

NANOTECHNOLOGY

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ABSTRACT

Imagine the chips embedded in the human body reporting every body movement and just waiting to strike at those nasty bacterial invaders, clothing smart enough to monitor out health and save us from environmental hazards, huge buildings and machines having the capability to repair and adjust themselves to the vagaries of the environment, or a regular wristwatch doubling up as a supercomputer. Thanks to nanotechnology, all of these wonders, and many more, are possible. This paper mainly contains about Nanotechnology and its ‘various’ applications.

INTRODUCTION

Scientists have been trying to understand the nature and through research in various disciplines such as physics, chemistry, Botany, Zoology etc. It is the study of properties of a few tens of atoms in a space of less than say 50 nm. “It is amazing what one can do by just putting atoms where you want them” says Richard Smalley, co-discoverer of Buck ball in 1985 winner of a Nobel Prize. It has revolutionized the basic sciences and has given rise to a new discipline, called Nanoscience, which is gradually proving to be the nucleus around which all

existing sciences will prosper. Nanotechnology is the study and use of materials, devices and systems on the scale of a nanometer. If we can learn to manipulate the characteristics of individual atoms we can revolutionize the fields of utter importance.

An idea is nothing but a spark of intelligence, call it a brainstorm or power infinite. Nanotechnology was conceived in Southern California in 1969, when Nobel Laureate physicist Richard P. Feynman gave a new-famous lecture at the California Institute of Technology in Pasadena. The talk was titled “There’s Plenty of Room at the Bottom” and it outlined the theoretical concept of manipulating atoms to build the molecules. At that time, people were quite apprehensive about such a phenomenon, and termed it as neat impossible.

NANOSCIENCE AND NANOTECHNOLOGY

Nanoscience is concerned with nanomaterials, i.e. materials that are at least one of the dimensions of about 1 to 10 nanometers. The word ‘nano’ comes from the Greek word “nanos” meaning dwarf. The term nano is the factor 10^{-9} or one billionth. Just to get a feeling of the size, we note that the diameter of one hydrogen atom is 0.1 nm. Five atoms of carbon would occupy a space about 1 nanometer wide. It would take 5 million carbon atoms to make a dot as big as the period at the end of this sentence. The width of a DNA molecule is 2.5 nm. These reduced dimensional systems have novel electronic, chemical, mechanical and optical properties.

AIRPORT SECURITY’S

After the 9/11 disaster, airports all over the world have gone for the highest security check-ins. The Regional Airport Authority of Louisville is banking on nanotechnology to counter any external terrorist strike. According to them new devices for baggage screening will be tiny enough to be wells between ticket counter positions to scan each bag as the passenger checks it in.

