

New Technology Nano Technology And its applications

Kumari Manisha

Department of physics, Himachal Pradesh University, Shimla (H.P.).

Abstract: Very tiny particles which having size of 0.1nm to 100nm refer as nanoparticles. The range of environmental application nano particle properties is very suitable. In this century Nanotechnology is a new frontier for this world. We can classify the nano material based on their dimensions. Applications of nanotechnology in the various different fields such as electronics, environment, medicine and energy. The applications of these particles we find in protein, cancer, drug delivery, peptide delivery and many more.

Keywords:- Nano material, Nanotechnology, Applications, Future.

Introduction :- Nanotechnology is the technology which manipulate and control the substance at the nano meter scale (one billionth of a meter). It is the branch of science devoted to producing, designing, using structures and system deals with 0.1 nm to 100 nm scale. At this scale we considered the interacting groups molecules and individual molecules which relate the properties of bulk macroscopic materials and devices. The fundamental molecular structure allows the control on macroscopic physical and chemical properties. The tools permit the control all over the different characteristics of agents and drugs such as :-

- a. Alteration in blood pool and in solubility retention time.
- b. The control released over the long and short durations
- c. Environmentally controlled released and very high specific site –targeted delivery.



Figure 1: Nano structure

Applications of nanotechnology:- Nowadays nanotechnology is progressing unstoppably. Applications of nanotechnology commonly incorporate in medicinal, energy and industrial uses. Due to its versatile nature we can modify them to physiochemical properties, cancer treatments, hydrogen fuel cells, nano scale electronics, vaccines and nano graphene batteries.



Figure 2: Applications of nano technologies as a new frontier.

Nanotechnology where we used the smaller sized can adjust the molecules of the material and substance at the level of nano scale which after that used in mechanical properties of the material. Nano materials are used in treating chemotherapy for tumour cells, glaucoma, many vaccines like hepatitis and also to produce large immunity to pathogens. We monitored the glucose level of the patient by nano devices.

1. Energy :- The advancement in these technology task towards power are:- storage, manufacturing, developing the material, transformation, power saving and implementation to improve alternative power.

1.1 Reduction of energy consumptions :- A less power intake only achieved by insulating material techniques. In the transport industry less heavy and provide more powerful material. Nano technology and their techniques are used in lights which turn roughly 5% power into wild .By using the nano techniques like huge caged atoms or light emitting diodes can lead strong less power intake for the illumination.

1.2 Increasing efficiency of the energy production:- Solar panel which are levelled with several different types of semiconductor placed together at different effort but they still handle only the use 40% of solar energy. Nanotechnology could enhance the help to increase the performance b using nanostructure. The efficiency level of the internal combustion engine is 30 to 40 % currently. Scientists at university of Toronto in 2005 designed a spray which instantly transforms to a solar panel when the spray on nano particles content.

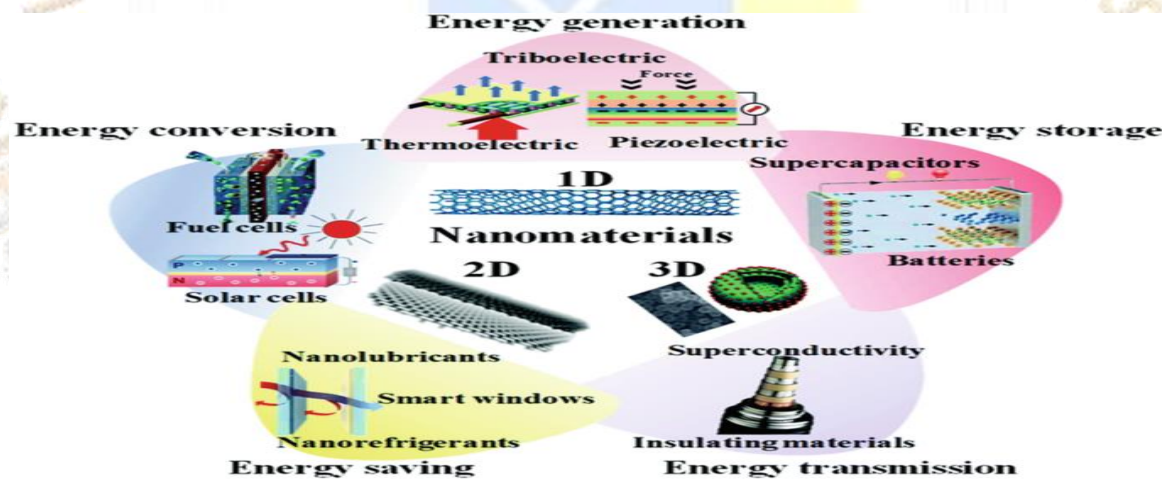


Figure 3: Application of nano particles in energy

2. Medicine:- Nano material are designed to interact cellular level. Those interactions at molecular level with tissues and living cells. Nano material and their devices are very important product in biomedical engineering. Through high grade of very useful precision they are used in medicine and physiology and

provide a high degree of integration among biological system. Applications of nano medicine and nano material comprise the level of biological fluorescent, lipids, proteins, drug delivery, detection of DNA structure, tumour detection, pathogen, MRI, nano machinery and purification the biological molecule.



