Lonsdaleite C

Crystal Data: Hexagonal. *Point Group:* $6/m\ 2/m\ 2/m$. Very fine-grained aggregates, forming cubes and cubo-octahedra, to 0.7 mm; in polycrystalline aggregates, mixed with diamond.

Physical Properties: Hardness = 3 VHN = n.d. D(meas.) = > 3.20 D(calc.) = 3.51

Optical Properties: Transparent. *Color:* Grayish in crystals; also pale yellowish or brown in broken fragments. *Luster:* Adamantine.
Optical Class: [Biaxial.] n = Slightly above 2.404. *Anisotropism:* Birefringence slight, probably due to strain.
R_1–R_2: n.d.

Cell Data: *Space Group:* $P6_3/mmc$. $a = 2.51$ $c = 4.12$ Z = 4

X-ray Powder Pattern: Cañon Diablo meteorite.
2.061 (100), 1.257 (60), 2.18 (40), 1.075 (30), 1.933 (20), 1.50 (10), 1.17 (10)

Chemistry:

	(1)
C	100.0
N	0.0
Total	100.0

(1) Cañon Diablo meteorite; by electron microprobe.

Polymorphism & Series: Polymorphous with diamond, graphite, and chaoite.

Occurrence: Discovered in the residue (ca. 200 mg) from the dissolution of 5 kg of Cañon Diablo meteorite. The mineral may be formed by impact shock, or be a product of direct crystallization in the parent body.

Association: Schreibersite, cohenite, taenite, graphite, chromite, kosmochlor, sphalerite, black diamond (Cañon Diablo); troilite, graphite, diamond, schreibersite, cohenite (Allan Hills 77283).

Distribution: In the Canyon Diablo [TL], Goalpara, and Allan Hills 77283 meteorites. From placers in northern Sakha; found in soil at the Tunguska explosion site, Federated SSR, Russia. At the Nördlinger Ries Crater, Bavaria, Germany. In the Sudbury impact structure, Ontario, Canada.

Name: To honor Professor Kathleen (Yardley) Lonsdale (1903–1971), distinguished British crystallographer, University of London, London, England.

Type Material: Harvard University, Cambridge, Massachusetts, USA, 130245.

References: (1) Frondel, C. and U.B. Marvin (1967) Lonsdaleite, a hexagonal polymorph of diamond. Nature, 214, 587–589. (2) (1967) Amer. Mineral., 52, 1579 (abs. ref. 1). (3) Hanneman, R.E., H.M. Strong, and F.P. Bundy (1967) Hexagonal diamonds in meteorites: implications. Science, 155, 995–997. (4) Kaminskii, F.V., G.K. Blinova, E.M. Galimov, G.A. Gurkina, Y.A. Klyuev, L.A. Kodina, V.I. Koptil, V.F. Krivonos, L.N. Frolova, and A.Y. Khrenov (1985) Polycrystalline aggregates of diamond with lonsdaleite from Yakutian [Sakhan] placers. Mineral. Zhurnal, 7, 27–36 (in Russian). (5) Ownby, P.D., X. Yang, and J. Liu (1992) Calculated X-ray diffraction data for diamond polytypes. J. Amer. Ceram. Soc., 1876–1873.