

Carbon Nanotubes: Structural Study and Applications in Biomedicine

Sumio Iijima

2007 Balzan Prize for Nanoscience

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Iijima's Balzan research project was composed of two parts. The first was concerned with the characterization of atomic-level structures and physical properties of carbon nanotubes (CNTs) and their related nano-structures by means of *in situ* high-resolution electron microscopy (HR-TEM). The detail of the atomic structures of individual tubes has become increasingly important for understanding their physical properties and growth behaviors where the atomic defects are believed to play an important role. The second part dealt with the basic characterization of the CNTs necessary for biomedical applications, namely, drug delivery systems (DDS). CNTs have advantageous properties with respect to conventional DDS materials, such as liposomes and polymeric systems. They can be modified physically and chemically to meet optimum conditions for loading drugs in the inner spaces of CNTs and releasing them at specific sites and timing.

In the main, the program was conducted at Sumio Iijima's affiliation, Meijo University, Nagoya, from 2008 to 2010. Some research was performed at the Research Center of Nanocarbon Materials at the National Institute for Advanced Industrial Science and Technology (AIST), Tsukuba, a governmental organization which is also directed by Professor Iijima.