

Carbon Nanotubes: Structure, Properties and Applications

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Discovered in 1991 by the Japanese scientist Sumio Iijima, carbon nanotubes (CNTs) are a molecular-scaled cylinder made up of carbon atoms. They are characterised by a hexagonal structure showing remarkable characteristics. With a radius of some nanometers, the length of the cylinder can be tens of microns long.

CNTs are of great international interest because of their extraordinary electronic and mechanical properties. Thousands of papers on nanotubes are published each year. In this talk, an introduction to the structure and the exciting field of the properties of CNTs is given. Especially elastic and vibrational properties of CNTs are studied in detail with a focus on the nature of their long-wavelength acoustic phonons. The latter are particularly relevant due to their low energy resulting in one of the dominant scattering mechanisms for electrons at low bias. Thus, understanding the nature of deformations in CNTs is of crucial importance for theoretical as well as applicative perspectives.