Figure 4: Applications of nano technology in medicine

2.1 Tissue engineering :- Tissue engineering techniques are used to improve and restore the lost functions of tissues. Tissue engineering techniques present very promising role in the last past decades even compared to traditional therapy. These techniques excite for making of osteoblast. Nano technology plays great role in tissue engineering.

2.2 Cancer therapy :- In cancer therapy the tumour cells are burned by atomic oxygen generated by laser. The atomic oxygen is very cytotoxic and it destroys the toxic cells. It destroys only the toxic cells. It destroys only the tumour cells by laser radiation and not affects the normal cells.

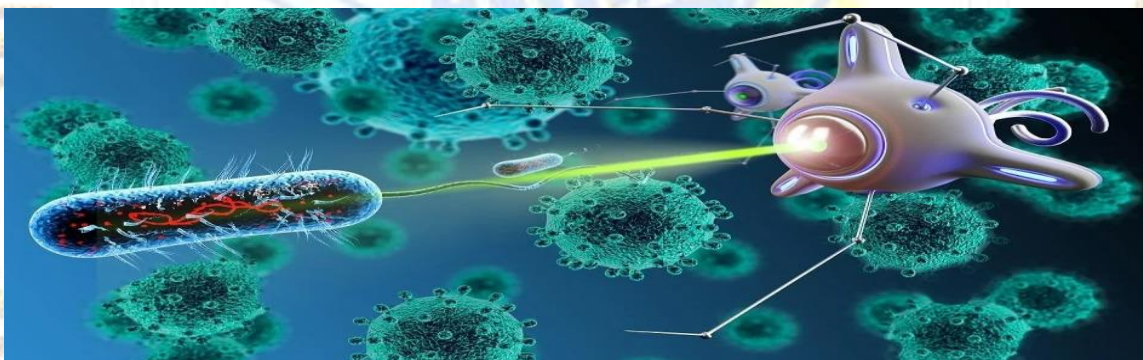


Figure 5: Applications of nano technology in cancer therapy.

3. Agriculture field :- Nanotechnologies are used in these days in pesticides and fertilizers. Different types of practises could be done on soil which is long term experiments and collect the data for soil properties. Plant growth used fertilizers, nano particles have properties to crop improvement and less eco toxicity where nano particles acts as fertilizers. Nanoparticles control the plant pests like many diseases of tomato and lettuce which only reduce by chemicals. But nowadays bio nanoparticles revealed it's very effective to increase the morality. Nano material such as zinc oxide, copper oxide, magnesium oxide and magnesium hydroxide synthesized by chemical and physical method. Nano particles can be used as nano fungicides. By different research it is found that its usages as eco friendly particles. The most important application nanotechnology is that it is also used for controlling plant virus.

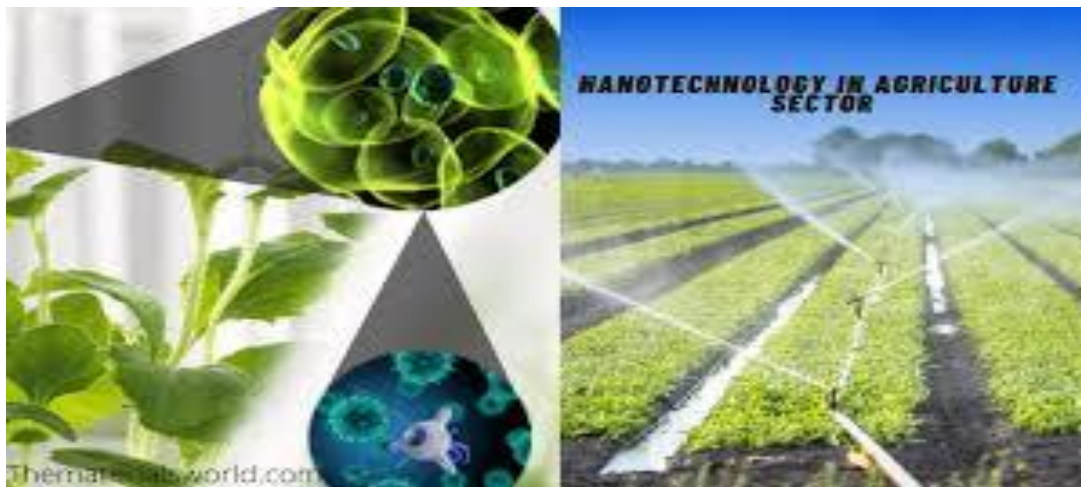


Figure 6: Application of nano technology in agriculture field.

