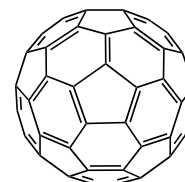


# Fullerenes

**Alfa Aesar**<sup>®</sup>  
A Johnson Matthey Company

The discovery of a third form of elemental carbon has instigated much of the modern field of nanotechnology. Researchers Harold Kroto,<sup>1</sup> 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 form a soot which contained clusters of carbon atoms, of which C<sub>60</sub> 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<sub>60</sub> molecule consists of 12 pentagons and 20 hexagons joined together rather like a "football" (or an American soccer-ball). Significant scientific debate,<sup>2</sup> followed the isolation of the material, particularly about its hypothesised structure. It was not until, Wolfgang Krätschmer and Donald Huffman<sup>3</sup> discovered a method to produce multigram quantities, that the structure of C<sub>60</sub> could be fully confirmed.<sup>4-6</sup>



During 1991, Sumio Iijima,<sup>7</sup> 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 Smalley were awarded the Nobel Prize for Chemistry in 1996 in recognition of their discovery of Fullerenes.

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# Fullerenes

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

## Nanotubes

44276	Aqueous dispersant for multi-walled carbon nanotubes
41548	Fullerene, buckytube/nanotube, single walled, as-produced
44508	Fullerene, buckytube/nanotube, single walled
44501	Fullerene, buckytube/nanotube, single walled, >60% SWNT
44691	Fullerene, buckytube/nanotube, double-walled, 80%
44945	Fullerene, carbon nanotube, multi-walled, 3-20 nm OD, 1-3 nm ID, 0.1-10 micron long, 95%
44790	Fullerene, carbon nanotube, multi-walled, <8 nm OD, 2-5 nm ID, 0.5-2 micron long
43839	Fullerene, nanotube, multi-walled, 20 nm OD, 5-20 micron long
43197	Fullerene, buckytube/nanotube, multi-walled, ground core, 3-24nm OD, 0.5-5 micron long, 60+% (by area)
44192	Fullerene, nanotube, multi-walled, 20-50 nm OD, 5-20 micron long
42886	Fullerene, nanotube, multi-walled, as-produced cathode deposits, core and shell
41549	Fullerene, buckytube/nanotube, multi-walled, ground core, 7-12nm OD, 0.5-10 micron long
44197	Fullerene, nanotube, multi-walled, 20-50 nm OD, <1 micron long

## Fullerene C<sub>60</sub>

39722	Fullerene powder, 99.5% C <sub>60</sub>
L13720	Fullerene, C <sub>60</sub> , 99.5+%
42007	Fullerene powder, 99.9+% C <sub>60</sub>
42008	Fullerene powder, sublimed, 99.92+% C <sub>60</sub>



## Fullerene C<sub>70</sub>

39720	Fullerene powder, 97% C <sub>70</sub>
42601	Fullerene powder, 98+% C <sub>70</sub>
42600	Fullerene powder, 99+% C <sub>70</sub>



## Fullerene C<sub>60</sub> and C<sub>70</sub>

41181	Fullerene powder, mixed refined, typically 73% C <sub>60</sub> , 22% C <sub>70</sub> , higher 5%
40968	Fullerene powder, mixed refined, typically 77% C <sub>60</sub> , 22% C <sub>70</sub> , <2% higher
40970	Fullerene powder, mixed, typically 98% C <sub>60</sub> , 2% C <sub>70</sub>
36202	Fullerene powder, mixed, 2-12% C <sub>70</sub>
40967	Fullerene powder, mixed hydrogenated, typically 77% C <sub>60</sub> H <sub>x</sub> , 22% C <sub>70</sub> H <sub>y</sub>
41182	Fullerene powder, hydroxylated, C <sub>60</sub> (OH) <sub>n</sub>
40971	Fullerene soot, as produced

## References

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