



Nanomaterials

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Applications of nanomaterials

Information and Communications

Nano-technology has enabled many advances in **computer memory**, increasing storage size, reducing power consumption, and increasing speed. These three factors will enable sophisticated computer controlled devices in the future.

Nano-RAM (or NRAM) is a random access memory that uses **carbon nanotubes** to determine the state of the memory element, comprising an information bit. This memory is a non-volatile device meaning that its cells maintain their information regardless of whether or not power is supplied to the system (the carbon nanotubes keep their mechanical position whether or not power is supplied). NRAM (which is a proprietary computer memory technology) has been projected to be of **very high density and low cost**.

Environmental Applications

Environmental pollution of air, soil and water, including the impact of **toxic waste** in landfills, is a major concern across the world. Using nanotechnology, scientists are designing new catalysts for waste remediation, and for conversion of toxic gases into benign components. These designs take advantage of the large surface area of nano-materials and of the novel properties and reactivity that arise at the nanoscale. New, efficient filters to trap mercury, heavy metals and other hazardous substances are developed, using carbon nanotubes and other nano-materials.

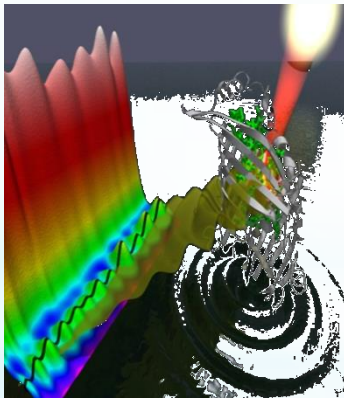
Nanotechnology in Energy Applications

More efficient and cost effective technologies for energy production

Solar cells

Fuel cells

Batteries



Solar Cell

Lithium-ion batteries

Nanotechnology and its
Applications to Fuel Cells

Development of Solar Cells

It is about 100% efficiency nano-solar cell. Despite its small size, it gives an impression about the future of nano-solar cells and the use of nanotechnology in the field of energy production.

Nano-materials are beginning to play a prominent role in developing other alternative energy technologies. Much of the solar cells produced worldwide today rely on bulk crystalline technology which competes with the computer industry for the silicon raw material. This is not a desirable situation, since both solar energy and computer electronics are critical technologies with high demand and expanding volumes. Alternative research directions include novel nanomaterials such as quantum dots to increase efficiency; and production of solar cells on flexible substrates (like plastic, thin metal sheets). Lightweight and high strength composites for *wind turbine blades* are being developed using nanocomposites to harness wind energy.

Biomedical Applications

Biomedical Applications

Nano-technology is expected to have a significant impact on improving the quality of health care through early and reliable **diagnostics of diseases**, better drugs, targeted drug delivery, **improved implants**, and other applications.

Biomedical Applications

Detecting Cancer Cells

