Nierite α–Si_3N_4

Crystal Data: Hexagonal. *Point Group:* $3m$. As lathlike crystals, elongated along [0001], to 2 μm, found in perchloric acid-resistant residues.

Physical Properties: Hardness = ~9 VHN = 2600–3500 (100 g load) (synthetic). D(meas.) = 3.167–3.171 (synthetic). D(calc.) = 3.11

Optical Properties: Transparent. *Color:* Colorless.
Optical Class: Uniaxial (–) (synthetic). $\omega = 2.03$ $\epsilon = 2.02$

Cell Data: *Space Group:* $P31c$ (synthetic). $a = 7.74(2)$ $c = 5.61(2)$ Z = 4

X-ray Powder Pattern: Source material not stated.
4.31 (32), 2.15 (32), 2.87 (28), 2.59 (28), 6.70 (17), 3.35 (17), 2.81 (17)

Chemistry:

	(1)	(2)
Si	57.2	60.06
N	42.8	39.94
Total	100.0	100.00

(1) Indarch meteorite; by scanning transmission electron microscope, average of eight analyses; corresponding to $Si_{2.79}N_{4.21}$. (2) Si_3N_4.

Occurrence: A very rare component of enstatite chondrite and chondrite meteorites, probably formed by exsolution during metamorphism.

Association: Diamond, kamacite, perryite, schreibersite, troilite, spinel, chromite, hibonite, rutile.

Distribution: In the Indarch enstatite chondrite meteorite, and the Inman, Adrar, and Tieschitz chondrite meteorites.

Name: Honors Alfred Otto Carl Nier (1912–1994), Professor of Chemistry at the University of Minnesota, Minneapolis, Minnesota, USA, a founder of mass spectroscopy.

Type Material: The Natural History Museum, London, England.

References: (1) Lee, M.R., S.S. Russell, J.W. Arden, and C.T. Pillinger (1995) Nierite (Si_3N_4). a new mineral from ordinary and enstatite chondrites. Meteoritics, 30, 387–398. (2) (1996) Amer. Mineral., 81, 251 (abs. ref. 1). (3) Kohatsu, I. and J.W. McCauley (1974) Re-examination of the crystal structure of α-Si_3N_4. Mat. Res. Bull., 9, 917–920.