NANO HIGHLIGHT

Properties of Deformed Nanotubes

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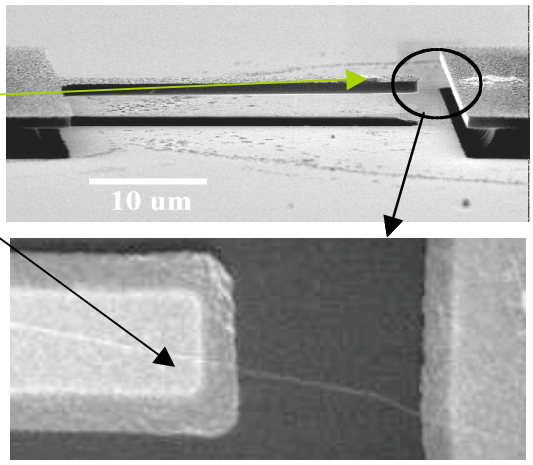
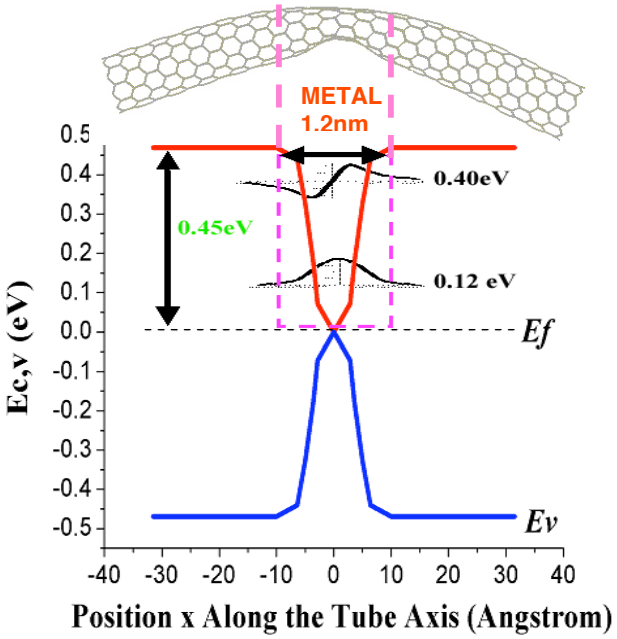
Carbon nanotubes (CNT) are one of the most extraordinary discoveries of nano-science and technology. They have extraordinary properties. We use an atomic force microscope to stretch a CNT by less than 1%, and the CNT changes from a metal similar to copper to a semiconductor similar to graphite or silicon.

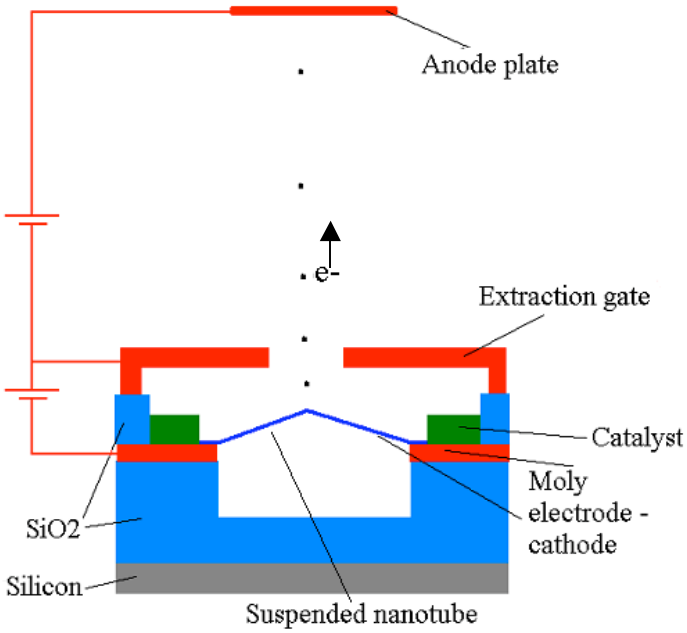
Microcantilever of atomic force microscope is deflected down to stretch CNT



Jien Cao, Qian Wang, Hongjie Dai, "Electromechanical Properties of Metallic, Quasi-metallic and Semiconducting Carbon Nanotubes under Stretching", *Physical Review Letters*, vol. 90, (2), p. 15.

By bending the SWCNT the metallic region is highly confined (to the bend) (left picture, below) offering great possibilities for new sensors (e.g. for bio-chemicals) and other devices such as a very low-noise source of free electrons (right picture) for high speed analog-to-digital conversion (for secure communications).





Alireza Nojeh, Gregory Lakatos, Shu Peng, Kyeongjae Cho and R. Fabian W. Pease, "Carbon Nanotube cross structure as a Nanoscale Quantum Device", *NanoLetters*, vol. 3, (2003), p. 1177.