4. Applications in industrial areas:- 4.1 :- Nano manufacturing :- There are two ways to able and manipulate the objects from atomic and molecular level to manufacturing perspective. First, using the material at the nano scale level by increasing the surface area of the material at same weight of the material used in which is very valuable in manufacturing operation. Second, at the nano scale the quantum affect arise which we cannot deal with large sized objects. The importance of manufacturing of quantum effects that these effects on optical, electrical and magnetic properties of the materials. We can combine the material by desirable properties.

4.2:- Semiconductor industry:- Nano material manufactured the semiconductor chip like carbon nano tubes (CNT). Rudimentary computes are completely based on CNT transistors silicon nano wires silicon nano wires (near diameter to 1nm) to build the tiny transistor of semiconductor chip (known as gate-all around).

4.3:- Solar industry and battery industry:- The solar industry explore the nanoparticles and by fabrication process it reduce the cost of solar panel and increasing their efficiency. Single wall carbon nano tubes (SWNTs) form the p-n junction diode and showing the effect of photovoltaic cell. Many companies experiments on batteries that electrolytes, anode and cathode are made with nano materials.

Many of the batteries made from non-aqueous lithium oxygen by using these batteries can eliminate the need of cathodes. Using germanium nano wires use with improvement of lithium ion coated with silicon.



Figure 7:- Application of nano technology in industrial field.

5. Drug delivery:- A big revolution in the medical field of drug devices made from nanofabrication techniques. For example - nano diamonds (NDs) released in medicine into the body for controlled. In cancer treatment many of the clusters of NDs to ensure the separation from healthy cells. Numerous use of nano gels in drug delivery to a better implementation on therapy.

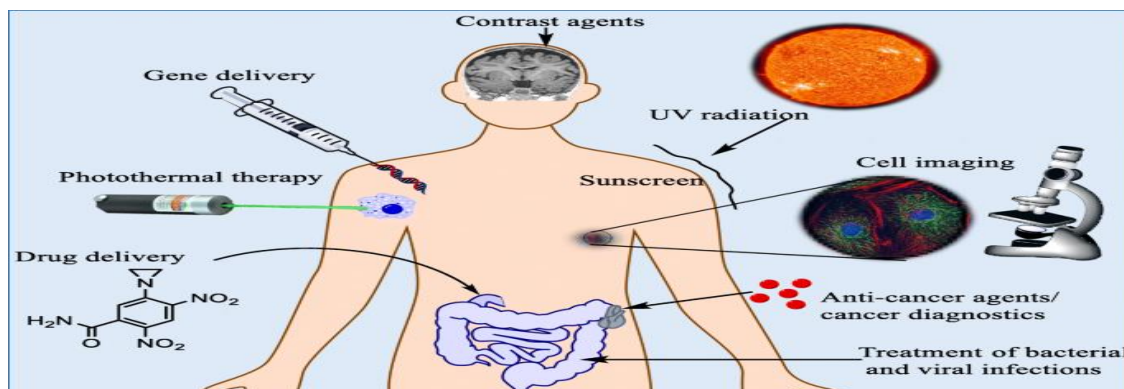


Figure 8:- Application of nano technology in drug delivery.

There is another application of nano manufacturing techniques use in thin films for drug delivery.

References:

1. Department of chemical engineering, Shivajiroa S.Jondhale College of Engineering, Dombivli (E), University of Mumbai, India.
2. Department of Biotechnology, Guru Govind Singh Indapastha University, Dwarka Sec- 16 C, Delhi.
3. Dean, Faculty of science, Department of Physics, Parishkar college of Global Excellence, Jaipur.
4. Department of Pharmacy, MS Ramaiah College Pharmacy, Bangalore, Karnataka, India.
5. Department of Biotechnology, AMITY University, Noida, UP, India.
6. School of Life Sciences, Department of Molecular Biology and Bioinformatics, University of Wolverhampton, UK.
7. Department of Pharmacology, TRR College of Pharmacy, Hyderabad, Telangana, India.
8. National Institute of Advanced Industrial Science and Technology AIST.
9. Department of Nano biotechnology, Faculty of Science , Razi University, Kermanshah, Iran.
10. Advanced Dental Environmental Health Engineering, School of Dentistry, Kermanshah University of Medical Sciences, Kermanshah, Iran.
11. Faculty of Computer Science and Information Technology Dronacharya College of Engineering Farrukhnagar, Gurgaon, India.