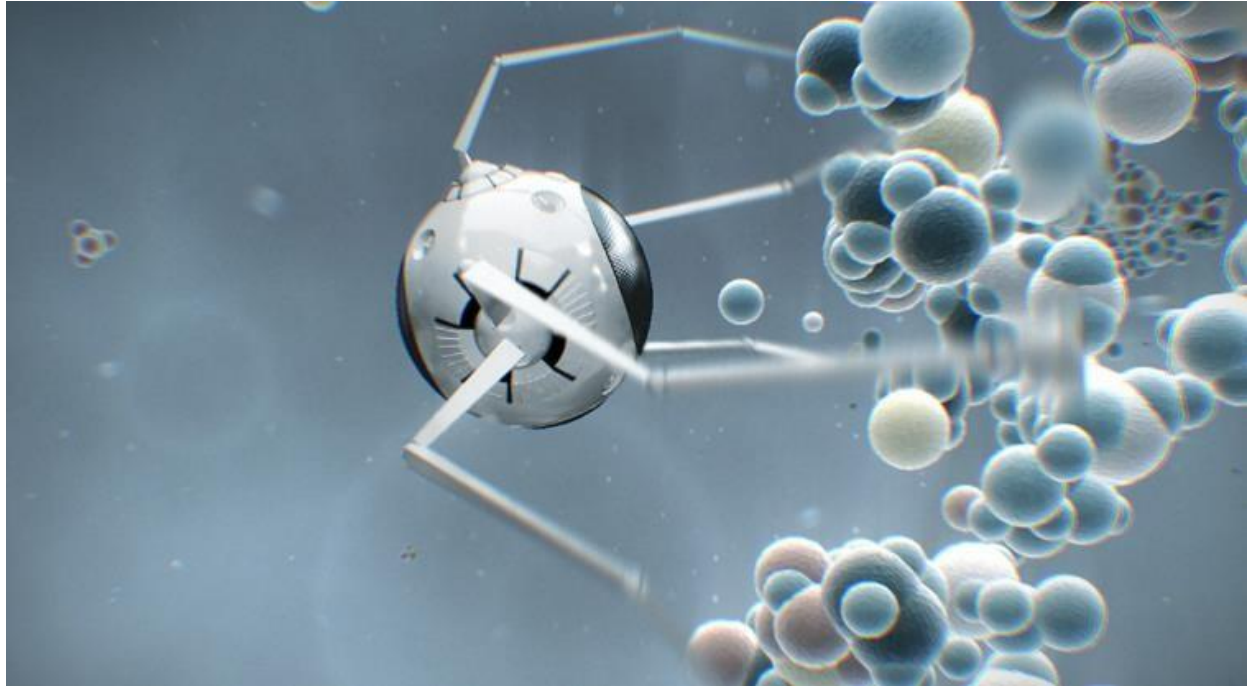
NANOTECHNOLOGY IN CLOTHES



FIGURE(1) CLOTHING WITH SENSOR, COMPUTERS AND MOTORS

“Smart dressing for smart people” seems to be the catch-line for the textile industry. With nanotechnology, even the finest textile fibers could have sensors, computers, and motors embedded in the fabric. The micro granules that form the basic molecular structure are smaller than a grain of sand, thereby forming a barrier that causes heavy liquids and stains to gently roll off. The fabric sensors ensure that garments resist fading or crumpling, and also monitor the body odour. Likewise, clothing would be smart enough to change according to the ambient temperature. It will keep you warm in winter or cool and dry in summer. In the future, we could have garments that clean and mend themselves, and grow or shrink to fit a variety of shapes and sizes.

NANOROBOTS



The nanorobots have two spaces which should be considered separately its interior and its exterior. The nanorobot exterior will be exposed to the diverse chemical brew that makes up our human biochemistry. But the interior of the nanorobot may be a highly controlled environment, possibly a vacuum, into which external liquids cannot normally intrude. Each species of medical nanorobot will be designed to accomplish a specific task. The machines, or ‘nanorobots’, would have onboard sensors and computers. Before being sent into the body, they would have to be programmed with a set of characteristics that lets them clearly distinguish their targets from everything else.

NANOTECHNOLOGY IN MEDICINE



However science has progressed through course of time, it has still not found a cure for common cold. With this in mind, doctors, scientists, and researchers all over the world are looking at nanotechnology for finding the necessary breakthroughs. With nanotechnology, it is possible to guard human body against harmful diseases. Consider tiny nanomachines embedded in our body performing their duties as disciplined soldiers with clock work precision. Their work involves detecting intruders (virus or foreign cells), isolating them at a particular junction, and finishing them off before they can potentially cause any further harm.

ADVANTAGES

- Nanotechnology can actually revolutionize a lot of electronic products, procedures, and applications. The areas that benefit from the continued development of nanotechnology when it comes to electronic products

include nano transistors, nano diodes, OLED, plasma displays, quantum computers, and many more.

- Nanotechnology can also benefit the energy sector. The development of more effective energy-producing, energy-absorbing, and energy storage products in smaller and more efficient devices is possible with this technology. Such items like batteries, fuel cells, and solar cells can be built smaller but can be made to be more effective with this technology.
- Another industry that can benefit from nanotechnology is the manufacturing sector that will need materials like nanotubes, aerogels, nano particles, and other similar items to produce their products with. These materials are often stronger, more durable, and lighter than those that are not produced with the help of nanotechnology.

DISADVANTAGES

- Included in the list of disadvantages of this science and its development is the possible loss of jobs in the traditional farming and manufacturing industry.
- Atomic weapons can now be more accessible and made to be more powerful and more destructive. These can also become more accessible with nanotechnology.
- Since these particles are very small, problems can actually arise from the inhalation of these minute particles, much like the problems a person gets from inhaling minute asbestos particles.
- Presently, nanotechnology is very expensive and developing it can cost you a lot of money. It is also pretty difficult to manufacture, which is probably why products made with nanotechnology are more expensive.

CONCLUSION

New tools are underway which will be equipped with Nano devices capable of replacing many cellular types of machinery efficiently. Use of nanotechnology could permit rapid advances in agricultural research, such as reproductive science and technology which will produce large amount of seeds and fruits unaffected by season and period, early detection of stresses and alleviating stress effects and disease prevention and treatment in plants. Nanotechnology covers a lot of domains today and will cover a lot more in the near future, it is infinitely big and will make a lot of inventions come true. I'd love to see the future with nanotechnology in daily life

REFERENCE

- Ghormade V, Deshpande MV, Paknikar KM 2011 Perspectives for nanobiotechnology enabled protection and nutrition of plants. Biotechnol. Adv. 29: 792 803.
- <https://en.wikipedia.org/wiki/Nanotechnology>