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A perspective review on nano technology

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Abstract

We discuss here about the analysis of qualitative nano technology. Nano Technology has been developed in several fields of studies including Physics, Chemistry, Biology, Material Science, Engineering as well as Computer Science. It is directly beneficial to medicine and environment. While taking advantage of this new technology for high sensitivity sensor, Automobile with fuel efficiency, Low-Cost flat Panel displays, New Generation Computer chips and its applications in the field of research, specially focused in development of nano-bio-info technologies. Science needs to examine the environment and health implications.

Keywords: Nano sensors, quantum dots, nano capsules, nano tubes, carbon allotropes, nano imprint lithography, glass matrices

Introduction

Nanotechnology is the application of new techniques and knowledge of material behaviour at the nano scale. It is use of matter on an atomic, molecular and supra molecular scale for industrial purpose. It is define as the manipulation of matter with at least one dimension sized from 1 to 100 nanometers. Nano Science and technology is progressing in India as very speedy way and a number of products are made in various fields as is Health Care, Medical field and Agriculture fields etc. Few of them are discussed here.

Development in Nano technology: Nano technology may be able to create many new materials and devices with a vast range application, such as in nano medicine, nano electronics, bio materials energy production and consumer products. It creates new opportunities in bio medical research and clinical applications. High-quality nano materials, of well-controlled size and shape, are a new class of building block to enable the establishment of assays for monitoring molecular signals in biological systems. New nano assays have higher sensitivity, selectivity and throughout than conventional bio-analytical methods. These assays are capable to detect bio-chemical changes at single-molecule level in living cells. These assays will lead to low-cost, point of care devices for rapid diagnosis of pathogenic and genetic diseases.

Semi-conductor nanocrystals (quantum dots, QDs) can be fabricated using a number of technologies, Few are given here QDs can be developed in glass matrices, porous glasses, ionic crystals, zeolites, polymers, on crystal substrates and as composite semi-conductor-glass films etc. Fabrication of QDs means the diffusion-controlled by growth process and study the characteristics with optical properties. It attract because of their high optical quality, low cost, stability of nano crystals for long duration and large optical non-linear properties. Many new technology including concern about the toxicity and environmental impact of nanomaterials, and their potential effects on global economics.

High-Sensitivity Sensors: Nano bio sensors & probes have been developed to study interaction at cellular molecular level. Biosensors convert a biological response into an electrical signal. All the parameters depend on the size of nano material's. The chemical reactions are increased by a decrease in the grain size. Typical applications for sensors made out of nano crystalline material are smoke detectors, ice dectectors on aircraft wings, automobile engine etc.

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Automobile with fuel efficiency: The spark plug did not burn the gasoline completely & efficiently they causes environmental pollution. Since nano material's are stronger, harder & much more wear-resistant, they are used as spark plug. These electrodes render the spark plug longer-lasting & combust fuel far more efficiently and completely. In many applications the high energy density batteries are used, because of conventional & rechargeable. The storage capacity are quite low requiring frequent recharging. Therefore no longer life of these type of batteries. Nano crystalline materials are based on sol-gel techniques & separating the plates, which can hold considerably more energy than their conventional counterpart.

High-Power Magnets: The strength of a magnet is measured in terms of coercivity & saturation magnetization values. These values increase with a decrease in grain size & increase in surface area of the grains. The nano crystalline materials possess very unusual magnetic properties due to their extremely large surface area. Typical application of these high power rare-earth magnets include automobile alternators, land-based power generators, motors for ship & magnetic resonance imaging for medical diagnostics.

Low-Cost Flat Panel display: Flat-panel displays covers huge market in the laptop computer industry. By using this the manufacturing cost of the display in significantly reduce. The display constructed out of nano material's posses much more brightness & contrast.

Health Care: Nano sensor has been developed now to detect Typhoid and other diseases and such types of detection kit has been made now. Typhoid fever caused by Salmonella typhoid is a serious health problem and a challenge to health authorities. It is mainly caused due to unsatisfactory water supply, poor sanitary conditions, malnutrition; emergence of antibiotic resistant spraying etc, in India. Typhoid fever is responsible for two to five percentages of all deaths in some parts. Generally wide test is performed for the diagnosis of Typhoid. The test is done with single serum sample, which do not provide the correct information of infection. Now recombine DNA technology and immunological technique for rapid diagnosis of Typhoid infection within minutes for initiating early treatment and saving human life.

Very important factory is Nanozymes. It is simply nano materials with having enzyme-like characteristics. They are an emerging type of artificial enzyme. These are applicable in bio sensing, bio imaging, tumor diagnosis and more. Nano material's are used in paints to improve UV protection easy to cleaning.

New-Generation Computer chips: All the electronic applications are based on microelectronics industry and they has been emphasizing miniaturization. The circuits are reduced in size as transistors, resistors and capacitors. By significant reduction in size, the microprocessors, which contain these components can run much faster, however, these are several technological impediments to these advancements, including lack of the ultrafine precursors to manufacture these components, because of faster speed. It has great success, lighter weight, increased electrical conductivity and chemical reactivity compare to their large scale equivalent.

Applications: Nano materials are used in a variety of manufacturing processes, products and health care including paints, filters, insulation and lubricant additives. Nano composite materials improve the vehicle fuel efficiency and corrosion resistance. They are lighter, stronger and more chemically resistant than metals. Nanoparticles in pharmaceutical products improve their absorption within body and make them deliver. Nano fibers in fabrics can enhance stain, water and flame resistance without increase in weight, thickness and stiffness of fabrics. Carbon nanotubes have variety of commercial uses, including making sports equipment stronger and lighter weight. Circuit made from carbon nanotubes could be vital in maintaining the growth of computer power also. Nano sensors are used to accurately identify particular cells or substance in body.

There many other important developments atomic force microscope (AFM) and scanning tunneling microscope (STM) are scanning probes that launched nano technology. The tip of a scanning probe can also be used to manipulate nanostructures. The other techniques of nanolithography such as optical lithography, X- ray lithography, dip pen nano lithography and electron beam lithography are developed.

Conclusion

The use of nanomaterial in biomedical diagnosis and drug delivery has been studied extensively. Nano sensors for *in vitro* detection are coming of age and, in the near future, some point-of-care devices for rapid detection of biomarkers of diseases will come to market. By contrast, it will take a much longer time to introduce nano sensors for clinical trials, in part, because of toxicity of nanomaterial.

Thus the field of Nanotechnology appears very promising. It is creating new industries across a wide range of fields and attracting interest as an infrastructural technology for enriching society. At last, we can say that such existing progress has been made but significant challenges still remain. These are just a few of thousands innovations that nanotechnology impacts on society. The main objective of the study is to identify the effect of nanomaterial on society.

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