



PRONT - PRODUCTION OF CARBON NANOTUBES

Ideas on utilisation

Over the past forty years of semiconductor industry development, there has been a tendency for the number of transistors fabricated in the integrated circuits to double approximately

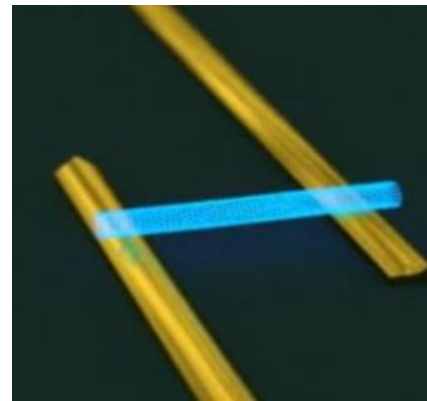
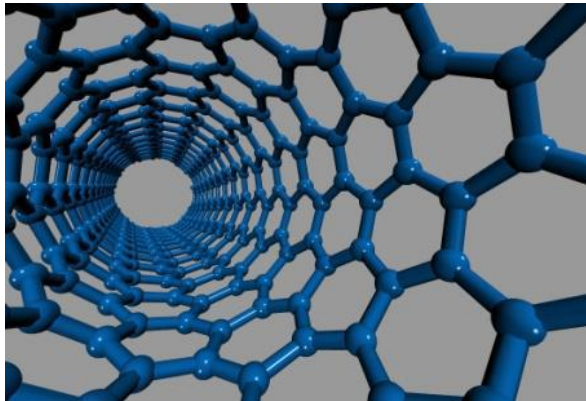


Fig.1 left : A single-walled carbon nanorod. Fig.2 right: CNT based transistor.

every 18 months. This trend, known as Moore's Law, was realized by downsizing the transistors. However, the silicon-based technology currently established on the market has now reached its physical limits: the transistor size can not be further reduced without considerable effort. As a solution to the existing problem, carbon nanotubes (CNTs) can be used as active elements of the transistors.

CNTs are tubular structures of single or multiple levels of graphite (see Fig. 1 and Fig. 2) and possess exceptional electronic and thermal conductivity as well as high mechanical tensile strength. Single-walled CNTs can be both metallic and semiconducting - the electronic properties of each tube depend strongly on its structure and diameter. The "ProNT" team will be involved in the production and distribution of identical custom-made semiconducting CNTs for laboratories and industrial needs. With a new scalable technology, the production of such "ready-to-use" nanotubes is possible for the first time in large quantities.

Potential adopters of technology

Our products will be used to develop and manufacture new CNT-based products. Semiconducting or metallic CNTs are innovative materials used in microelectronics, especially in CNT-based microprocessors, in chemical sensors and biosensors, in flexible electronics for CNT-based TFT devices, in the solar industry, in novel batteries, in nanophotonics and find their application in thermoelectrics. Our goal is to provide optimally designed CNTs for individual requirements for customers from research and industry.



Advantages of technology

- We offer "ready-to-use" single-walled CNTs with defined electronic properties that require no further sorting steps. Such a type of high purity single-walled CNTs are not yet available on the market.
- By lowering the price level, we will make the CNTs and their applications affordable.
- Our process enables sustainable products and manufacturing processes - so (almost) no admixtures or catalysts are required.

Market and context of technology

- The currently commercially available materials are predominantly mixtures of metallic and semiconducting CNTs. These products have to be laboriously, costly and time-consuming cleaned up in order to be able to be installed in applications. As a result, users are currently losing valuable time and resources. Currently available methods for separating the synthetic mixtures of semiconducting and metallic CNTs are not efficient enough to allow economical use. Therefore, only small amounts of CNTs are produced at relatively high cost.
- The patent application for the manufacturing process has already been filed.
- The concept of utilization proposed by us offers in principle new products that have a great potential for change in manufacturing processes in the semiconductor industry.
- A hurdle for entering the market is the lack of industrial users who can use CNTs for mass production. Therefore, the start-up will be involved in the development of CNT applications "from lab to fab" in addition to the production of CNTs. through close cooperation with scientific and industrial customers.