G. Robert *Crowningshield* (1919-2006), who at the Gemological Institute of America (GIA) for more than 50 years, advocated for spectroscopy as a valuable tool in gemology and meticulously recorded the absorption patterns of many gems, ultimately publishing them as a key reference for gem mineral identification.

Type Material: Museum of Mineralogy, University of Padova, Italy (MMP 20501) and the Gemological Institute of America Museum, Carlsbad, California, USA (41800).

References: (1) Smith, E.M., F. Nestola, L. Pasqualetto, F. Zorzi, L. Secco, and W. Wang (2021) The new mineral crowningshieldite: A high-temperature NiS polymorph found in a type IIa diamond from the Letseng mine, Lesotho. Amer. Mineral., 106(1), 301-308.