



Nanotechnology with graphene, nanotubes and diamond-like carbon

Andrea C. FERRARI (acf26@eng.cam.ac.uk)

Department of Engineering, University of Cambridge, UK

Carbon based materials play a major role in today's science and technology. Carbon is a very versatile element, which can crystallise in the form of diamond or graphite. Great excitement has followed the discovery of new forms of carbon, including fullerenes, nanotubes and single layer graphene. This fuels the enormous amount of research in the ever-growing field of nanotechnology.

In recent years, there have been continuous important advances in the science of carbon such as chemical vapour deposition of diamond, the discovery of fullerenes and carbon nanotubes, and the production of isolated single layer graphene.

There are also many non-crystalline carbons, known as amorphous carbons and nanostructured carbons (mixture of amorphous and graphitic carbon, nanotubes and fullerenes). Diamond-like carbons play an important role, being a key element in numerous everyday-life applications, in the information technology, telecommunications and automotive market. Their great versatility arises from the strong dependence of the physical properties on the ratio of sp^2 (graphite-like) to sp^3 (diamond-like) bonds.

Here I will review the main deposition methods, characterisation techniques and applications of graphene, nanotubes and diamond-like carbons. I will focus in particular on the use of Raman spectroscopy to fingerprint each carbon species and to extract the most relevant structural information.