Fullerenes

The discovery of a third form of elemental carbon has instrigated much of the modern field of nanotechnology. Researchers Harold Kroto[1], Robert Curl and Richard Smalley, together with graduate students J.R. Heath and S.C. O'Brien, discovered that graphite, vaporized by a laser in one billionth of a second, condensed to forma soot which contained clusters of carbon atems, of which C_{60} is the most common.

This form of carbon was named Buckminsterfullerene (affectionately known as 'Buckyballs'), after the American architect Buckminster Fuller, whose geodesic domes resemble the fullerene structure. The C_{60} molecule consists of 12 pentagons and 20 hexagons joined together rather like a 'football' (or an American soccer ball). Significant scientific debate[2] followed the isolation of the material, particularly about its hypothesised structure. It was not until Wolfgang Krätschmer and Donald Huffman[3] discovered a method to produce multigram quantities that the structure of C_{60} could be fully confirmed.[4-6]

During 1991, Sumio Iijima[7], a senior research fellow at NEC Corporation, introduced another major development with the discovery of carbon nanotubes. The link between graphite and fullerenes carbon, nanotubes are cylindrical structures consisting of hexagonally-linked carbon atoms rolled into tubes.

Fullerene-based derivatives are soluble in benzene, toluene and chloroform, and can be chemically processed and modified in a vast number of ways. Kroto, Curl and Smallet were awarded the Nobel Prize for Chemistry in 1996 in recognition of their discovery of Fullerenes.

Alfa Aesar is pleased to offer a wide range of fullerenes for research and development.

Nanotubes

Item	Description	Sizes
44276	Aqueous dispersant for multi-walled carbon nanotubes	10ml
41548	Fullerene, buckytube/nanotube, single walled, as-produced	1g, 5g
44508	Fullerene, buckytube/nanotube, single walled	250mg, 1g, 5g
44501	Fullerene, buckytube/nanotube, single walled, >60% SWNT	100mg, 500mg, 2g
44691	Fullerene, buckytube/nanotube, double-walled, 50 - 80%	100mg, 500mg, 2g
44945	Fullerene, carbon nanotube, multi-walled, 3-20 nm OD, 1-3 nm ID, 0.1-10 micron long, 95%	1g, 5g, 25g
44790	Fullerene, carbon nanotube, multi-walled, ≤8 nm OD, 2-5 nm ID, 0.5-2 micron long	250mg, 1g, 5g
44192	Fullerene, nanotube, multi-walled, 20-50 nm OD, 5-20 micron long	1g, 5g, 25g
42886	Fullerene, nanotube, multi-walled, as-produced cathode deposits, core and shell	2g, 10g, 50g
41549	Fullerene, buckytube/nanotube, multi-walled, ground core, 7-12nm OD, 0.5-10 micron long	1g, 5g, 25g
44197	Fullerene, nanotube, multi-walled, 20-50 nm OD, <1 micron long	1g, 5g

Fullerenes

Fullerene C_{60}

Item	Description	Sizes
39722	Fullerene powder, 99.5% C_{60}	10mg, 1g, 5g
42007	Fullerene powder, 99.9+% C_{60}	250mg, 1g, 5g
42008	Fullerene powder, sublimed, 99.9+% C_{60}	50mg, 250mg, 1g, 5g

Fullerene C_{70}

Item	Description	Sizes
39720	Fullerene powder, 97% C_{70}	10mg, 50mg, 250mg
42601	Fullerene powder, 98+% C_{70}	250mg, 1g
42600	Fullerene powder, 99+% C_{70}	250mg, 1g

Fullerene C_{60} and C_{70}

Item	Description	Sizes
41181	Fullerene powder, mixed refined, typically 73% C_{60}, 22% C_{70}, higher 5%	250mg, 1g, 5g
40968	Fullerene powder, mixed refined, typically 77% C_{60}, 22% C_{70}, <2% higher	250mg, 1g
40970	Fullerene powder, mixed, typically 98% C_{60}, 2% C_{70}	250mg, 1g
36202	Fullerene powder, mixed, 2-12% C_{70}	25mg, 100mg, 500mg
40967	Fullerene powder, mixed hydrogenated, typically 77% $C_{60}Hx$, 22% $C_{70}Hy$	100mg, 500mg
41182	Fullerene powder, hydroxylated, $C_{60}(OH)_n$	25mg, 100mg
40971	Fullerene soot, as produced	1g, 5g

[1] H.W. Kroto, J.R. Heath, S.C. O'Brien, R.F. Curl, R.E. Smalley, *Nature*, 1985, **318**, 162.
[2] R. Taylor, J.P. Hare, A.K. Abdul-Sada, H.W. Kroto, *J. Chem. Soc., Chem. Commun.*, 1990, 1423.
[3] W. Krätschmer, L.D. Lamb, K. Fostiropoulos and D.R. Huffman, *Nature*, 1990, **347**, 354.
[4] W. Krätschmer, K. Fostiropoulos, D.R. Huffman, *Chem. Phys. Lett.*, 1990, **170**, 167.
[5] R. Taylor, J.P. Hare, A.K. Abdul-Sada, H.W. Kroto, *J. Chem. Soc., Chem. Commun.*, 1990, 1423.
[6] J.M. Hawkins, A. Meyer, T.A. Lewis, S. Loren, F.J. Hollander, *Science*, 1991, **252**, 312.
[7] Sumio Iijima, *Nature*, 1991, **354**, 56.